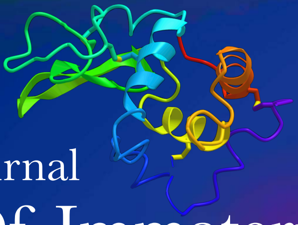
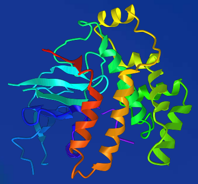
Solvent Misconduct
How a flask of DMSO nearly lost me my job

99.99% Pure Cookies
In the kitchen with Ligma-Aldrich

The Flatom
A novel atomic theory, based on a flat earth





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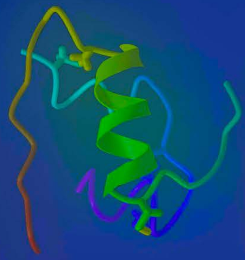

THE PUTIN PROTEIN

An Illiterature Review

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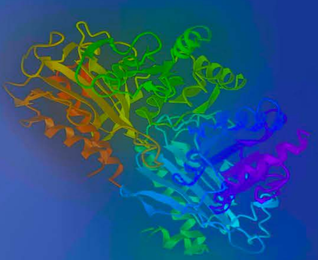

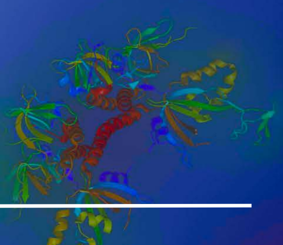

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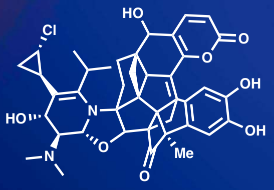

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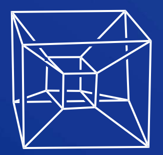

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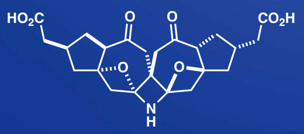

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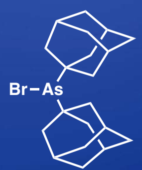

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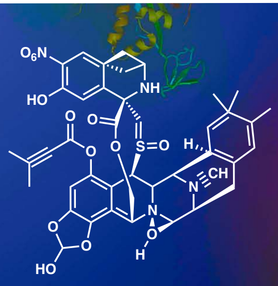

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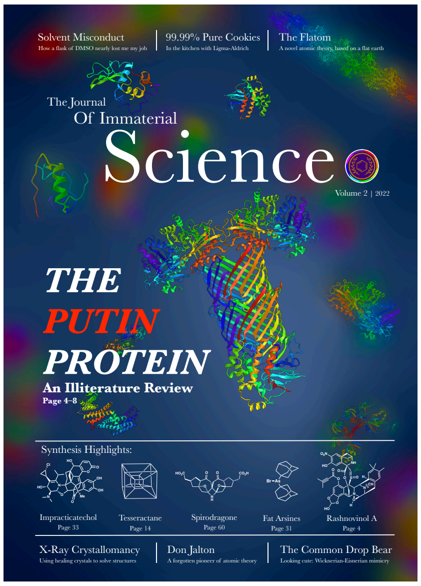

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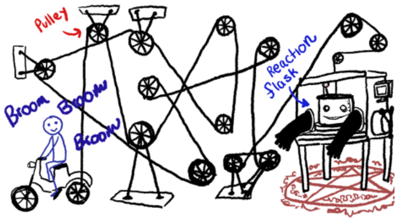

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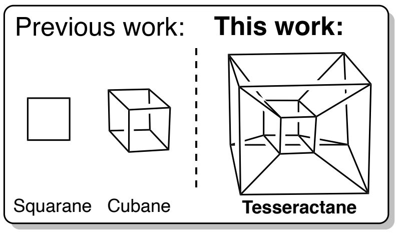

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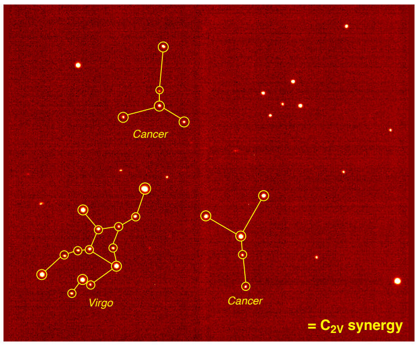

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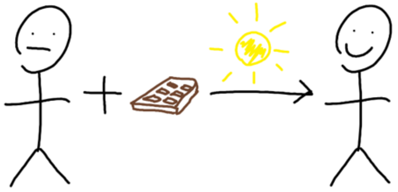

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Acknowledgments

The editor wishes to thank Admiral Danger and Jeff Vader for copyediting, and Legate Beef-Cheeks for moral support. The editor also acknowledges the fine work of B. McGraw, who kindly hosts *J. Immat. Sci.* at www.jabde.com

Image credit (front): Cozzie the Mozzie

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Perspectives

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ORGANIC CHEMISTRY

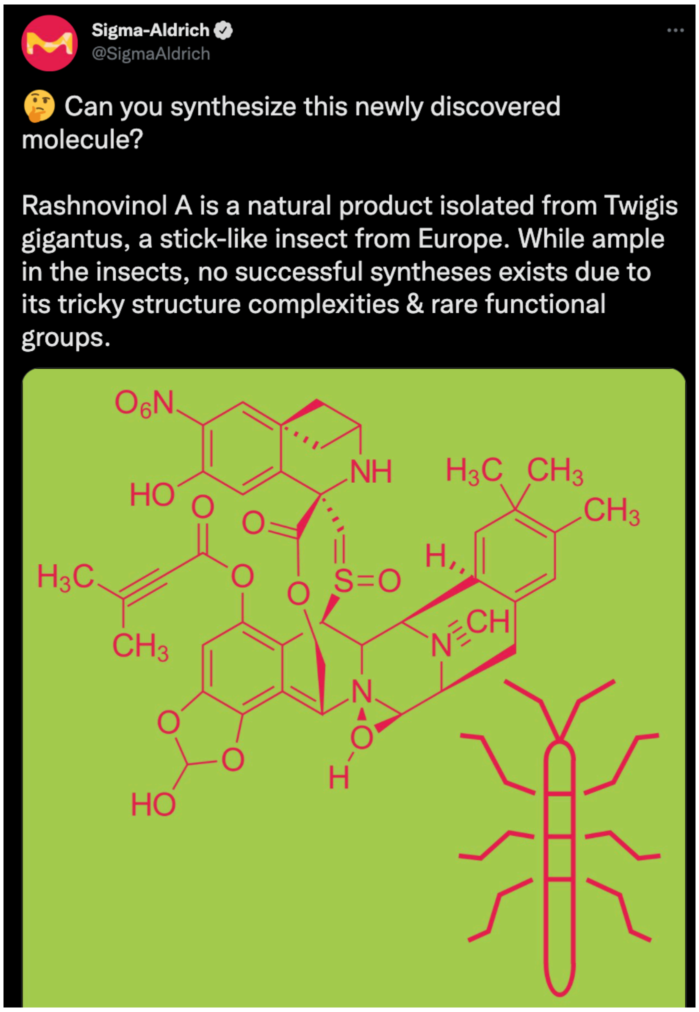
A Total Synthesis of Rashnovinol A

Thomas Baloney,[A] Robert Woodwood,[B] Burnie Urethra,[C] Jakob von Grünfeld[D] and Günther Schlonk[E]*

Abstract: Ain't nobody does bullshit chemistry like we do.

Specific: On April 1st 2022, the well-known fine chemical company Sigma Aldrich published the structure of a novel natural product: Rashnovinol A. The authors claim to have isolated this bizarre molecule from *Twigis gigantis*, (a European stick insect), and assigned a structure incorporating a number of unconventional functional groups. If this assignment is accurate, Rashnovinol would belong to the family of natural products known as Elseviamines: the most difficult molecules to access (synthetically). We report the first total synthesis of Rashnovinol A, and a comparison of its spectroscopic data to the structure proposed by the Aldrich group.

When we first saw the proposed structure of Rashnovinol A, we assumed the good folks at Sigma Aldrich had been sampling some of their own products.[1] We sketched it in Chemdraw, and an error message appeared asking if we needed professional help. Among the many delightful features of this molecule are a nitrinidino group, an ester of sarcastic acid, an isonitrolyle, a hydroxaziridine and no fewer than six sp^4-hybridised carbons. The Aldrich lab presented a challenge to the chemistry community: to complete a synthesis of this absurd target. No doubt they chuckled to themselves as they laid down the gauntlet with one finger extended (figure 1). "Nobody would actually waste their time on this …"



Sigma-Aldrich
@SigmaAldrich

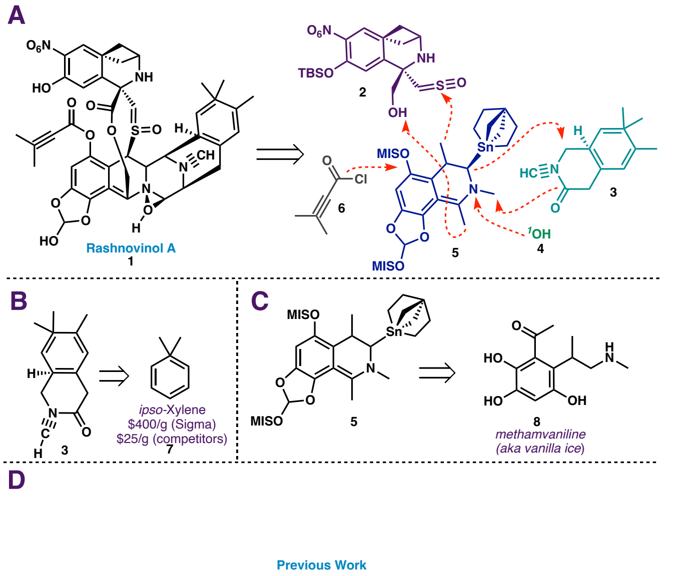
🤔 Can you synthesize this newly discovered molecule?

Rashnovinol A is a natural product isolated from Twigis gigantus, a stick-like insect from Europe. While ample in the insects, no successful syntheses exists due to its tricky structure complexities & rare functional groups.

Figure 1: S. Aldrich's original report of the natural product Rashnovinol A in the open access journal *J. Twit. Chem.*

Well, it just so happens that the 3-ethoxy-9-methoxymorphine we thought we'd isolated from poppies was actually the ethyl acetate adduct of morphine, so our group found itself with a paucity of projects and a penury of papers. We hoped that a decisive strike towards Rashnovinol A might finally free us from the shackles of *J. Brown Chem.* and permit us entry to the sunlit uplands of *JACS* (if we could beat Casey Nicolaou to it). Committed to this dubious goal, we stoked the coffee machine, imbibed a cocktail of conventional natural products, and set out to meet Aldrich's challenge.

Rashnovinol A's structure is fiendishly complex, with a contorted polycyclic skeleton supporting several mutinous moieties. Thus, a convergent synthetic strategy was deemed essential to avoid atomic attrition. Our primary retrosynthetic disconnections focused on the construction of the elseviamine core (scheme 1).



Scheme 1: Retrosynthetic analysis of Rashnovinol: A) Dismantling the elseviamine core into a sulketene (**2**), an N-hydrocarbido-tetrahydroisoquinolone (**3**), singlet hydroxide (**4**), an obstannyl isoquinoline (**5**) and sarcastoyl chloride. B) Derivation of **3** from *ipso*-xylene, a feedstock chemical. C) The street-drug methamvaniline maps onto fragment **5**. D) Previous work on Rashnovinol A.

We began with the construction of obstannane **5**. The street drug methamvaniline is readily available on a multigram scale if you know who to ask. We obtained a sample of this potent stimulant/flavouring agent and subjected it to formyl chloride and methyl-isopropylsilyl chloride (scheme 2). The resultant silane-protected amine (**9**) was cyclised at high temperature to yield isoquinoline **10**. The distribution of the olefin in **10** is logically controlled, and as such harsh conditions are required to overcome this barrier and deliver the illogically favoured product. **10** was halogenated with bromine monochloride under photocatalytic conditions, and the resultant amine **11** underwent lithium-halogen exchange with *R*-BuLi. Trapping with obstannyl chloride gave **5** as a single enantiomer in acceptable yield. The structure of **5** was secured by X-ray crystallomancy.

With the obstannane in hand, we turned our attention to the more challenging tetrahydroisoquinilone **3**. A previous study by Erhardt

A. Department of Grant Applications, UC Barclays
B. School of Chemistry, Elysian Fields University
C. Department of Pharmacy, Rural University of Penury Bridge
D. Department of Chemistry, Imperial College London, West Failure Campus
E. Department of Pyrofrolics and Inorganometallics, University of West Failure
** Corresponding author contact: günther.schlonk@onlyfans.de*

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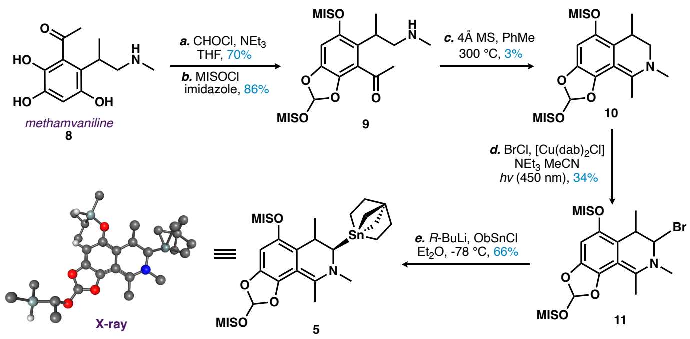
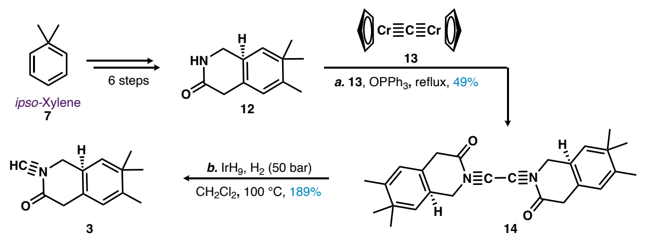


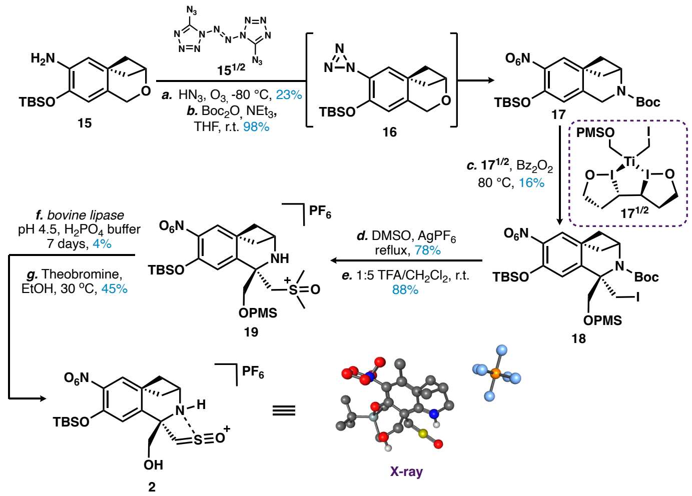
Scheme 2: Conversion of the drug methamvaniline into obstannane **5**. Spheroids at 50% occupancy, hydrogens and random OPPh₃ excluded for clarity.

Sprocket has described the conversion of *ipso*-xylene (**7**), to intermediate **12**, which was fortuitous because that looks like hard work.[2] When **12** was treated with μ-carbidochromium **13** in refluxing TPPO, a smooth conversion to **14** was observed. However, no conditions were found capable of delivering more than a 50% yield of **14**, based on starting isoquinoline. The reason for this shortfall eludes us, but the next step made up for this deficiency. Reduction of **14** with iridium hydride gave a stunning 189% yield of **3**. We decided not to look a gift yield in the mouth and moved onto the next fragment.



Scheme 3: Preparation of isonitrolyle **3** from *ipso*-xylene via Sproket's route. The structure of **13** is compliant with the octet rule: carbon has eight bonds.

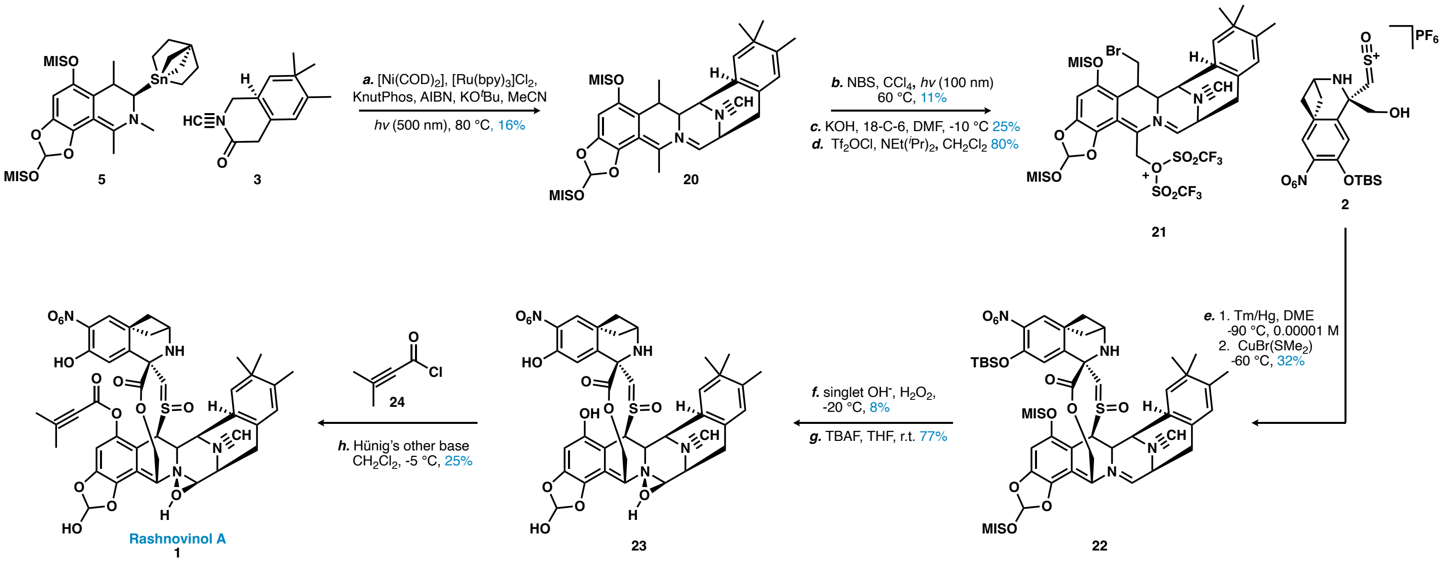
The final fragment prepared was sulketene **2**. The route to this molecule began with chromane **15**, which is commercially available (though it costs more than a yacht made of rhodium). **15** was treated with 2,2'-azobis(5-azidotetrazole) ($15^{1/2}$) in hydrazoic acid at -80 °C, under at atmosphere of ozone (scheme 4).[3] Known as the Dragosteadintei rearrangement, this reaction converts the aniline to a nitrinidino via a triaziridine intermediate (**16**). Concomitantly, the chromane core is nitrogenified via a ring-opening Fukovski-Lavrenti pnictogen-insertion chalcogen-ejection (ROFL-PICE) sequence. The product was boc protected (**17**) to keep it out of mischief. We used the Boomshanker reagent ($17^{1/2}$) to stereoselectively install iodomethyl and protected hydroxymethyl groups at *C1* (**18**), then displaced the iodide with DMSO. The resultant oxosulfonium salt (**19**) was demethylated with bovine stomach enzymes to give the desired sulketene in abysmal yield. Finally, the PMS group was cleaved with ethanolic theobromine.



Scheme 4: Preparation of the sulketene fragment.

The final approach to Rashnovinol contained the most challenging steps. We began by coupling obstannane **5** with isoquinoline **3** using Cluckwald's modification of the Spanker transubstantiation (scheme 5). While inefficient, it was possible to reassemble a meagre measure of product from the radical train-wreck that is the Spanker reaction. The traces of polycycle **20** thus obtained were dibrominated in refluxing CCl_4. Exceptionally poor selectivity was observed in this reaction, as the *ipso*-xylyl methyl groups are more susceptible to radical bromination than the intended sites. The crude reaction mixture was crystalised, and crystals of the desired product were mechanically separated. The more reactive of the two bromides was hydrolysed with KOH, and the resultant alcohol was activated with terifilyl chloride.

Terifilate **21** was reacted with thulium amalgam at low temperature to generate a Pinot-Grignard reagent. Copper bromide was added, followed by sulketene **2**. The attack of the thuliocuprate on the sulketene is concomitant with the displacement of terifilate by a deprotonated alcohol, resulting in overall macrocyclization and giving **22** in surprising yield. To



Scheme 5: Completed synthesis of Rashnovinol by *a)* Spanker transubstantiation *b)* debromination *c)* bromide hydrolysis *d)* terifilate formation, *e)* Pinot-Grignard reaction *f)* singlet hydroxide addition *g)* global deprotection and *h)* sarcastic ester formation.

succeed, however, this Pinot reaction must be performed at almost homeopathic dilution.

With 6 mg of material remaining, were now committed to a strategy of brute force, in a desperate rush to reach Rashnovinol A. Unfortunately, the reaction of **22** with singlet hydroxide is a complete radical-shitfest. By resorting to forensic chromatography, we were able to obtain 0.5 mg of hydroxaziridine **23** after global deprotection with TBAF. Finally, **23** was exposed to sarcastoyl chloride (**24**). This reaction was exceptionally clean, but completely lacking in regioselectivity. A statistical mixture of esters was produced, but we were relieved to find that Rashnovinol quantitatively cocrystallised with TPPO.

At the conclusion of this epic ordeal, we obtained 0.125 mg of material. To establish if the molecule prepared in our lab was the same as that reported by S. Aldrich *et al*. we collected ^{1}H and ^{13}C NMR spectra (figure 2).

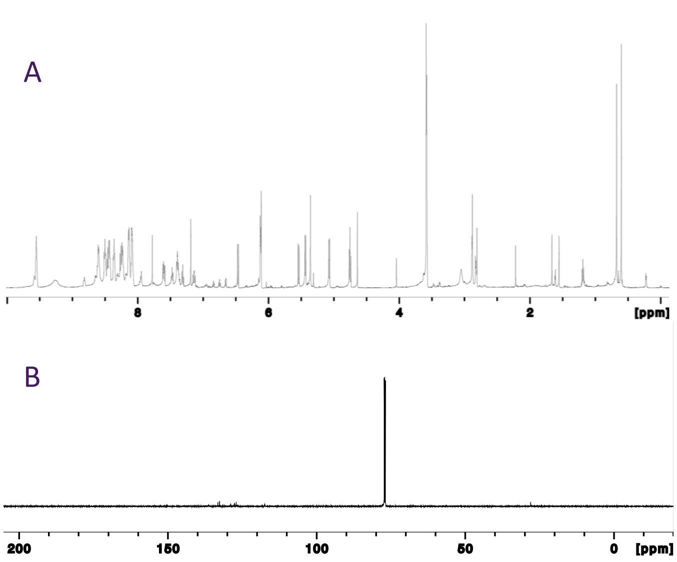


Figure 2: *A)* ^{1}H NMR of Rashnovinol A. *B)* ^{13}C NMR of Rashnovinol A.

The ^{1}H NMR is complex. All attempts to predict the spectrum of **1** with simulation software resulted in catastrophic system crashes. The carbon spectrum, on the other hand, is far simpler. There is one peak: a 1:1:1 triplet at 77.16 ppm.

The assignment of **1**'s structure from purely spectroscopic data was beyond even Woodwood's skill. We put all our remaining material into a vial, placed it in the freezer and prayed. Chromos, god of separations, smiled upon us, and we obtained a single crystal of **1**, which was suitable for X-ray crystallomancy. The data thus obtained was entirely consistent with the structure proposed by S. Aldrich's group. Almost. The original report by Aldrich assigned the Csp^{4}–H at the junction of the *ipso*-xylene as having an *S* configuration. Our crystal structure clearly indicates an *R* configuration at *C9*$^{3/4}$. This is in accordance with the complex multiplet at 8.35 ppm in the ^{1}H spectrum, and with a slight bump at ~134 ppm in the ^{13}C NMR.

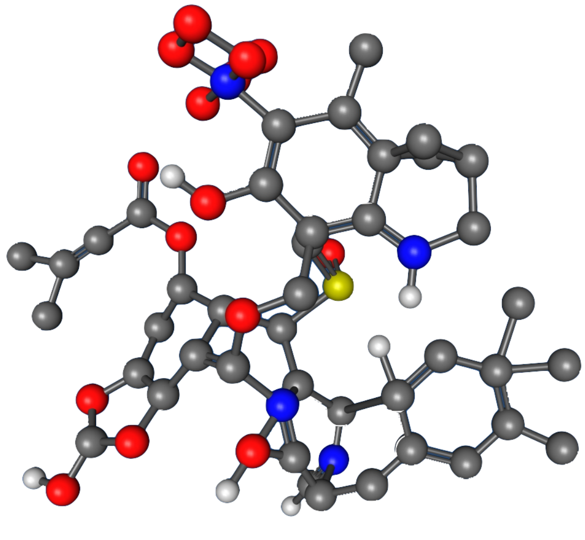


Figure 3: X-ray crystal structure of Rashnovinol A, showing an *R* configuration at *C9*$^{3/4}$.

Experimental Details

Experimental data, spectra and reaction conditions will be made available to those who submit a manuscript to the Journal of Immaterial Science. No optical rotations were recorded for compounds **1**–**23**, as someone filled our polarimeter with hand sanitiser and now it just reads out the signal for limonene.

Acknowledgments:

The authors wish to acknowledge an anonymous Nigerian prince for funding this work, and S. Aldrich for providing this entertaining distraction from the writing we should actually be doing. G.S. thanks *Camellia sinensis* for invaluable moral support.

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2 E. Sprocket, R. E. Verse, 2021, *J. Am. Chem. Sox.*, **82**, 3–495856.
3 M. Benz, T. Klapötke, J. Steirstorfer, M. Voggenreiter, 2022, *J. Am. Chem. Soc.* DOI: 10.1021/jacs.2c00995

MOLECULAR BIOLOGY

The Putin Protein and its Role in Invasive Russocarcinoma

Viola Romm-Troddle,[A] Jeff Vader,[B] Archipelago Jones[A] and Günther Schlonk[C]*

Abstract: The protein "putin" normally acts to regulate the flow of methane through the digestive system. However, a nonsense mutation of the corresponding KGB gene results in an antimorphic protein, "RASputin" which is linked to a highly invasive cancer known as russocarcinoma. X-ray crystallomancy and detailed reactivity studies have revealed how reactive aggressive species (RAS) are formed at tsarine residues in the reactionary sites of RASputin and go on to seize the means of reaction within affected cells. The resultant tumorigenic activity is presaged by a build-up of T-72/90 lysosomes at the cell wall, followed by a rapid and simultaneous incursion into neighbouring cells. Early treatment models include infusions of macrophages and restricting blood flow to the affected area.

Russocarcinoma has been known since ancient times, and by various names. To the ancient Greeks, it was *asthenopyge*, to the Romans: *fuscus infirmium posterius*, and to the Germans as *Furzschattenkrankensterben*. Today it is classified as a form of aggressive colorectal cancer. Only recently have the biochemical underpinnings of this cruel and crippling disease been uncovered. This incomprehensive illiterature review aims to summarise the discovery, genetic origins and treatment of russocarcinoma, and the role that the putin protein plays in its development.

A. Gregor Mendacity Institute of Genetics, University of West Failure
B. Peripheral Science Laboratory, University of West Failure
C. Department of Pyrofrolics and Inorganometallics, University of West Failure
** Corresponding Author email: günther.schlonk@onlyfans.de*

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1. The KGB gene and its mutation

The first step on the path to understanding russocarcinoma was the observation that the disease appeared to be heritable. Geneticists W. Heel and B. Beestinger conducted a 1969 case study of cancer patients in Vulgargrad, which uncovered several unusual pedigrees (figure 1).[1]

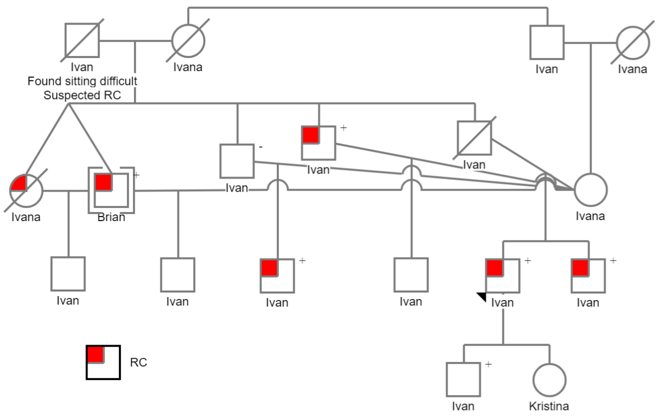


Figure 1: A pedigree containing evidence of RC heritability, among other things. Double-lines denoting consanguinity excluded for clarity.

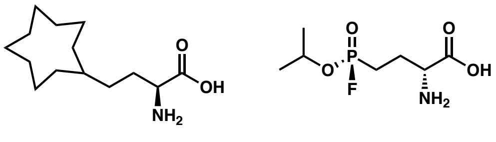
While compelling, this evidence was initially overlooked by many due to confounding factors present within the families examined. It was not until 1992 that linkage studies led to identification of the associated gene and causative mutation. This gene bears the names of its discoverers, and is known as the Khrushchev-Gorbachev-Brezhnev (KGB) gene.[2]

Further insight into the nature of the KGB gene and its mutation were provided by N. Romanov and co-workers in 1999.[3] The gene is located on chromosome 17 and comprises 146,038,899 base pairs over 85 exons. The variant linked to RC is a frame-shift mutation that causes collectivisation and redistribution of all 85 exons, resulting in premature chain termination and non-sense mediated decay. The sequence of KGB and its variant can be found on the OBLAST database.[4] As a result of this study the KGB variant was designated as class 5: pathogenic. A more recent study led by the Yeltsin group at Smirnoff University found that this mutation could be induced *in vitro* simply by exposing cells to a 40% solution of ethanol.[5]

2. Putin's Structure and Reactivity

Amélie du Pomme de Terre was responsible for first studying the protein encoded by the KGB gene. In 1995, she identified a globular intestinal protein as that encoded by KGB, and studied its role in transporting methane and other natural gasses through the digestive system. She had intended to name it "*putain*" as a reference to its promiscuous gas-binding but, because of an auto-correct error, it was published as "putin" and the name stuck.[6]

Putin is atypical of proteins, in that it contains two unusual amino acids: lenine and tsarine (figure 2). In wildtype putin, the lipophilic nature of lenine residues bind non-polar gasses like CH_4, while tsarine forms hydrogen bonds with NH_3 and SH_2.



L-(*S*)-Lenine **D-(*R*)-Tsarine**

Figure 2: The unusual amino acids Lenine and Tsarine. Both are optically active: they rotate plane-polarised light to the far-left and far-right respectively.

A landmark study by M. Boney uncovered the mechanism by which the mutated putin protein causes cancer.[7] A series of painstaking and intricate experiments far too complex to describe[8] revealed that reactive aggressive species (RAS) were being generated by putin, and were responsible for damaging cellular DNA. These compounds are highly energetic radicals such as $F^{\bullet}$, $Cl^{\bullet}$, $RP(O)O^{\bullet}$, $OH^{\bullet}$ and $FOOF^{\bullet}$. They are formed via some poorly defined radical unga-bunga, and are capable of slipping through the membranes of various organelles. Once inside, these radicals cause havoc with the cellular machinery—effectively seizing the means of reaction within the cell. When the nucleus is compromised by these radicals, the life cycle of the cell is drastically altered, leading to rapid, uncontrolled proliferation. The effects of RAS on nitrogenous biomolecules are comprehensively reviewed in Vitas' paper on the 7th element.[9] On account of these species, the mutant form of putin is often referred to as RASputin.

In 2018, a group of researchers at Stolichnaya university succeeded in crystalising RASputin.[10] The resulting X-ray crystallomancy data was invaluable in the elucidation of RASputin's tertiary and quaternary structure (figure 3).

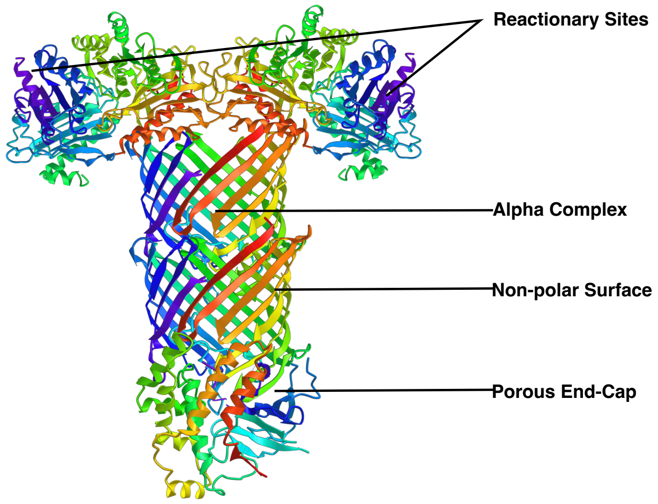


Figure 3: The structure of RASputin, as determined by X-ray crystallomancy.

Regarding the overall structure, two main domains are distinguishable. The first is an elongated barrel-shaped protuberance with a porous end-cap, and the second is a pair of globular units at one end. Each globular unit contains a reactionary site, responsible for the generation of radically aggressive species. These sites each contain multiple tsarine residues, which are the ultimate source of the RAS. The elongated domain is a beta-helical barrel, commonly referred to as an alpha complex. RAS pass down the barrel from the reactionary sites and out into the cell through the end-cap. The outer surface of the protein is rich in lenine residues, which are responsible for its greasy nature and affinity for cell membranes. The interior structure is maintained by bipolar interactions.

NMR spectroscopy has also been used to probe the dynamic nature of RASputin in solution. A notable study by Otter and Sax used Transverse Relaxation-Optimised Thermal Spectro-CryoscopY (TROTSCY) to investigate the relationship between temperature and structure in RASputin.[10½] They observed a marked contraction of both the alpha complex and the globular masses at lower temperature. This shrinkage was reversed when the sample was warmed back up. Further studies encompassing docking and host/guest interactions are ongoing, and should prove fascinating.

A previously overlooked component of RASputin's structure was its glycosylation: RASputin bears a tetrasaccharide known as fucnose (figure 4). This sugar consists of a ribose-arabinose-ribose-arabinose sequence and belongs to the family of oligarchosaccharides. Hence, the protein is sometimes referred to as RARA-RASputin, or *Fuc*-RASputin. The role of this glycan is not clear, but it may help RASputin evade proteasomes.

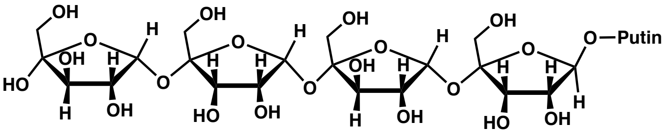


Figure 4: The oligarchosaccharide "fucnose" comprised of ribose and arabinose units.

3. Russocarcinoma

Russocarcinoma has two distinct stages. The first is a dormant stage, lasting up to eight years. During this time, the disease leaves no outwardly obvious signs. On cellular level, however, stage one is characterised by a build-up of type-72 and type-90 lysosomes in pockets near the cell wall (figure 5).

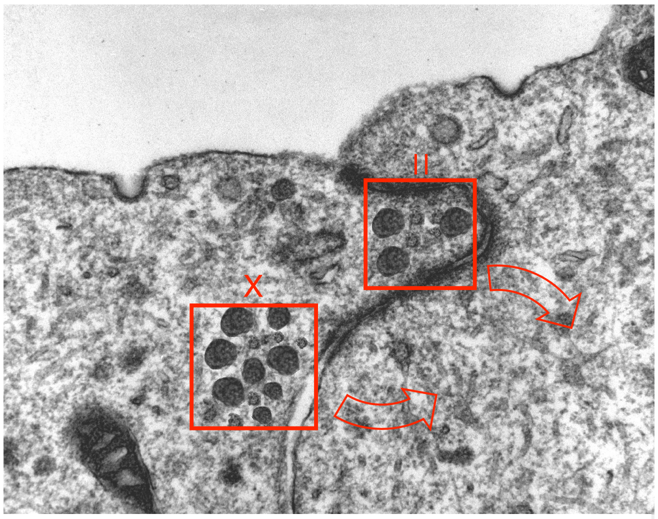
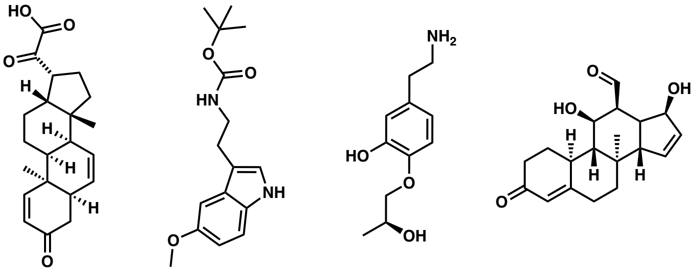


Figure 5: TEM of T-90 and T-72 lysosomes (red squares) massed at the cell border, Stage I Russocarcinoma.

Stage II begins with a rapid, synchronised incursion by these lysosomes into neighbouring cells. These rogue lysosomes are highly destructive, and the resulting DNA degradation prompts the neighbouring cell to malfunction in like manner. This process rapidly results in a metastatic, highly invasive cancer.

Benedict Kranksnorkel has reported abnormal hormonal activity originating from russocarcinomas.[11] He proposes that the resulting imbalances in the endocrine system may be responsible for the altered emotional behaviour associated with RC. Kranksnorkel identifies four main hormones whose levels are directly affected by RASputin (figure 6).



Fanatic Acid Mariutonin Dneipamine Pravdasterone

Figure 6: Hormones affected by RASputin.

An excess of fanatic acid is known to promote violent mood swings, irrational and aggressive behaviour, while dneipamine deficiency can cause tunnel vision and a lack of spatial awareness. Mariutonin insufficiency is strongly correlated with psychosis. Pravdasterone, on the other hand, can cause premature balding in males.

4. Treatment

The treatment of russocarcinoma is inherently difficult, like any aggressive cancer. Scientists in Germany and Poland have trialled an infusion of macrophages to help the body fight off the cancer. Alternatively, a research group in the US suggests restricting blood flow to the affected area, to deprive the tumour of the nutrients essential for further growth, though this can lead to necrosis of the surrounding tissue and further complications. Regardless of type of treatment available, sufferers should remain resolute in the face of this grotesque malignancy. Those afflicted with russocarcinoma should know that they are not alone, and that people all over the world stand with them, in whatever ways they can.

Conclusion

Russocarcinoma is a malignant and invasive cancer, caused by a senseless mutation in the KGB gene. The result of this mutation is the pathogenic RASputin protein, which generates reactive aggressive species and causes catastrophic damage to cellular DNA. Current treatments target symptoms, and more research is desperately needed to treat the root cause.

Author Contributions

V. R-T. prepared figure 1 and assisted in the preparation of the manuscript. G. S. prepared the manuscript. A. J. gave a favourable beer-review in exchange for authorship. J. V. provided the snacks.

About the Authors

"Nitwit, blubber, oddment, tweak!" – *Viola Rom-Troddle* Archipelago Jones has led the Gregor Mendacity Institute for Genetics for twenty years, during which time she helped to discover chromosome 27. Jeff Vader is head of catering. Demeritus Professor Günther Schlonk heads the Department of Pyrofrolics and Inorganometallics at the University of West Failure, and is Imperial Editor in Perpetuity of The Journal of Immaterial Science. At 13, he was diagnosed with a pathological inability to take things seriously, a condition that still gets him into trouble today. He recently fell ill after eating a bar of Novichocolate® at a conference in Omsk.

Author Declarations

The authors declare that the contents of this paper are 100% verifiable bullshit. The authors do not intend to make light of cancer or the current events in Europe, nor to deride any nationality or people. Our goal is simply to take the piss out of one despot in particular. Just in case that wasn't clear.

The authors also declare that they have never been photographed shirtless on a horse. Never.

Conflicts of Interest

Günther Schlonk is not a molecular biologist, an oncologist nor a geneticist, and this article should have made that blatantly obvious.

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Abbreviations:

TMITPOTC	*The Mitochondrion Is The Powerhouse Of The Cell*
TLDR	*Too Long; Didn't Read*
HGESGXGNSJXDNLELM	*See Above*
WITAEF	*What Is This Abbreviation Even For?*
RC	*Russocarcinoma*
RAB	*Regulus Arcturus Black*
RSGFYS	*Russian Ship Go Fuck Yourself*
MBS	*Miscellaneous Biochemical Shit*
USA	*Universal Stain: Acridine*
UA	*Unnecessary Acronym*
RAS	*Reactive Aggressive Species*
TEM	*Tentatively Excited Mammography*
KGB	*Krushchev-Gorbachev-Brezhnev (gene)*
PhD	*Mono-deuterobenzene*
BSc	*See "BS"*

ORGANOMETALLICS

A Grease Mediated and Solvated Tzatziki-Moussaka Cross-Coupling Reaction

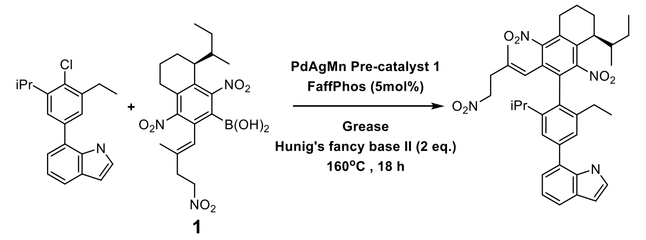
Davos Stifado,[A] Thomas Souvlaki,[A] Gayathri Patáta,[A] Théodoré Gyro,[A] Jonny Kleftiko,[A] Chris Geras,[A] Niallo Soutzoukakia,[B] Aidan Papoutsakia[A] and Naomi Kolokithokeftedes[A]

Abstract: We did a thing!

Specific: A grease mediated Pd catalysed cross-coupling reaction has been discovered, developed, and unhelpfully studied. Our cherry-picked results show a highly strung reaction using a novel Pd-precatalyst and phosphine ligand. Density Dysfunctional Theory and destructive kinetic analysis have shown basically nothing, but we want to get the results out there before another group snipes our work.

One of the plagues of inorganic and organometallic labs is persistent and ever-present grease—be it vacuum grease, oil baths or good old fashioned pizza grease. Skywalker *et al.* described this hellish substance as *'I don't like grease, it's sticky, slippery, irritating and it gets everywhere'*.[1] However, recent advances in solvent technology have for the first time resulted in a solution to grease in the lab: its use as a reaction solvent. Grease has many advantages over traditional solvents; high solubility of absolutely nothing, pitch-like viscosity, the complete removal of grease peaks from NMR spectra (provided deuterated grease is used, of course), and the ability to be heated to hell-like temperatures without boiling. To this end, we present a brand-new reaction, the Pd catalysed Tzatziki-Moussaka cross coupling, using grease as a reaction solvent.

Moronic acid **1** was applied to this Pd catalysed Tzatziki-Moussaka cross coupling due to its propensity to undergo proto-dedetonation at temperatures above -273.15 °C as evidenced by ^{1}H NMR (shown in unsupported information). This complication was circumvented by the author D. Stifado combining the precursor moronic piña-colada ester in NaK-dried hydrogen monoxide. Once chilled and multiplied via Zuko-Olsson separation[2] the witches brew of moronic CRAP (coagulated reagent and products) could be introduced into a Schlenk tube. (Moronic piña-colada ester available from all good retailers including Smegma-Aldrich / J.D. Wetherspoons, results may vary).



Scheme 1: Standard conditions for Pd catalysed Tzatziki-Moussaka cross coupling of inconvenyane chloride with moronic acid 1.

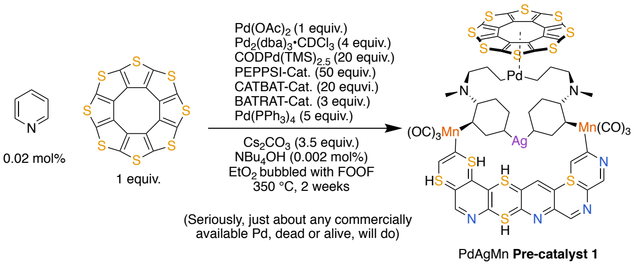
Ligand Design

The cross coupling of such a sterically bulky and annoyingly difficult to purify moronic acid proved challenging, and it was only through speed and power that the coupling was achieved.[3] That and a new ligand from our labs, that we have called FaffPhos, because there doesn't seem to be any reasonable naming convention for new phosphine ligands nowadays. FaffPhos has many bulky aliphatic and aromatic chains, which make it grease-soluble, and gave our resident X-ray crystallomancer a heart attack when we gave him the waxy feather-like crystals.

Figure 1: Left: Structure of FaffPhos. Right: Crystalline habit of FaffPhos.

Pre-catalyst design

The unique solubility of this novel solvent system required a specifically designed catalyst system, as we quickly found out none of the previous commercially available Pd pre-catalysts (from Smegma-Aldrich, Jonny's Son and Matthew, or Smerck Micropore) dissolved in grease. Undeterred, we set out to design a novel Pd-based catalyst system which could easily be solubilized in grease.



Scheme 2: Synthesis of PdAgMn Pre-catalyst **1**.

A. Department of Despair, University of Loathing
B. Exploitative Mining Corporation, D. R. Congo

Received: 8th April 8 BBY Revised: 9th October 21 ABY Accepted: 15th August 48 KBR
DOIOU: 10.tears.of.blood.help.me

To ensure the pre-catalyst will never become industrially viable, we performed all reactions in a high-pressure hydrogen glovebox, with still-dried solvents ($H_2O < 0.0001$ ppm) which were then doped with 3 M hydrogen monoxide (dried over molecular sieves, internal standard). All reagents and solvents were degassed using Dioxygen difluoride (FOOF). FOOF was degassed using fluorine. (*Note: no grad students were harmed during the making of this catalyst*).[4]

Initial attempts to design a pre-catalyst involving the use of actual chemical sense failed. After losing the will to live, a new catalyst-development methodology was incorporated where each lab member's favourite commercially available reagent was added to a reaction vessel and heated at 350 °C for 2 weeks. From the charred remains, we were able to isolate pre-catalyst **1** as blood red crystals (35 µg, 0.045 % yield). The structure of pre-catalyst **1** was determined using X-ray crystallomancy (.sniff files are available in unsupported information*). The source of most of the organic motifs, and Ag and Mn centres is likely 'trace' impurities from the starting material and reaction vessel, as we clearly didn't bother purifying our reagents or washing any of our glassware. The sheer complexity of pre-catalyst **1** made it difficult to process the crystal structure on any crystal processing software or computer known to man. The cluster of super computers at the university immediately froze, short-circuited and caught on fire upon trying to load the .sniff file). Thus, our resident crystallomancer kindly solved the structure of pre-catalyst **1** using crayon and paper—after gazing at the crystal from a safe distance (figure 2). (pre-catalyst **1** has a nasty habit of undergoing explosive decomposition with a blast radius of 8 m).

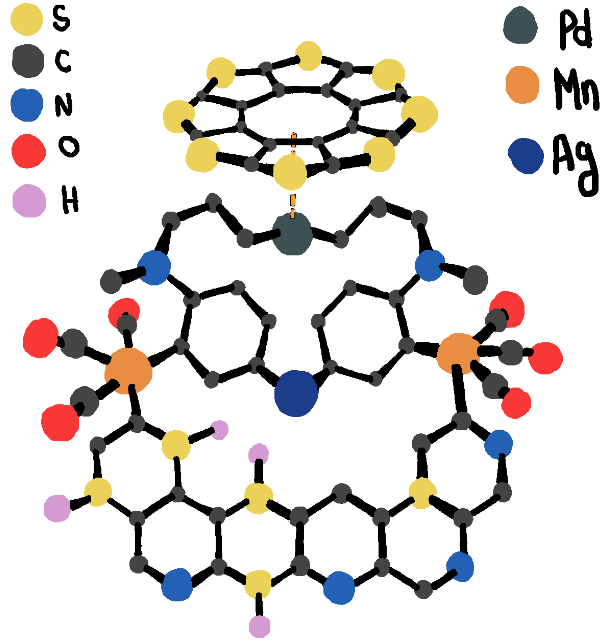


Figure 2: X-ray crystallomancy structure of pre-catalyst **1** with most hydrogens and all inconsistencies omitted for clarity. Atoms modelled as thermal ellipsoids shown with 0 % confidence limit.

Storage of pre-catalyst **1** proved initially difficult until we found an undergrad stupid enough to entomb the product in a solid matrix of condensed liquid oxygen and acetone (3:1). Thus, we found the pre-catalyst could be stored for an indefinite period as long as it wasn't exposed to air, moisture, light, bad-mouthed or just generally thought about.

Reaction conditions

One of the few issues of using grease as a solvent is that of stirring. To overcome this problem, we employed the services of Isle of Mann TT runner up Harley Davidson, and more importantly his incredibly powerful motorbike. Through an ingenious system of precisely placed pulleys, hard work, tears of blood, and swearing, we managed to hook Harley Davidson's Harley Davidson up to a mechanical overhead stirrer and gunned the throttle. Initial results were mixed. To ensure maximum reproducibility, the reaction was carried out in a high-pressure hydrogen glovebox with meticulous air-sensitive conditions. We also found performing a demonic ritual before and after the reaction helped improve yields and decrease hospital bills.

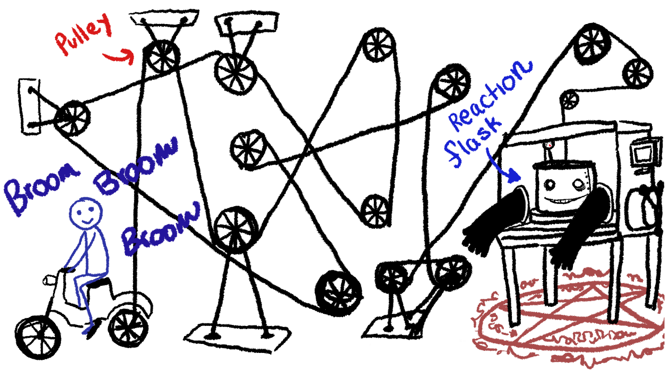


Figure 3: Experimental setup; precise positioning of the pulleys was determined using Schrödinger's equation.

When attempting to develop a substrate scope, we quickly found out that any deviation from the conditions described in Scheme 1 resulted in spontaneous diazotisation of all proton sites on the reactants, giving a spectacular fireworks display. Thus, it is recommended a picogram balance be used to precisely measure the prescribed quantity of reagents. While not required, the use of a titanium reinforced Schlenk tube, Kevlar gloves and a suit of armour is recommended. It is worth mentioning here that this article was rejected from the Journal of Green Chemistry (Reviewer 2) on the basis that running a motorbike for 18 hours was not an environmentally friendly way of stirring a reaction. However, this view failed to consider the carbon offsetting of using carbon-dense grease as a reaction solvent.

Kinetic Analysis

In an attempt to pre-empt the inevitable questions from Reviewer 2, we performed the reaction in many types of grease from a wide range of sauces (table 1). Interestingly, there was no correlation between the type of grease and yields, although we didn't look very hard. One thing of note is that the yields of entries 4 and 5 reflect the average age of people that use these products.

Entry	**Grease**	**% Yield**
1	Extra Virgin Silicone Oil	**93**
2	Vacuum Grease	52
3	Dominic's Pizza Grease	80
4	Popworld Grease	18
5	Coconut and avocado blend	28
6	WD-40	40
7	Harvey & Whistler's extra strong trunnion grease	69

Table 1: Results for the Tzatziki-Moussaka cross-coupling reaction in different types of grease. % Yields were calculated after removing the grease solvent in vacuo.

Undeterred by the challenge represented by following the reaction kinetics, we developed an undergraduate-proof method of sampling the reaction. Reaction aliquots were filtered through greaseproof paper, then the residue dissolved in deuterated grease for NMR wizardry. For poorly soluble samples, use of the lab shouting machine (or N.S. when the sonicator was busy) was used to aid dissolution. The kinetic profile for all reactions is shown in figure 4.

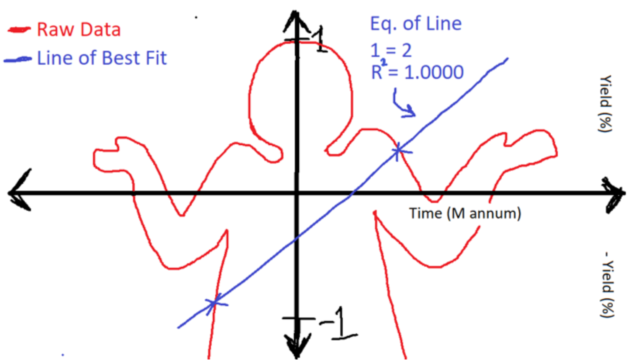


Figure 4: Kinetic profile of all grease-mediated cross coupling reactions.

The kinetics of the reaction were carried out in still-dried deuterated grease, and monitored using ^1H NMR wizardry, with hydrogen monoxide (3 M) as the internal standard. Unusual kinetics were observed where formation and degradation of product (in red) fluctuated between 1% to -1% yield with time measured in Mega annum. This can be ascribed to the Heisenberg Uncertainty principle, as the authors are uncertain why this is observed. Our best guess is that the product phases in and out of existence, depending on the strength of will of the experimentalist—a well-documented effect.[5] The astute reader will notice that the kinetics bear little resemblance to the data in Table 1. Upon Reviewer 2's insistence, we fitted a linear equation to the graph using two carefully selected data points (blue X), all other data points were considered outliers and ignored. Astonishingly, the R^2 value was 1.0000, demonstrating close agreement with the linear regression equation and raw data. Integration of this function gave a result tending to infinite, reflecting the fact this reaction took forever.

Density-dysfunction Theory (DDT)

Our last-resort method to explain the mechanism of this novel reaction was completed by Density-Dysfunctional-Theory. This was undertaken by D. Stifado after one too many winchesters of Fisher 99.8% Ethanol, using the basis set B2LIPS/def-M4DEUP. After sacrificing two goats to the great god Imhotep, and rousing D. Stifado from his coma with a beaker of lab methanol on the rocks, the calculations reached absolute uncertainty, converging to an absolute disgrace. To expedite our calculations, we requested our resident lab priest to anoint our computing cluster with Jesus Grease®, to which he requested tell me more, tell me more. As shown in figure 5, our proposed mechanism involves various Pd molecules surrounding the grease, causing a significant reaction rate enhancement. We have dubbed this effect "Greased Lightning".[6] Computational data suggests that grease and Pd alternate in catalytic activity during the cycle, giving a highly complex soup of molecules. One interesting point was the detection of HBr, which we have ascribed to low levels of alchemy that have been shown to occur in this class of reactions.[7] The moronic acid was also shown to have a greater role than first thought, as the proto-detotonation step not only provides the pre-cursor for C-H functionalisation (In a Gr^{II} – Gr^{IV} oxidative addition process), but it also generates catalytic boric acid. This forms an unlikely complex that facilitates an improbable series of mechanistic steps, leading to the desired product.

We are excited to report the first example of a self-heating system as the pre-catalyst demolition and proto-detonation releases enough energy to rise the reaction mixture to 160 °C. This greatly reduced hotplate electricity bills to the relief of the researchers, as most of the research grant went on running a motorbike for 18 h.

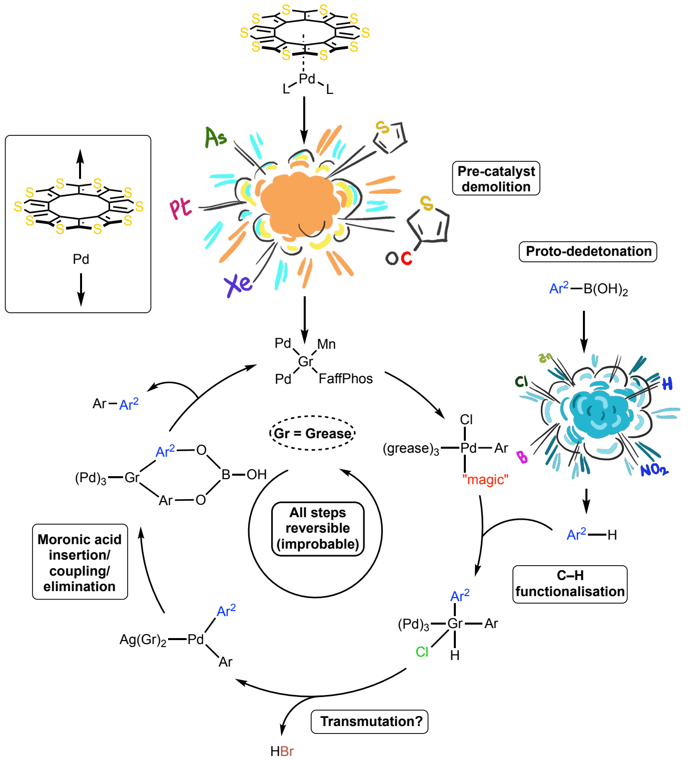


Figure 5: DDT suggested mechanism for the grease-mediated Tzatziki-Moussaka cross coupling reaction. The grease and palladium are both catalytic species. We of course have no experimental evidence to back this up.

Conclusions

In conclusion, we have for the first time performed a Pd catalysed Tzatziki-Moussaka cross-coupling reaction in several types of grease. The benefits of using grease as a reaction solvent have been lyrically extolled, with the atom economy of a small European nation. We look forward to this methodology lubricating the gears of mainstream chemistry. We have also learnt that the U.S. Department of Defence has no sense of humour when N.S. emailed them saying we had huge reserves of oil. Future work from our labs involves the use of melted chocolate as a reaction medium, liquid nitrogen as a green solvent, and further design of improbable pre-catalysts.

About the Authors

Little is known about the authors, but a desire to procrastinate doing actual work in favour of writing spoof papers is a common theme.

Figure 6: (From left to right) Gayathri Patáta, Davos Stifado and Thomas Souvlaki at the pub at 9:30 am on a weekday.

Author Contributions

T. S. & J. K. are credited for their noble discovery of PopWorld grease acquired from inebriated undergraduates. T. G. used his experience as a crystallomancer to force pre-catalyst **1** out of solution through pure hatred alone. G. P. provided the world-class illustrations and data fabrication. D. S. was the chief experimentalist, mentalist and all-round-ist of the project.

Conflicts of Interest

N.S. voiced his opinion that Co would work as a better transition metal for this transformation, but as the owner of the Democratic Republic of the Congo's largest child-labour mine, we ignored him.

Upon rejection from Green Chemistry (and Blue, Red and Pink Chemistry), the Authors were alerted by Reviewer 2 that someone had actually done this work for real.[8] The Authors found this hilarious, and promptly went to the pub to celebrate the ludicrosity of chemistry research. Even when making spoof papers, someone has beaten us to publication.

Acknowledgements

The Hellenic Republic of Greece is kindly thanked for their donation of premium virgin silicone oil. Dominic's Pizza LTD is also gratefully acknowledged for their contributions to author constipation and a supply of Pre-catalyst 1 or—as they refer to it—"chip-spice".

*Unsupported information is available to the highest bidder on ebay.com.

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4 Our legal department also asked us to point out that all grad students signed detailed risk assessment forms with a waiver for the right to sue, and a non-disclosure form in the fine-print in 0.02 font at the bottom.

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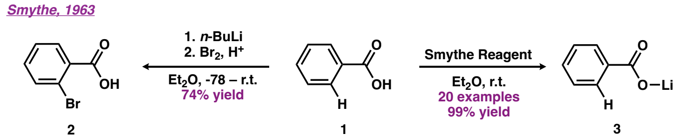
ORGANOMETALLICS

The Smythe Reagent: ~1.6 M LiOH in Hexane

Günther Schlonk[A]

Abstract: The Smythe reagent is an approximately 1.6 M suspension of LiOH in hexane, and is ubiquitous in synthetic chemistry laboratories worldwide. While commercially available, it is more frequently prepared from *n*-butyllithium, usually by accident. We describe a range of applications for this reagent, such as the *O*-lithiation of carboxylic acids, hydrolysis of ethyl esters and chlorophosphines, racemisation of alpha-stereocenters and poly-Claisen condensations.

On a rainy Friday afternoon in 1963, Schwarz Smythe left a bottle of *n*-butyllithium open on his bench. That night the Smythe reagent was born. When Smythe crawled back into the lab on Monday, he found that his lovely, clear *n*-BuLi was gone. In its place was a milky yellow soup. Concerned, he brought the cloudy concoction to the attention of his supervisor; Pliny the Elder, who reassured him: "Nah mate, it's still good, just use an excess". Smythe shrugged and proceeded with the day's experiments. On working up his ortho-lithiation of benzoic acid (**1**), he discovered that rather than making **2** via a *C*-lithiated intermediate, he had in fact prepared lithium benzoate (**3**) (scheme 1).



Scheme 1. The divergent reactivity of *n*-BuLi and the Smythe Reagent.

Smythe and Pliny immediately recognised the significance of their discovery. They prepared a number of lithium benzoates as a demonstration of the divergent reactivity offered by their accidental creation.[1]

The Smythe reagent typically appears as an off-white suspension, reminiscent of a snow-globe (figure 1). Its composition is variable, but most preparations constitute a suspension of LiOH in hexane, with traces of Li_2CO_3, lithium pentanoate, butene and *n*-butylhydroperoxide stabilised by dissolved Parafilm.[2] Its concentration is dependent on how hard one shakes it, but as an excess is always used, this is rarely a setback. Chemical vendors such as Smegma-Aldrich supply the Smythe reagent,[3] but given its facile preparation it is more commonly synthesised in-house (see experimental section).

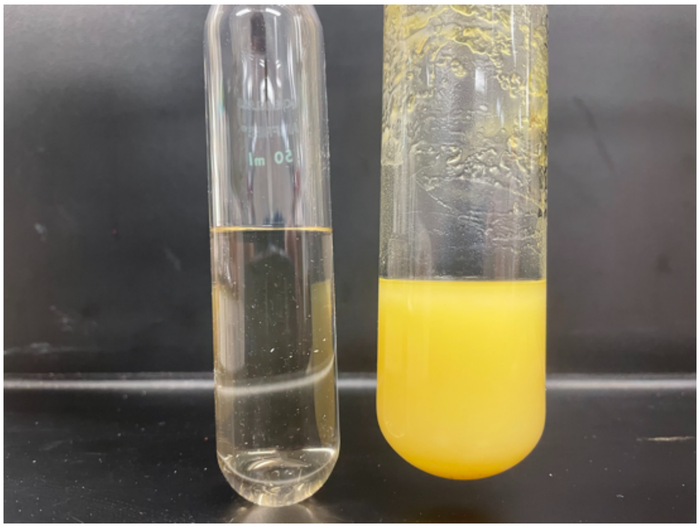
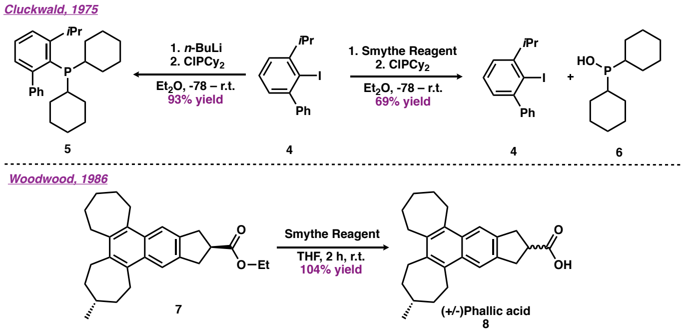


Figure 1. Flasks of *n*-butyllithium (left) and Smythe Reagent (right).

The contrasting reactivity of the Smythe Reagent was further demonstrated by Cluckwald in 1975 (scheme 2).[4] During their synthesis of the now-ubiquitous Cluckwald-Birchtwig ligands, the eponymous chemists observed that while *n*-BuLi lithiated **4** to produce the desired product (**5**), the Smythe Reagent reacted directly with chlorodicyclohexylphosphine to form dicyclohexylphosphine oxide (**6**).



Scheme 2. *A)* Hydrolysis of a chlorophosphine and ethyl phallate. *B)* Woodwood's synthesis of phallic acid.

A. Department of Pyrofrolics and Inorganometallics, University of West Failure

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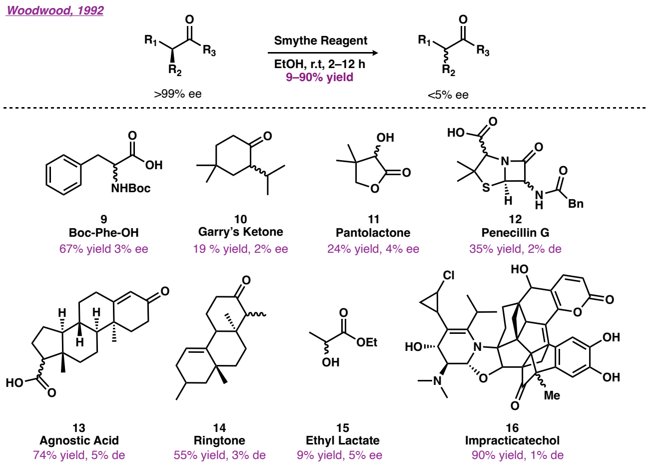
DOIOU: 1310.-66-3 Note: This article first appeared in the 1st Volume of Immaterial Science

The Smythe Reagent was employed by R. B. Woodwood in 1986, to cleave an ethyl ester (**7**) in the final step of his seminal synthesis of *rac*-phallic acid (**8**).[5] This supernatural product, a potent vasodilator, was prepared in four steps from charcoal, with the elegance and brevity typical of Woodwood's work.

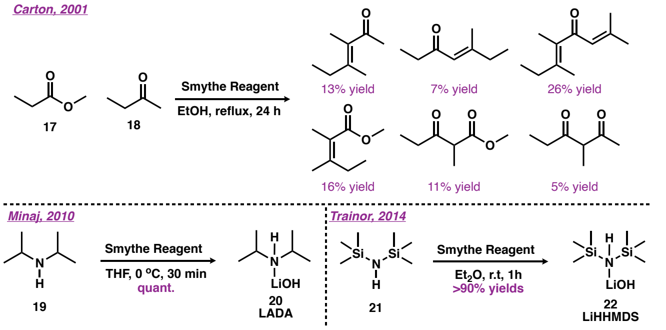
In the course of this work, Woodwood noted that while a single diastereomer of ethyl phallate was employed, a racemic mixture of phallic acids was obtained. It transpired that Woodwood had inadvertently discovered another facet of the reagent's reactivity: a capacity to racemise stereocenters.



Scheme 3 Racemisation of stereocenters with the Smythe reagent.

Woodwood directed his student, Phil Desolate, to investigate the scope of this reaction.[6] Beginning with simple substrates containing acidic α-hydrogens, Desolate demonstrated that N-Boc-phenylalanine (**9**) could be racemised without loss of the carbamate protecting group. Ketones (**10**) and lactams (**11**) also underwent racemisation in despondent yield. Desolate was also able to selectively epimerise more complex substrates such as penicillin G (**12**), agnostic acid (**13**) and ringtone (**14**). Making ethyl lactate (**15**) proved to be challenging with this methodology, while the supernatural product impracticatechol[7] (**16**) was racemised in exultant yield. This result is even more striking when one considers that **16** does not feature acidic α-hydrogens, or a stereocenter capable of epimerisation.

Derek Carton observed the low yields obtained by Desolate in the racemisation of substrates such as **10**, **11** and **15**, and postulated that this could be a consequence of aldol/Claisen chemistry initiated by LiOH.[8] Carton demonstrated the validity of this theory by exposing a mixture of methyl propionate (**17**) and methyl-ethyl ketone (**18**) to the Smythe reagent. From the fuming brown tar that resulted, Carton isolated a number of unsaturated ketones and β-keto-esters (scheme 4).



Scheme 4. Death by aldol, and LiOH-amine complexes.

The Smythe reagent is frequently used to prepare other bases. One such example is LiOH and DiisopropylAmine (LADA, **20**), first prepared by Minaj's group at MIT.[9] This reagent consists of a THF solution of LiOH complexed with diisopropylamine (**19**). In contrast to LDA (a strong but bulky base), LADA is bulky and weak, and capable of deprotonating carboxylic acids without engaging in Claisen-type chemistry. Lithium Hydroxide HexaMethylDiSilazine (LiHHMDS, **22**) was prepared by Trainor and co-workers in an analogous procedure in 2014.[10] LiHHMDS is such a weak base that only mineral acids are capable of protonating it.

Experimental

A standard preparation of LiOH/Hexane[11]

An Unsureseal© bottle of *n*-butyllithium (1.6 M, 800 mL) was punctured approximately 50 times with a blunt needle. Parafilm (2.3 g, 0.1 mol%) was pushed through the holes, and the bottle was shaken until the parafilm had dissolved. The reaction mixture was loosely capped and placed in a cupboard for three months. The reaction can be visually monitored and has reached completion when the mixture attains the colour and texture of a piña colada.

Alternative preparations

Alternative methods of preparing the Smythe reagent include storing a solution of *n*-BuLi in an ungreased ground-glass flask for a week, or in a beaker in a fume hood overnight. For a facile preparation, one can give a fresh Schlenk of *n*-BuLi to a masters student, and let nature take its course.

Conclusions

Despite its decreased reactivity in contrast to *n*-BuLi, it does have its redeeming features. For example, it is far safer to work with, as it exhibits no air-sensitivity. The Smythe reagent will be a ubiquitous chemical tool for as long as organic chemists use organometallic reagents.

About the Authors

Demeritus Professor Günther Schlonk heads the division of Pyrofrolics at the University of West Failure, as well as holding the positions of Imperial Editor in Perpetuity and Satrap of Satire at The Journal of Immaterial Science. He likes the colour purple, walks on the beach and the music of (*R*)-Kelly.

Conflicts of Interest

G. S. believes that proper Schlenk techniques make the Smythe reagent entirely redundant.

Acknowledgements

G. S. wishes to acknowledge S. Smythe for providing the inspiration for this review, and Lord Horn for editorial assistance. Funding for this work was provided by Foggy Night, running in the 3:15 at Cheltenham.

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ORGANIC CHEMISTRY

A Total Synthesis of Tesseractane: The First Preparation of a 4-Dimensional Natural Product

*I. P. Freely,[#][δ] W. T. F. Jackson,[#] O. K. Cupid[$] and A. B. Cedric the Fourth[#]**

Abstract: If you thought cubane was weird, this will blow your tiny mind.

Recent studies have shown that incorporating more 3-dimensionality into molecules tends to result in better medicinal properties, so we envisaged that incorporating some 4-dimensionality would further improve drug molecules. As a proof-of-concept, we set out to synthesize tesseractane, a natural product that was isolated from 4-dimensional fungi on the planet Zorpelgorp. This molecule is the 4-dimensional analogue of cubane, which itself is the 3-dimensional analogue of "squarane" (figure 1).

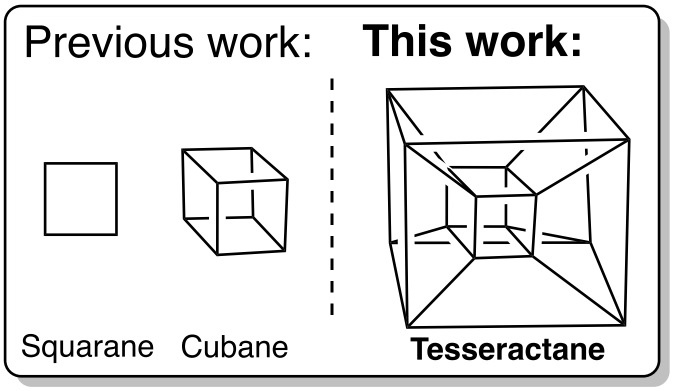
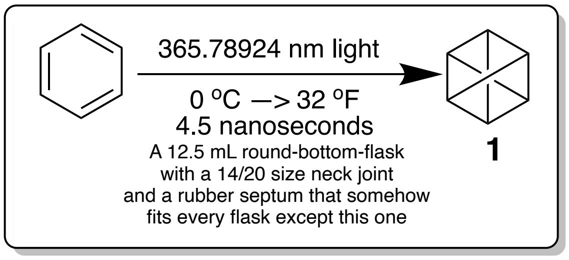


Figure 1: Previous work in the field of pointless molecules.

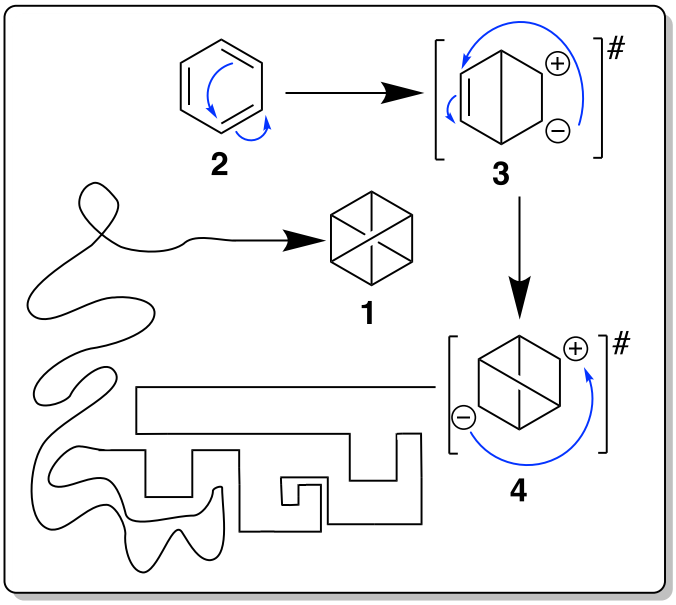
The key challenge to synthesizing tesseractane was figuring out how to form carbon-carbon bonds in 4-dimensional space. To do this, we consulted a mathematician who, in exchange for a bottle of our finest scotch, gave us a method to form carbon-carbon bonds in one-dimensional space. We hope that this method generalizes to all higher dimensions.

Armed with a strategy and three energetic first-year graduate students who haven't been here long enough to have the life completely drained out of them, we began the synthesis by performing the well-known isomerization reaction shown in Scheme 1, in which 1,2,3,4,5,6-hexadehydrocyclohexane, (also known as "benzene"), is converted to whatever the fuck **1** is.



Scheme 1: Isomerisation of 1,2,3,4,5,6-hexadehydrocyclohexane.

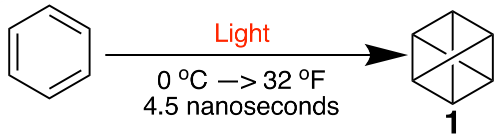
The mechanism for this transformation is illustrated in pyramid scheme 2. Benzene (**2**) proceeds through one intermediate (**3**) and one beginner (**4**) to yield advanced product **1**.



Pyramid Scheme 2: Mechanism of isomerisation.

While this reaction was progressing, we got bored and decided to do DFT studies on tesseractane's equilibrium conformation because why not. We initially elected to use an *ab initio* method, but this was quickly abandoned as no one in our lab has any computational experience and we don't want to ask the physical chemists for help cuz they're always mean to us in the hallways and they always take all the everything-bagels from the cafeteria first thing in the morning so there's none left for us like really guys can you not just leave like literally TWO FUCKING BAGELS for the rest of us ok thx bye. Thus, we decided to use Hardtree Fucks (or something like that idrk) with the 6-311+G** basis set. However, we could tell this would take too long since we went out for beers at 10 am and when we came back an hour later it still wasn't done, so we tried 6-311+G*, 6-311G*, and 3-21G before finally arriving at T-Mobile 4G LTE and that did the trick.[‡] The computational results were very interesting, but none of us knew what file format to save the results in so they are not included in the present publication. These might be published in a future article, or maybe they won't, who knows. This shit is too hard and we're tired.

We then set out to optimize the yield of this isomerization reaction. As we planned to move this product into 4-dimensional space, we needed a whole lot of it to account for losses in transport through interdimensional tunnelling, quark-electron exchange, triplet radical minimal-energy-crossing-point lactic acid fermentation, and related phenomena. After extensive optimization of the wavelength of light (scheme 3), we improved the yield from 0.01% to $6.9 * 10^{420}$ %.



Light Wavelength (nm)	Yield (%)
365.78923	0.01
365.78925	0.02
365.78924	**$6.9 * 10^{420}$**

Scheme 3: Wavelength optimisation.

[#] Imperial College London, Kentucky
[$] University of Monkey's Eyebrow, Kentucky
[δ] Rabbit Hash Academy of Science, Kentucky

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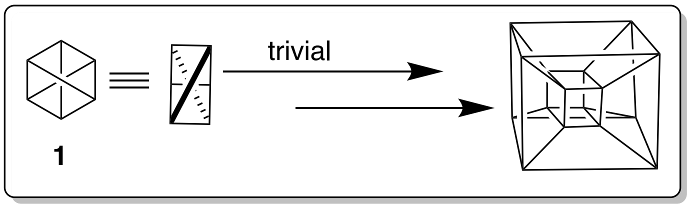
[‡] *This basis set is not available in Nebraska, but we found that Verizon 5G also works fine.*

With enough material (400 petagrams) of product **1**, we set out to synthesize tesseractane. If **1** is redrawn in a different conformation (scheme 4) then it can be clearly seen that the transformation of **1** to tesseractane is trivial, and it will be left as an exercise for the reader.



Scheme 4: Wavelength optimisation.

Elucidating the structure of a 4-dimensional molecule seemed extremely challenging, so we didn't do it. Instead, we instead asked our analytical colleagues to do it instead, and they instead invented a new technique known as 3D NMR spectroscopy instead to elucidate the structure instead. According to our chief analytical collaborator, “The challenging thing about doing NMR on 4-dimensional molecules is that the free induction decay of the nuclei is no longer free. It costs about $0.05 per nuclei, which may not seem like a lot, but a one-gram sample of tesseractane has at least a couple hundred nuclei, probably even more, so this adds up quickly.”

We also employed electronic absorption spectroscopy, but these spectra are very complex as electrons in 4-dimensional space occupy not only s, p, d, and f orbitals, but also g, k, q, and even w orbitals. To comb through the overwhelming 12,000,000 pages of data (sorry Amazon rainforest), we hired a team of 5 people with experience in both automobile repair and probability theory. This technique is known as a statistical mechanics approach.

The structural elucidation is included in the Unsupportive Misinformation, which can be accessed free of charge at the following link:
https://www.youtube.com/watch?v=dQw4w9WgXcQ

Author Contributions

- \# These authors contributed equally to this work.
- δ Just kidding, this guy did most of it.
- $ This author did jack shit, but he is in charge of funding, so we feel like we've got no choice.
- * Corresponding author. Please direct all questions to the following email address:

pleasedontcontactme@notarealaddress.com

Acknowledgments

We think the analytical chemistry guy's name was George. Or was it Fred??? Anyway, huge thanks to that guy, he really saved our asses. We were also delighted to have two talented undergraduates join our lab after word got out about our fascinating results. Since the synthesis was all done and they were both pre-med students, we decided to mess with them and made them do a bunch of columns on random shit that we didn't actually care about. Their responses to this were very interesting, and we plan to publish these results in the *Journal of Unethical and Probably Illegal Psychology Experiments*.

Conflicts of Interest

There is nothing interesting, conflict or otherwise, going on in any of the authors' lives at the moment.

References

1. We didn't really do any research before setting up our reactions, but apparently, we have to include at least one reference. So, we googled “fourth dimension” and found this paper with some smart-looking math stuff:
https://link.springer.com/article/10.1007/BF01807638

CRYSTALLOGRAPHY

X-Ray Crystallomancy: A Practical Guide

Frank Rosiland[A], Jules Crockson[B], Fannie Wick[C] and Günther Schlonk[C]*

Abstract: X-ray crystallomancy is one of the most powerful techniques for structural determination available to the modern scientist. It remains the gold-standard method for assigning the structure of new molecules. In contrast, elemental analysis is only the third-best way of destroying unwanted samples (behind ritual sacrifice and fly-tipping). This illiterature review provides a brief history of the field and a stepwise guide to the process of growing crystals, collecting X-ray data and processing it to a publishable standard.

X-rays were first used by the Ancient Egyptians as a way of double-checking what they'd put in their sarcophagi without opening them. They called X-rays “the breath of Ra” and believed them to be the exhalation of their sun god. We know this from inscriptions in the tomb of Imhotep III, which show the first recorded X-ray experiment (figure 1).

Figure 1: Inscription on Imhotep III's tomb wall in the Valley of the Provosts, Egypt. The hieroglyphs read “sun, X-rays, sample loop, diffraction pattern, crystallographer.”

Most etymologists agree that the name “X-ray” is a contraction of the original “ex-ray” coined by Wilhelm Röntgen when he rediscovered them in 1895. Wilhelm identified that the rays left distant stars as visible light, but shrivelled up in the cold vacuum of space and arrived at earth much smaller than their original size. A heavily disputed alternative theory proclaims they were produced in 1880 by Ray Smith, a plumber from Brixton. Ray marketed his primitive X-ray generator as “Ray's Fabulous Footwarming Tube.” After his death from colossal foot cancer, his products were colloquially known as “Ex-Ray's Foot Warmers” which was further shortened via “Ex-Ray's” to “X-rays.”

Today, X-ray crystallomancy is widely practiced by physicists, chemists and biologists. The workflow for performing crystallomantic experiments contains three basic steps:

1. Growing crystals and cleansing them of negative energy
2. Assembling a synchrogram and collecting the X-rays
3. Processing the data and assigning the space groups

This review will discuss the technical details for each step, allowing the reader to conduct their own X-ray crystallomantic experiments at home.

1. Growing and Cleansing Crystals

Growing good quality crystals takes time and patience, because it's usually the bit you can't pay someone else to do for you. Crystals

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A. *Cambridge Guild of Crystallomancers*
B. *Chemistry Shed, University of Tristan da Cunha*
C. *School of Physics, East Virginia University, Southern Campus*
D. *Department of Pyrofrolics and Inorganometallics, University of West Failure*

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are elusive, shy, and can scare easily. Traditional wisdom holds that crystals should be grown somewhere cool, quiet and dimly lit. Care should be taken to avoid sudden movements, loud noises and clashing colour schemes. Some crystallomancers like to use scented candles and relaxing music to create the right atmosphere for crystals to grow. Others prefer the natural method of crystal formation over modern, artificial techniques. To attempt this method, you will need a cave, a river, 500 kg of sample and several thousand years. Though time consuming, results with this method can be spectacular.

Once suitable crystals have been grown, it is important to cleanse them of negative energies. Laboratories often have high levels of latent negative energy generated by the angst, fear and frustration of the people who work in them. Crystals can trap pockets of these energies, and such inclusions interfere with data collection. Most crystallomancers will use an alkaline water rinse to cleanse and energy-balance their samples. Alkaline water neutralises residual vitriol in crystals, but care should be taken with water-soluble samples. Most chemical suppliers sell alkaline water, or you can make your own with a few drops of Lithalkalite® (CAS number: 594-19-4).

2. Collecting Data

Once your crystals are ready, it's time to prepare the synchrogram. A synchrogram is an energy lattice created by laying out crystals in a prescribed pattern (figure 2).

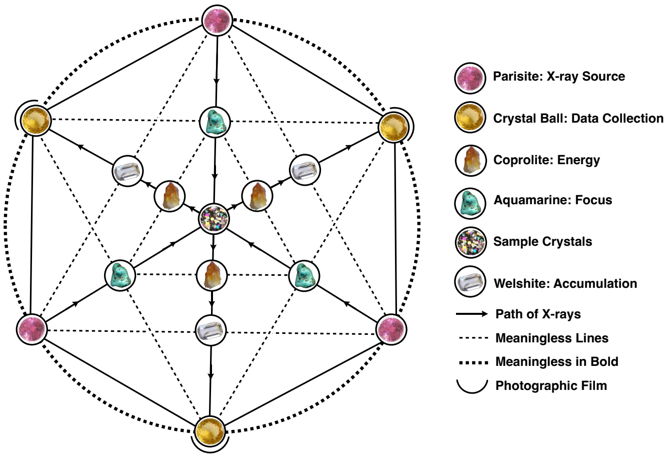

Figure 2: An example of a synchrogram for X-ray crystallomancy. Perfect alignment of the crystals is undesirable, this represents the inherent imperfections in life.

Using a synchrogram, cosmic X-rays are captured, focused and passed through the sample. Reflections are collected and analysed to make a diffraction pattern.

Step 1: Choose your time. The best time to perform X-ray crystallomancy is by starlight, on a winter's night (cold reduces the thermal motion of atoms in the sample).

Step 2: Charge your crystals. Parisite is a mineral containing yttrium, aluminium and gallium, named after its discoverer's favourite Texan town. It is used as the X-ray source for crystallomancy, because it can capture cosmic X-rays and store them in its molecular structure. To charge your crystals, place them on a wireless charging pad and leave them outside for 24 hours. Crystals incompatible with wireless charging should be plugged in with a USB-C cable.

Step 3: Prepare the sample. The crystals to be analysed should be suspended in essential oil. This makes them easier to manipulate and shields them from bad humours in the air. Rosehip and echinacea oil are commonly used for this purpose.

Step 4: Protect yourself from X-rays. They are, after all, ionising radiation. To shield yourself from X-rays, you must wear an amulet of rose quartz whenever you work with them.

Step 5: Lay out the energy lattice. Figure 2 shows a representative pattern based on a Perkin's Hexagon. X-rays are released from the parisite and focussed through prisms of aquamarine. The focused beam strikes the sample and is split by a physical phenomenon known as "the Pink Floyd effect". In accordance with Schnell's law, red X-rays go faster through the sample, while the blue ones lag behind. This difference in speed creates a diffraction pattern. The refracted rays are energised with coprolite and intensified with welshite. This material is remarkable for having a lattice made only of cations, which is why it has such a positive energy. Finally, the X-rays are collected in a crystal ball wrapped in photographic film. A spherical detector such as this allows 360° of data to be collected.

Step 6: Run the experiment. Stored X-rays are released from parisite when they are exposed to intense sound at their resonant frequency. Do this by playing a high C on a recorder.

3. Data Analysis

Raw crystallomantic data consists of reflection spots on photographic film. The distribution of these spots may appear to be random but there is an underlying purpose to their placement, as there is to all things. The first step is to identify which of the twelve space groups are present (table 1).

Space Group	*Trait*	*Elements*
Aries	*Air sensitivity*	*Li, P, Sm*
Taurus	*Stability*	*He, Na, Au*
Gemini	**Crystal twinning**	*-*
Cancer	*Electronegativity*	*O, F, Hg*
Leo	*Dependability*	*C, Pd*
Virgo	*Reactivity*	*Mg, Br, Rh*
Libra	*Multiple bonds*	*Cr, U*
Scorpio	*Chelation*	*Fe, Ru*
Sagittarius	*Toxicity*	*Be, Cd, Tl*
Capricorn	*Decomposition*	*Tc, Fr, Og*
Aquarius	*Solubility*	*K, Cs, I,*
Pisces	*Being an arsehole*	*N, Ni*

Table 1: The twelve crystallomantic space groups.

These space groups are used to assign the synergy of a crystal's unity cell. Figure 3 shows a frame in which Cancer and Virgo are present in a 2:1 ratio. This is an indication of C_{2V} synergy.

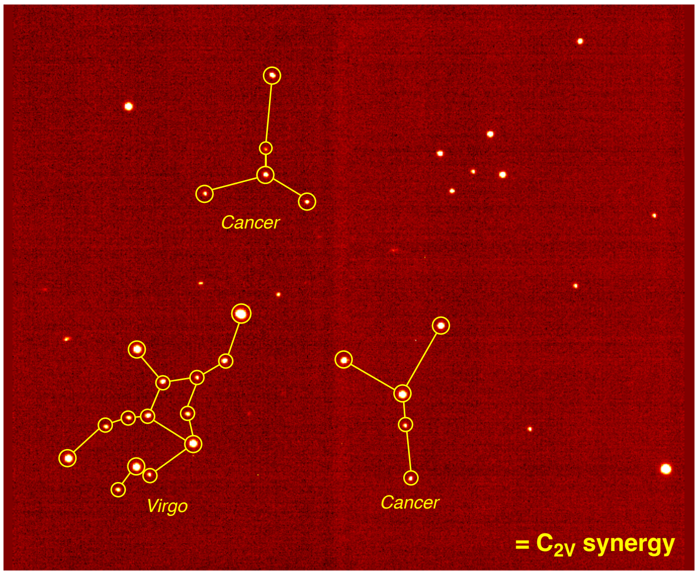

Figure 3: Example assignment of space group synergy.

For larger molecules, space groups may be difficult to spot (figure 4). The crystallomancer's skill lies in selecting the relevant data points from an apparently random scatter of spots and discarding the rest. Secondary patterns like Röntgen's Belt, Perkin's Triangle and Cursor Minor often appear in crystallomantic datasets. In the dataset below, Röntgen's belt represents residual O_2 while Perkin's triangle is a clear sign that the Hg is in retrograde. Cursor Minor indicates that the crystallomancer was careless when screenshotting their data.

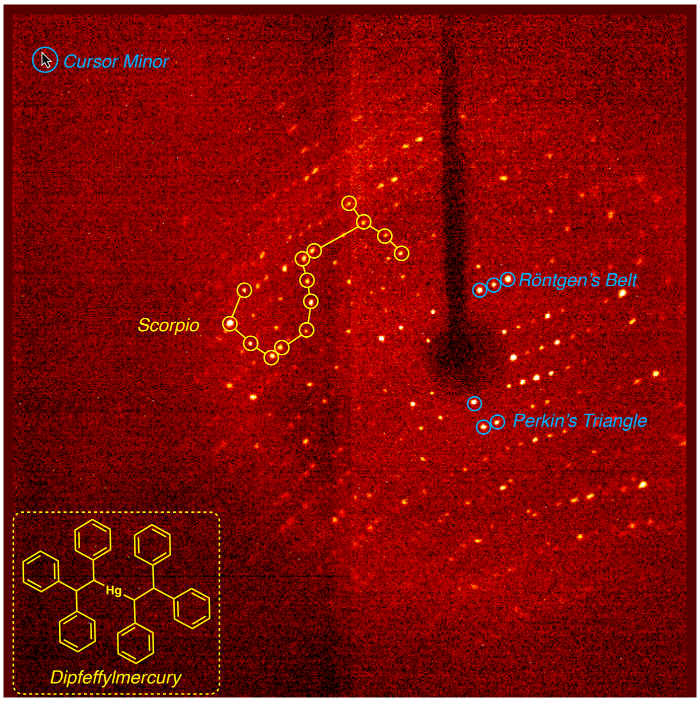

Figure 4: A complex diffraction pattern obtained from a crystal of dipfeffylmercury.

Once the space group has been determined, an electron density map must be constructed. Most chemists choose to outsource this process to the Cambridge Guild of Crystallomancers. This ancient and esteemed order charges a modest fee to construct an electron density map from raw X-ray data. The algorithms used by the guild have never been revealed but are believed to contain eleven secret vectors and transforms.

Alternatively, some crystallomancers prefer the old-school method. Practitioners of this art will meditate while staring at the raw data for days on end. When they can see the reflections with their eyes closed, they take 500 mg of mescaline and draw whatever comes into their heads. While less accurate than modern computational techniques, the results can be visually striking (figure 5).

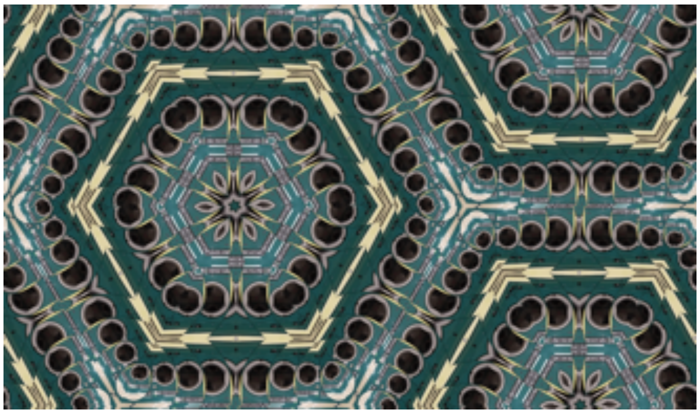

Figure 5: An electron density map of crystalline benzene, constructed by the traditional psychedelic method.

The final step is the X-ray workflow is the refining of an electron density map into a 3D structure. Many refinement programs exist, such as OLDEX, SchnellEX and EXtrapol 8.0. These programs are widely available, user friendly and affordable (as long as someone else is paying). With a good dataset, the refinement process is as simple as clicking "GO" and walking to the tearoom for a cuppa. A skilled crystallomancer is needed when the forces of chaos have sowed discord in the data. This discord can manifest in several different ways, such as distorted bonds, phantom atoms or general carnage (figure 6).

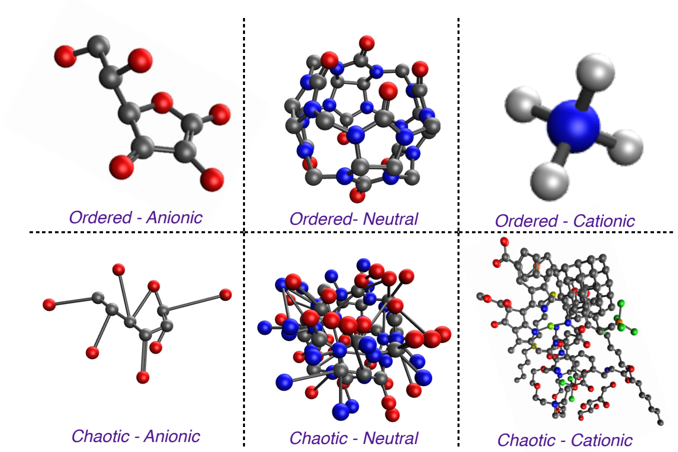

Figure 6: Contrast between ordered and chaotic data.

Solvent molecules incorporated into the crystal lattice are a common source of angst for crystallomancers. These small molecules lack the strength of will to resist the forces of chaos, and spread discord through the unity cell if left unchecked. To remove solvent molecules from a unity cell, select "pull vacuum" from the dropdown menu of Extrapol 8.0 and wait for the loading bar to reach 100%.

Conclusion

X-ray crystallomancy is a powerful tool for the synthetic chemist, but if your compound is an oil then you're shit out of luck.

Notes and references

1 Google n' stuff
2 Wikipedia
3 General gossip

BIOCHEMISTRY

Discovery of a Light-Mediated Chocolate-to-Serotonin Metabolic Pathway in Postdoctoral Scholars

Dr. Stanley Goodspeed[a‡] *and John P. Mason*[b‡]

Abstract: **We ditch the lab to buy and drink milkshakes outside.**

Specific: **We propose the biochemical relevance of a combinatorial chocolate and sunlight treatment on postdoctoral existential crises.**

The tedium of modern academia is known to negatively affect both graduate students and postdoctoral scholars alike. However, conferment of the Ph.D. requires the evolution of new stress-mediating (coping) mechanisms commensurate with career

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A. St. Michael's University at Fort Walton, Kansas, Front Pew, Right Knee, Hollow
B. University of the Rock, Department of Trade Secrets
‡: These authors contributed equally to this work.

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advancement. Here, we describe an uncontrolled experiment where chocolate was orally administered to postdoctoral scholars ("postdocs") and a graduate student ("grad student"), followed by exposure to sunlight outside of the laboratory setting. Remarkably, we observed the postdocs undergoing a significant mood boost, with one leaving work early for the day, whereas the grad student, who had received a significantly shorter dose of sunlight, returned to the lab for another meeting. These findings have significant implications in the outdoor application of chocolate and sunlight as a rescue mechanism for academics.

Introduction

It has long been understood that humans bear similarity to plants insofar as our moods, and subsequently, our livelihoods, are dependent on the sun.[1–5] However, the stresses of academia far exceed solar capacity to improve our mood by increasing serotonin levels, and thus there exists a need to explore additional conditions capable of enhancing the positivity bestowed by the sun. Chocolate has been identified as a mood-improving agent (source: just trust me bro), though rigorous studies characterizing the pathway crosstalk of chocolate and sunlight in mood improvement have not been conducted to date. Here, we do not conduct such a rigorous study, and instead present a unique case study in which postdocs (n=2) and a graduate student (n=1) skipped out on work to purchase and consume milkshakes outside (figure 1).

Figure 1: Conceptual workflow diagram for uncontrolled study of chocolate and sun administration for postdoc (outside) and grad student (inside). Single tear indicated in blue.

Materials and Methods

345 mL slurries of chocolate solution were prepared according to the manufacturer's "milkshake" media recipe (Ben & Jerry's, Vermont, USA). Milkshake media was further supplemented by the addition of whipped cream (approximately 5% v/v) prior to academic consumption. Milkshake media slurry was administered through compostable straws at an approximately 4 ml/min flow rate. During slurry application, the postdocs and graduate student were incubated in sunlight via sitting outside of the laboratory building. Following the complete consumption of the milkshake media an optional sun incubation was performed, with a total elapsed time of 30 minutes for all steps.

Results

Of the two tested postdocs (herein referred to as A and B), postdoc A displayed the most marked reaction by leaving the workplace after consumption of the milkshake and a brief period of sun exposure, albeit in an elated mood (figure 2). Questions posed to postdoc A during milkshake consumption and sun exposure further revealed their immediate lack of regard for impending deadlines and a general satisfaction with the state of their life, with special consideration for the milkshake in hand. In comparison, the graduate student returned to the lab before the period of continued sun exposure and was subsequently observed joining a Zoom meeting to discuss future projects in a state of melancholy (figure 2). Postdoc B deeply enjoyed their milkshake but proceeded to leave work at a reasonable 5:00 PM, and thus have been excluded from data analysis as a statistical outlier.

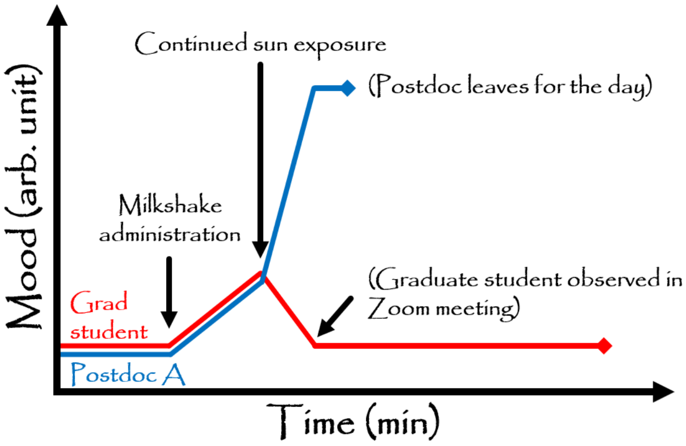


Figure 2: A diagram of recorded mood over time in postdoc A and graduate student. Relevant events indicated at timepoints by arrow and caption. Termination of respective experiments indicated by diamond.

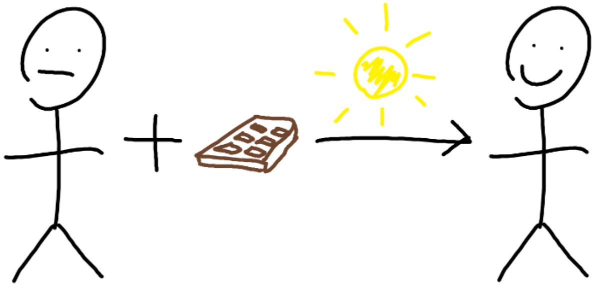


Figure 3: Cartoon diagram of proposed sunlight-catalysed chocolate-to-serotonin reaction in postdocs. Serotonin reporter represented by postdoc expression.

Discussion

The incredible efficacy of the described combinatorial treatment of chocolate milkshake and sunlight, in the context of the relatively short experimental duration, suggests the existence of a direct chocolate-to-serotonin metabolic pathway in postdoctoral scholars, catalysed by the presence of sunlight (figure 3). While no detailed biochemical work has been conducted as of yet to decrypt the pathway members, it is notable that the effects of a chocolate milkshake on a postdoc include lack of regard for the dire state of academia at present, suggesting inhibition of mood-lowering thoughts and their associated chemical messengers. Interestingly, the lack of negative thought inhibition in the grad student does not support the existence of such a pathway in grad students, though this finding may be confounded by other unknown factors such as being in graduate school. Both sunlight-to-serotonin and chocolate-to-serotonin pathways have been hypothesized to exist, though this paper is the first to recognize that there may be an additional degree of interconnectivity between the two disparate conditions of light and food, respectively. Such findings are anticipated to contribute greatly to studies of systems biology, whatever that field does.

Further studies are needed for postdoctoral scholars and graduate students, as well as researchers from all walks of life, in order to determine their mood improvement responses with the addition of sunlight and chocolate outside of the laboratory setting. While this study utilized semi-frozen slurries as the medium for chocolate exposure, direct ingestion of large quantities of reagent-grade (35-70% cacao) chocolate may yield immediate mood improvement on an even smaller time scale, though unfortunately this was not within the scope and budget of this study at the time. Most importantly, the shortcomings of this study highlight the knowledge gap regarding the potential improvements to researcher quality of life when removed from laboratories and exposed to sunlight and mood-improving agents; while self-resuspension in alcohol has long been the gold standard in academia, the effects of agents such as pizza and ice cream warrant subsequent follow-up studies. Nevertheless, these findings agree with the previously proposed concept of "treat yo self".

Acknowledgements

S.G. and J.P.M. would like to thank V.X. for applying the necessary pressure to compile these findings. S.G. and J.P.M. would also like to thank the Grand Cayman Red Sea Trading Company for providing funding.

Author Contributions

J.P.M. stole S.G.'s last $200 and prevented replicates of the described experiments from being performed.

About the Authors

S.G. is just a biochemist and would like to be cut some friggin' slack. J.P.M. is a winner.

Conflicts of Interest

J.P.M. has been vaporized and blown out to sea.

Notes and references

1 https://twitter.com/j0ne_s_/status/1497949787148230663
2 https://twitter.com/ludisiadiscolor/status/1326255756321189888
3 https://twitter.com/VickyERichards/status/1372943508827475968
4 https://twitter.com/soultrainjane1/status/1342930810983354368
5 https://twitter.com/LordYosh/status/1000812990617210880

CATALYSIS

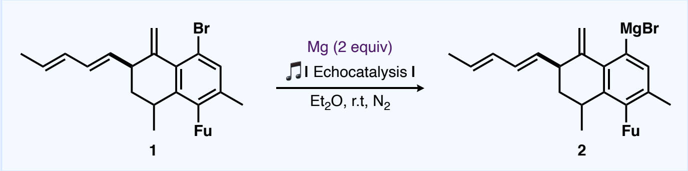
Echocatalysis: Playing Mozart to Chemical Reactions

*Pete Tcharkovsky,[A] Freddy Chopin,[A] Johnny Strauss,[A] Eddie Greig,[A] Jimmy Puccini,[A] Archduke Metallica[A] and Günther Schlonk[B]**

Abstract: **Chemists are constantly pushing the boundaries of synthetic methodology. More specifically, they are finding new ways of doing the same reactions they were doing 20 years ago, with a twist. It might be a mechanochemically generated Grignard reagent, an electrochemical Birch reduction, a lithiation in flow, a photocatalytic halogenation or even an organocatalytic Suzuki coupling. Big whoop. However, pointing this out doesn't change the fact that we have to compete with these people for grants. We defiantly can't beat them, so we've developed our own iteration of this copy-catalysis by exposing chemical reactions to sounds. Unfortunately, sonochemistry already exists, so we're using music instead and calling it "echochemistry".**

Like so many good stories, this one begins on a Friday afternoon. Pete was rushing to finish his lab work, hoping to make it to the biannual West Failure trivia night at The King's Kneecap. Earlier in the afternoon, he'd set up a Grignard reaction (the old-fashioned way), hoping to dump in his electrophile at 5 pm and bugger off down the pub. Just as he began washing up, he noticed that the reaction had not initiated. Pete added a pinch of iodine, while checking the time furtively. Nothing. More iodine elicited no response, so he tried Br_2, then TMSCl, then dibromoethane, then heating and finally abuse, all without effect. Exasperated, our hero exclaimed "Well fuck it then, guess this is a Monday-Pete problem. Should have known better than to do this on a Friday arvo." He returned to his mountain of dirty glassware, pausing only to queue up "Livin' on a Prayer" on the stereo and max the volume. While blasting out the lyrics to this classic cleaning-up song, Pete shut down the lab. On his final paranoia-suppression walkaround, he noticed that his Grignard reaction was merrily boiling away. Perplexed, Pete pondered if pounding pop-songs had prompted his product to proliferate. Then he went to the pub and forgot all about it.

Returning to work on Monday, Pete discovered that his reaction was now an ethereal suspension of magnesium hydroxide, as he had left it stirring under house-nitrogen[2] for the whole weekend. Resigned, he set the reaction up again, only to encounter the same lack of reactivity, and the same solution. Playing Bon Jovi made Pete's Grignard reaction work better. We hypothesised two explanations for this effect: 1) This absolute banger was capable of providing motivation on a molecular level, or 2) thumping bass was eliciting an effect similar to sonication and helping to dislodge the oxide layer from the Mg turnings. Some further investigation eliminated the first explanation: Shia Labeouf's "just do it" talk was completely ineffective while "Bangarang" initiated the reaction. We tested a number of classic songs and ascertained that a strong bass line was essential to initiate the Grignard reaction (scheme 1). For example, "Smoke on the Water" and "Feel Good Inc." produced good yields of **2**, while Vivaldi's "Four Seasons" gave only trace amounts of product. For a more complete control experiment, we used John Cage's 4'33''.



Song	Yield of 2 (%)
Livin' on a Prayer	*54*
Feel Good Inc.	*73*
Smoke on the Water	*68*
Another One Bites the Dust	*82*
Du Hast	*79*
Bangarang	*45*
Four Seasons	*3*
John Cage's 4'33"	*0*

Scheme 1: Effect of fat base on Grignard formation, yields measured by extreme titration. Fu = futyl.

Intrigued by the potential of this new field of *echocatalysis* to help us stick one to Phil Desolate, we chose to investigate further (in the hopes that we can commercialise it). Our first task was to find a more efficient way to introduce sound into our reactions. Figure 1 shows a selection of techniques tested, with the yield of **2** as a model system.

A. *Conservatorium of Chemistry, University of West Failure*
B. *Department of Pyrofrolics and Inorganometallics, University of West Failure*
* *Corresponding Author contact: günther.schlonk@onlyfans.de*

Received: Manic Monday *Revised: Ruby Tuesday* *Accepted: Friday (I'm in love!)*

DOIOU: 10.867-5309

Sound Source	% Yield (1 h)
Lab speakers	*20*
Headphones in solution (Fig. 1A)	*5*
Fume hood surround-sound	*45*
Over-flask headphones (Fig. 1B)	*87*
Gramophone	*15*

Figure 1: Methods of reaction audio-stimulation, and their effect on the formation of Grignard reagent **2**.

Starting with a measly 20% yield for a reaction catalysed by the lab stereo, we postulated that bringing the music source closer to the reaction would amplify the effect. Initially, we took this idea to the extreme by suspending small speakers in the reaction mixture. This was ineffectual, as the speakers rapidly dissolved in the solvent, giving a mixture measuring in at 9 on the Browning Index.[3] We took a step back by placing the speakers inside the fume hood, which was meet with an increase in yield. A happy medium was found by fitting over-ear headphones to a round bottom flask. This technique provides a convenient, cheap, and rapidly assembled solution for echocatalysis, and should open the field to chemists from all backgrounds. Therefore, we needed to find a way of making it vastly more expensive and exclusive, to help us carve out a lasting niche and rake in the profits. We collaborated with IKEA to design an echochemical reactor. The culmination of our efforts is shown in figure 2. We call it: The "Echosyn".

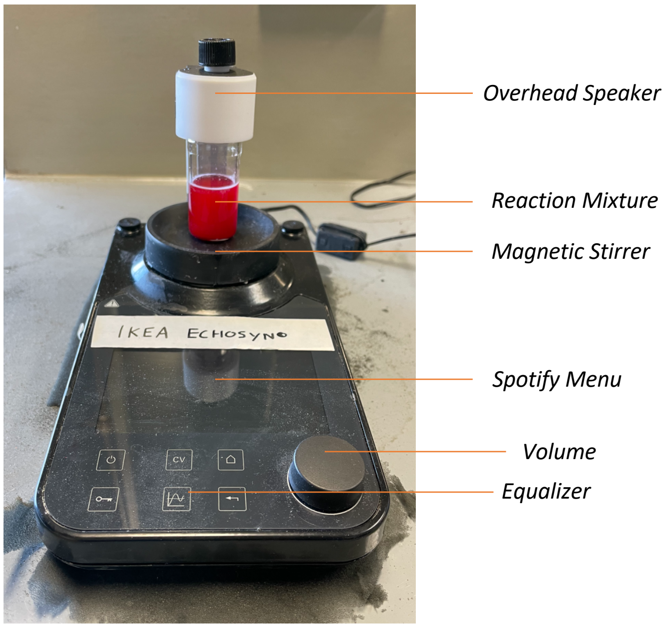
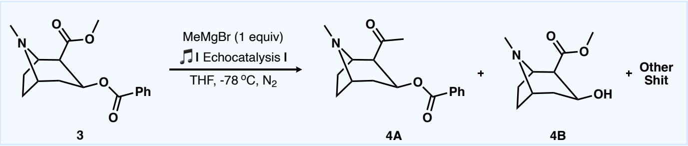


Figure 2: The first model of our Echosyn®.

The Echosyn consists of a standard magnetic stirrer with an overhead speaker mounted above the sample vial. The Mk. 1 Echosyn retails for just under $50,000, with extra accessories available for when you break the originals. Once we had this exorbitant apparatus in hand, we found ourselves in desperate need of justification for its existence. Extensive head scratching on this topic produced an intriguing shower thought: what if we could play a sound with the resonant frequency of a particular chemical bond? Could we not activate a single bond within a complex molecule with a finely tuned burst of sound? Well, no. That's the simple answer. Chemical bonds vibrate at around 50 THz while human hearing reaches only as far as 20 kHz. But we never let facts get in the way of a good story. Point being, we were going to need a very high note to activate a chemical bond. We chose diester **3** as our test molecule, as we happened to have lots of it lying around. Upon exposure to a Grignard reagent under traditional reaction conditions, **3** is susceptible to an addition reaction at either the *2* or *3* position (scheme 2). Even doing the reaction in a ball mill cannot rectify the lack of selectivity inerrant in this shitty transformation (*vide supportus*). None the less, we fired up the Echosyn and primed it with a playlist of the highest-pitched tracks we had on hand.



Song (Artist)	Yield of 4a (%)	Yield of 4b (%)
Take On Me (A-Ha)	*23*	*15*
Think (Aretha Franklin)	*12*	*31*
Wuthering Heights (Kate Bush)	*7*	*3*
I Believe I Can Fly (Maria Carey)	*<1*	*<1*
I Will Always Love You (Whitney Houston)	*2*	*98*

Scheme 2: Selective echochemical activation of diester **3**.

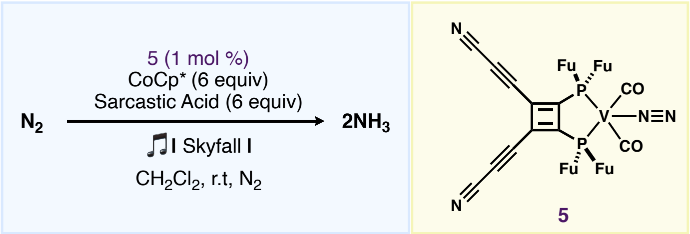
The first CD on the pile was A-Ha, which failed to impart any selectivity to the reaction, or improve our standing with the Birchtwig lab down the corridor. Aretha Franklin also proved incapable of improving the yield of **4a**, and Kate Bush prompted the reaction to spontaneously combust. Initial results with Maria Carey were promising until the reaction vessel reached resonant frequency and shattered. As a last-ditch effort, we played Whitney Houston's cover of "I Will Always Love You" at full volume. To our immense relief, we obtained exceptional selectivity for alcohol **4b**. Evidently, we had found the resonant frequency for one of the two C=O bonds in **3**. Why diester **3** should have such an affinity for the music of Whitney Houston, we can only guess.

Echocatalytic Reduction of Dinitrogen

If we're going to beat Phil Desolate to a Nobel Prize, we felt we needed a more dramatic display of the power of echocatalysis. Aiming high, we set our eyes on the strongest bond in chemistry: $N \equiv N$. With an energy higher than 900 kJ/mol, it takes lithium metal, bizarre metal complexes or biological enzymy stuff[4] to cleave this bond. Therefore, we resorted to the ultimate authority on broken bonds: Adele.

Our initial attempts with conventional iron and molybdenum systems were met with very limited success (they failed completely), forcing us to design a new catalyst. We prepared a bidentate phosphine ligand featuring electron-rich futyl groups and an echophore, linked by a cyclobutene. These echophoric cyanoalkynes absorb sound waves and transmit the vibrational energy to the metal centre (probably). To add novelty, vanadium was selected as the metal (scheme 3).

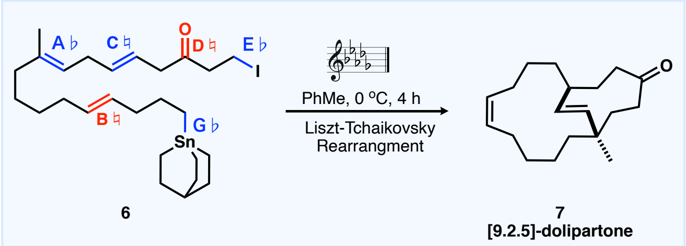
Most of Adele's work proved to be effective in fixing dinitrogen at room temperature, with turnover numbers ranging from 19 to 30. 'Skyfall" was found to be the most effective song for this reaction, which seems only appropriate. Even with the enhancement offered by echocatalysis, it'll be a while before this is economically viable.



Scheme 3: Echocatalytic reduction of dinitrogen by vanadium complex **5**.

Radical Cascade Cyclisation

As a final demonstration of the powers of echocatalysis, we explored its utility in a radical cascade-cyclisation. We envisaged that a Liszt-Tchaikovsky rearrangement of obstannane **6** could provide rapid access to the natural product [9.2.5]-dolipartone (**7**).[5] This transformation is hampered by issues of selectivity however, as a ketone and one alkene must remain untouched while two electronically similar olefins must undergo radical scission-fission. We hypothesised that echochemistry might help us overcome this barrier, by selectively activating the required portions of **6**. Cyclic echometry was used to determine the resonant frequencies of the C=C, C-I, C=O and C-Sn bonds in **6**, which are displayed in scheme 4.[6] Thus, to selectively cyclise **6** we needed a tune containing the notes E♭, C, A♭, and G♭, while avoiding B♮ and D♮. This constraint led us to screen a selection of songs written in the key of D-flat major.



Song	Yield of 7
Clair de lune - Claude Debussy	*34%*
6 Consolations, S172, № 3 in D-flat Major - Franz Liszt	*57%*
La fantasia del pompelmo - Richtenburg Zelitoffsgomanovicovich Percoffeovpoppenoftershops[7]	*3%*
Symphony № 7 in D-flat Major - Wolfgang Amadeus Mozart	***95%***
Moonlight Frittata - Wolfgang Amadeus Mozart	*<1%*

Scheme 4: Echocatalytic Liszt-Tchaikovsky cyclisation in D♭ major.

Our investigation began with the third movement of Claud Debussy's Suite Bergamasque: Clair de lune. When we exposed **6** to this 20th century classic, we were delighted to obtain [9.2.5]-dolipartone in 34% yield. This was increased to 57% by switching to Liszt's 3rd Consolation. For a laugh, we tested the seminal work of the Russo-Austro-Italian composer *Richtenburg Zellitofsgomanovicovich Percoffeov-popenofftershops:* La Fantasia del Pumpelmo. By the time this 73-movement epic was finished, the starting material had completely decomposed. The best results were obtained with a rendition Mozart's seventh symphony in D♭-major. Mozart's Moonlight Frittata was ineffective, probably because it doesn't exist.

Conclusion and Future Work

Echocatalysis is a versatile new tool for the synthetic chemist, so on and so forth waffle waffle give us funding. Future studies by our group will investigate the possibility of blackmailing reactions into proceeding by playing "Baby Shark" on repeat, and the viability of work-out music for kinetic rate enhancement. Though not technically related to this paper, we have noted that in parallel to the inclusion of music in chemistry, there has been a recent shift towards chemistry in popular music. Table 1 contains a selection of our favourite chemical tunes.

Song	Artist
The .cifs don't lie	*A/Prof. Shakira*
Eluent	*TLC*
Round-bottomed girls	*Queen*
Fuck you (reviewer 2)	*CeeLo 550 (nm)*
I write sins not lit reviews	*Panic! At the Conference*
How do you solve a problem like urea?	*The Sound of Mannich*
Boc to Black	*Boc-Street Boys*
In The End	*Linkin Park*
Bump n' Grind (my rotovap)	*(R)-Kelly*
Stairway to Tenure	*Pb Zeppelin*

Scheme 3: Popular chemistry-themed songs.

In conclusion, we're no strangers to catalysis. You're familiar with Ingold's rules, as are we. A comprehensive study's what we're thinking, which is unlikely to result from another group. This paper aims to inform the community of our feelings on this matter, and to help them understand that we're…
NEVER GONNA GIVE YOU UP, NEVER GONNA LET YOU DOWN, NEVER GONNA RUN AROUND AND DESERT YOU!!! NEVER GONNA MAKE YOU CRY, NEVER GONNA SAY GOODBYE NEVER GONNA TELL A LIE AND HURT YOU!!!

Author Contributions

P.T, F.C, J.S, E.G, J.P and A.M. played background music while G.S. prepared the manuscript.

*The supporting information is currently undergoing maintenance, but we can offer a replacement spectral service, which is a collection of random NMR's lifted from the journal *Dolphin Transactions.* Reviewer 2 never noticed.

Notes and references

1 There is no reference 1, but we can't be arsed renumbering.
2 "House nitrogen" refers to the "inert" gas supply plumbed into the fume hoods of many laboratories. Its composition is variable, and it often contains O_2, H_2O and CO_2.
3 K. Kahverengi, M. Mierda, R. Braun, G. Schlonk, 2021, *J. Immat. Sci.* **1**, 10–12.
4 B. I. Ology *et al.* 2020, *Cells N. Stuff*, **45**, 183495–183496.
5 D. R. Parton, 1980, *J. Mus. Chem.* **23**, 1.
6 Cyclic Echometry is like cyclic voltammetry, but instead of drawing a duck, it just sounds like one.
7 B. L. Black, M. Bianco, F. Katzenjammer, 2002, *J. Black. Chem.* **S2E1**, 13:22.

PHYSICS

The Flatom™: a Novel Atomic Theory Inspired by a Flat Earth

I.B.Lyin,[A] R.U.Stoopyd[B] and C.U.Leighter[C]*

Abstract: Drawing from the recent scientific consensus that the Earth is flat, we disclose a new model of atomic theory proposing that atoms are also flat. In fact, every subatomic particle is flat except neutrons which are shaped like little pretty stars. This postulate, dubbed Flatomic Theory™, is in perfect agreement with contemporary and classical experiments conducted by scientists who erroneously believed that the atom was shaped like a ball. Morons.

Keywords: Atomic Theory, Flatom™, Flat Earth.

1. Introduction

The Earth is flat. Finally, the scientific community has embraced the truth acknowledged by many to be obvious: the Earth isn't a weirdly shaped ball. In light of Flat Earth Theory, this study examines the topology of particulate matter, concluding that the atom is also flat.

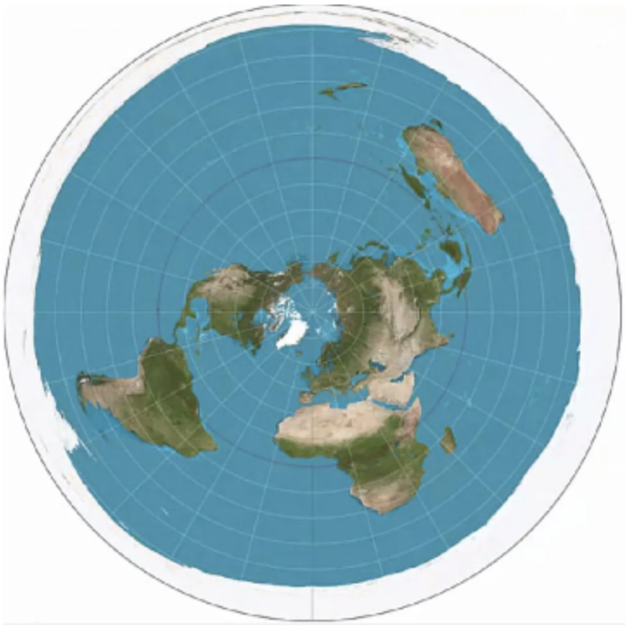


Figure 1: A map of the Earth as seen from above. See how it already looks like an atom, with most of the mass in the middle? Uncanny.

Previous works on atomic theory include those of Ernest Rutherford,[1] Niels Bohr,[2] and a bunch of other, more difficult-to-write names that we'll not include here as we're too lazy to do so. The Flatom™ model not only works with all previous experiments but also explains some of the weird shit that subatomic particles get up to.

John Thomson proposed that the atom had electrons with his famous cathode ray experiment. This should've been the first clue that the true nature of the atom is planar. The cathodic rays, now known to be electrons, manifested as a line on glass tubes, not as little balls, therefore proving that electrons are little flat lines. Furthermore, the deflecting magnetic coils of the apparatus curved this line, proving these small lines to be negatively charged. And what's the symbol for the negative electric charge? **A small flat line.** Exactly. Mind blown.

Ernest Rutherford proposed that the atom had a nucleus and a region he called the "electrosphere", a mostly empty spherical space where the electrons would be. This was after his gold foil experiment, in which he shot a beam of alpha particles at a sheet of gold foil and a few of the particles were deflected. His mistake, however, was in attributing the penetration of alpha particles through the gold foil to empty spaces inside the atom, when there's a simpler explanation: the atoms are flat and were all laying on their sides.

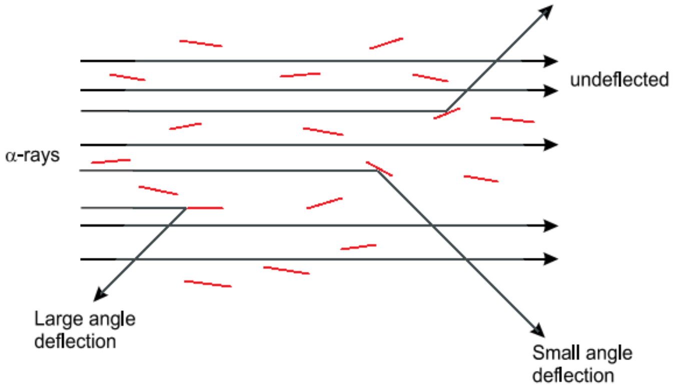


Figure 2: Rutherford's experiment through the eyes of the Flatom™.

The Flatom™ theory proposes that the alpha particles that were deflected came into contact with the electrodisc and their trajectory was modified.[3] Most atoms were laying on their sides because the material used was gold, which is a solid metal, densely packed with its atoms all neatly organized.[4]

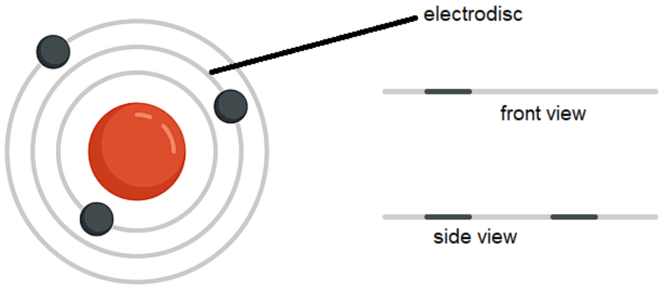


Figure 3: The Flatom™ as seen from above, front and side.

Another famous experiment probing the nature of subatomic particles is the double-slit experiment. It is notable that this experiment validated Flatomic Theory™ two centuries before this theory existed. It is, after all, an experiment using two flat slits, not

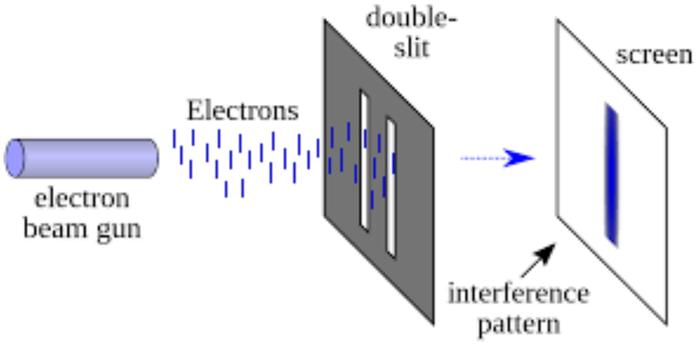


Figure 4: Electrons pass vertically through the vertical slits creating the interference pattern. If electrons try to pass horizontally or diagonally, they can't. This is called the Vertical Exclusion Theory.

A. Department of Untruths, University of Atlantis
B. His own home, as no one would accept him as a researcher
C. Somewhere. Everywhere. Where life leads him.

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DOIOU: 10.2D

two round holes. The flat atom model explains perfectly whatever the hell happens here, and the interference pattern is also a single line from all flat electrons passing vertically through the slits. The truth is no one knows exactly what's happening as far as subatomic particles are concerned.[5] Predominantly, work in this field is based on smashing stuff into other stuff to see what comes out. Practitioners prefer to call this "high energy particle physics" and object to comparisons with monkeys banging rocks together. Emeritus Professor M. Gandalf dismissed this assertion in his acceptance speech for the Nobel Prize in thaumaturgy: "He that breaks a thing to find out what it is has left the path of wisdom".

This model requires a complete overhaul of how we draw molecules. VSEPR theory is still valid, but to better represent the planar nature of atoms, all future drawings should use a single, horizontal line to represent all atoms and all subatomic particles (with the exception of the neutron, which is a pretty little star). The authors are aware this may be impractical at first, but we urge the scientific community to leave its errors behind and do justice to science.

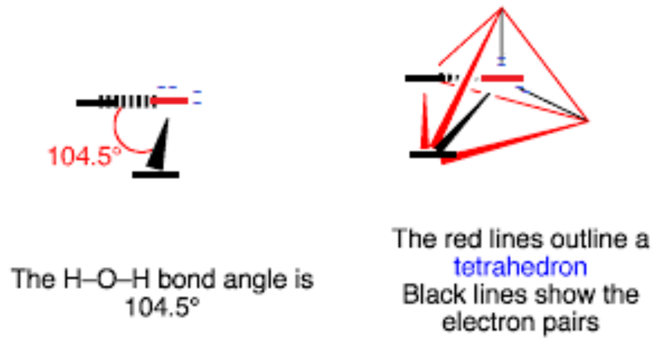

Figure 5: Water molecule represented through Flatoms™. The authors are too lazy to draw more complex molecules.

A final experiment was conducted to support the planar nature of the atom. The authors are audiophiles, and the Flatom™ looks similar to a LP Vinyl record. Curiosity struck: if a flat vinyl disc is capable of producing sound, so too should be an atom – its energy levels working as the grooves on a disc when struck by a needle. And what would be the sound made by each different element? We took it upon ourselves to test this and began poking different types of rapidly spinning matter with an atomic force microscope. The results can be found below.

Element	Sound Produced
Hydrogen	Starlight - Muse
Helium	Here Comes The Sun – The Beatles
Lithium	Oxygen – Spice Girls
Nitrogen	Teriyaki Boyz – Tokyo Drift
Oxygen	Lithium - Nirvana
Iron	Iron Man – Black Sabbath
Nickel	The entire Nickelback discography
Uranium	Radioactive – Imagine Dragons

Table 1: Sounds produced by atoms when struck by an AFM tip, akin to LP vinyl records on a record player. Interesting results point to Lithium being Oxygen and vice-versa all along.

Conclusion

"This we know: that the atom is flat." – I.B.Lyin

If our planet, the sheet of paper or computer/smartphone screen you're reading this on, and the tail of a platypus are all flat, why shouldn't the atoms inside them be flat too? Future study opportunities include trying to explain why celestial bodies are round and if their atoms—unlike ours on Earth—are also round. Also, we aim to prove that string theory is 100% correct, since strings are lines and lines can be flat. Also, we aim to understand why the fuck the neutron is a pretty little star-shaped weird thing.

Acknowledgements

Humanity, for finally accepting that the Earth is flat. All undergraduate students involved in this tremendously important study. They weren't paid properly but who cares amirite?

Warning

All Flatom™ rights reserved. Should you be willing to study the atom from now on, please transfer 11.11% of all funding to The Flatom™ Institute, Department of Untruths, University of Atlantis, or suffer severe consequences. You've been warned.

Notes and references

1 J. J. Thomson, 1897, *Phil.Mag.* **44**, 293-316.
2 E. Rutherford, 1911, *Phil.Mag.Series 6.* **21**, 669-688.
3 I. B. Lyin, 2022, *J.Immat.Sci*. Yes, I am citing myself. Citeception!
4 My middle school science teacher told me this once.
5 Common sense.

SEPARATION SCIENCE

The Ultimate Technique for Complex Mixture Separation: FUPLC-NMR-CE^6-GC-IR-ICP-MS-MS-MS-MS

*Günther Schlonk,[A] Günther Schlonk,[A] Günther Schlonk,[A] and Günther Schlonk[B]**

Abstract: Nothing we can write is funnier than a journal called Anal. Chem.
Specific: We have observed the trend of combining analytical instruments in series, and extrapolated it to the max.

The march of analytical chemistry is relentless. In the century-and-a-bit since the invention of chromatography, it has made great strides, from tubes full of sand to the million-dollar instruments of today. We have seen LC become HPLC, then UPLC, and MS become MS-MS, then MS-MS-MS. At this rate, the acronyms will take over by 2050, and chemistry will become just as incomprehensible as molecular biology.

The Schlonk lab is infamous for creating mixtures of hellish complexity, resulting from spectacularly failed reactions.[1,2] Consequently, we have a need for extremely powerful analytical techniques to help us figure out what on earth happened to our reactants. Conventional techniques such as UPLC and MS^3 are incommensurate with our needs, so we have been driven to develop our own instrumentation and methodology. We have constructed a device capable of isolating and fully characterising a new molecule from a complex mixture. This was accomplished by stringing together every analytical instrument we had in series. The result is the FUPLC-NMR-CE^6-GC-IR-ICP-MS-MS-MS-MS. (figure 1).

A. *Centre of Mediocrity for Segregation Science, University of West Failure*
B. *Department of Pyrofrolics and Inorganometallics, University of West Failure.*

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DOIOU: 10.FUPLCNMRCE6…

Figure 1: Two operators at the controls of the FUPLC-NMR-CE^6-GC-IR-ICP-MS-MS-MS-MS.

The Instrument

The instrument is about the same size as a semi-trailer, and currently occupies a small building adjacent to the chemistry department. Power consumption is equivalent to a medium sized city block, and the instrument requires copious amounts of argon, hydrogen, xenon, solvent and Taxol buffer solution. Thus, it may be some time before a portable version becomes available. Figure 2 shows a diagrammatic representation of the instrument.

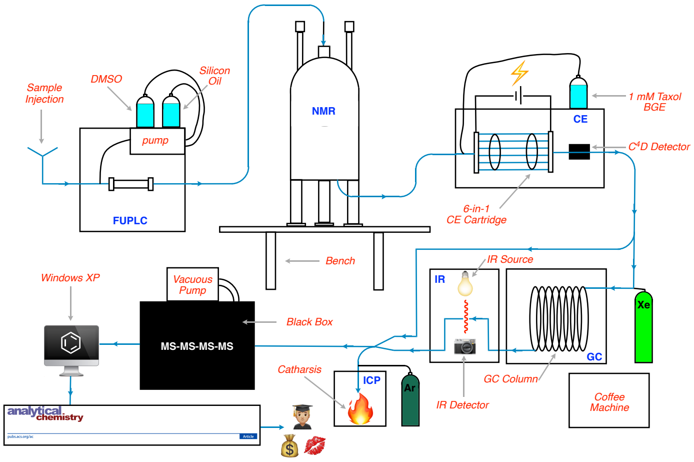


Figure 2: Diagrammatic representation of the instrument.

FUPLC-NMR

The instrument is designed to accept liquid samples, which are placed on a stone plinth, recessed into one side. Appropriate offerings and propitiations are made before the injectionator descends. Thanks to a fruitful collaboration with Flagellant Technologies, a range of commercially available columns have been adapted to function with our instrument (table 1).

Abnormal Phase	Perverse Phase
Silica	*C10 Silica*
Alumina	*C18 Silica*
PtO/Pentazole MILF	*Sand + Butter*
Powdered Mentos	*Styrofoam Packing Beads*
Icing Sugar	*Golf Balls*
Coffee Grounds	*Macerated Tyres*
Smythe's Column (LiOH slurry)	*Oceanic Microplastic*[3]

Table 1: Compatible stationary phases for FUPLC.

Of particular note is the platinum oxide/pentazole metal-inorganically-linked-framework (PtO/N_5 MILF) developed by Kimmel and Klein,[4] which contains enough theoretical plates for an entire Christmas dinner. Conjectural crockery aside, coffee grounds have recently been proposed as a sustainable and biodegradable column packing material. This may be the case, but running a blank on a new column is essential. We ignored this step, which led to our erroneous claim that Antarctic sea-ice contains caffeine at 2000 ppm.[5] The Smythe type column is ideal for the separation of basic molecules such as amines. It is most effective when freshly prepared by filling an empty column with *n*-BuLi and waiting a while.

Perverse phase columns are available for the separation of analytes at the far ends of the polarity spectrum. Conventional C18 columns are effective but expensive. A cheaper alternative is to treat sand with butter, which yields a passable imitation of C18 silica (though much less durable). Golf balls are also cheap and have a non-polar surface, but large void spaces reduce the efficiency of such columns. Styrofoam pellets have a much larger surface area, but careful selection of eluent is crucial to prevent the stationary phase dissolving. Oceanic microplastics are an ideal column packing: cheap, readily available (to excess, some might say), robust and with adjustable particle sizes.

A range of eluents can be used with the instrument, in either gradient or autocratic solvent programs (table 2).

Non-Polar Eluent	Polar Eluent
Silicon Oil	*DMSO*
Vacuum Grease	*Spryte (5% carbonic acid)*
Des-methyl Toluene	*$CDCl_3$*
Perfluorohexane	*Magic Acid (1% aq.)*
Crude Oil	*Brine*

Table 2: Solvent systems for autocratic elution.

Extensive optimisation is required for most samples, but as a general rule a gradient from 0–100% silicon oil/DMSO is sufficient to elute most analytes from a perverse-phase column.

Some time ago, we won a 420 MHz NMR spectrometer as the main prize at VariBrük's annual quiz night, (for those interested, the crucial question was "what's the difference between a duck?").[6] The spectrometer contains a new generation of Rh/Sr/Ho superconductors capable of operating at liquid H_2 temperatures, and is technically a bench-top instrument (provided you have an extremely large bench). Using the latest advances in NMR-flow technology, we have run the FUPLC-column through the guts of the spectrometer. This modification allows us to collect spectral information on our analytes in real time (sort of). Flow-NMR has some significant challenges associated with it, the first of which is the solvent. Several workarounds exist to prevent analyte peaks being swamped by solvent signals. The simplest, though most expensive, is to use deuterated solvents in the FUPLC. This is manageable when chloroform is a suitable eluent, but cost can escalate rapidly when THF is involved. Aprotic solvents like perfluorohexane and diphosgene also circumvent these issues, albeit with some added toxicity. Finally, a harsh program of solvent-repression can be conducted, to supress unwanted peaks.

NMR experiments must be conducted rapidly to account for the constant flow of analyte through the sample chamber. Conventional 1D-NMR spectra can be acquired, with some minor peak broadening (figure 3).

Two-dimensional techniques such as the ^1H-^1H HASTY (*Highly Accelerated Spectroscopy*) experiment can provide more comprehensible spectra (figure 4).

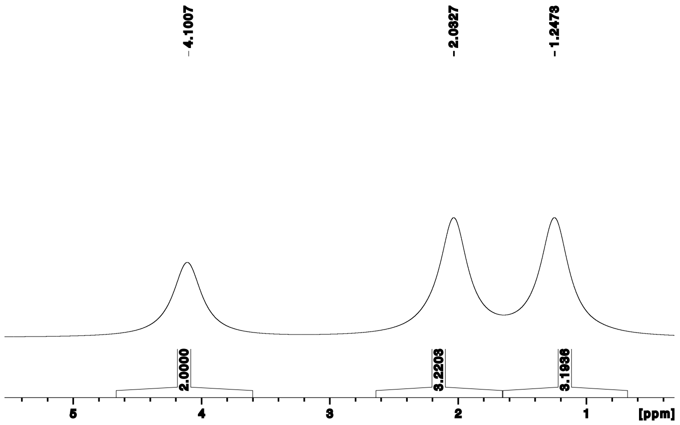


Figure 3: ^{1}H NMR of ethyl acetate under flow conditions.

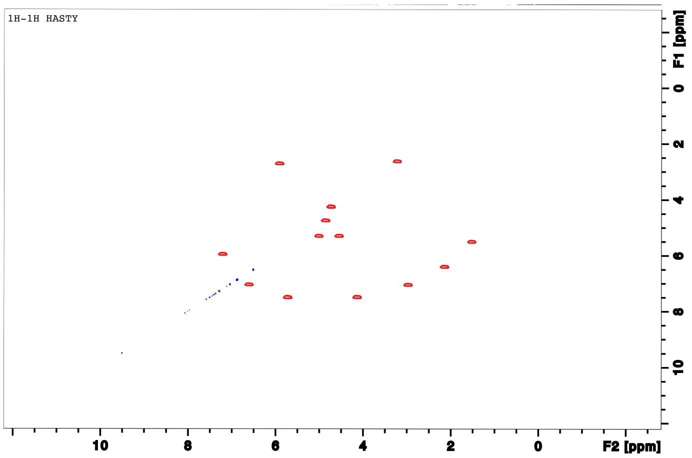


Figure 4: ^{1}H-^{1}H HASTY spectrum of serotonin.

CE^6

One of my students helpfully pointed out that this grey box I was using as a coffee table was actually a capillary-electrophoresis mass-spectrometer. We dusted it off and installed a new six-barrelled cartridge designed by Smythe and Wesson, allowing six fractions to be separated simultaneously. Chiral separations can be achieved with phthalidomide-coated capillaries and 1 mM Taxol background electrolyte. The voltage is supplied by a lightning rod on the roof, and detection is by Calamitously Capricious Contactless Conductivity Detection(C^{4}D).

GC-IR

Output from CE is split into two streams, one of which is nebulised, volatilized, and disorganised in an Aspirationalizer (patent rejected). Volatile components enter a GC column, propelled by xenon as carrier gas. While in the gas phase, the analyte molecules are irradiated with IR light, and absorbance spectra are obtained. Of particular interest are the C-H twerking, C-C bopping and C-O thrusting frequencies. Output from the GC is split between inductively coupled plasma (ICP) and MS^4 systems.

ICP

Analyte molecules are obliterated in a whirling vortex of argon ions at 10000 °C. This serves no practical purpose but is immensely satisfying to watch (figure 5).

MS-MS-MS-MS

The final stage of analysis combines the feeds from both the CE^6 and GC-IR and infuses them into a veritable mountain of mass spectrometers. Electrosquirt Idolisation (ESI) is used to produce the sample ions, which pass through an ion trapdoor into the vacuum chamber. A pressure of 10^{-10} Torr is maintained within the chamber by a vacuous pump, which scares gas molecules out of the chamber by playing *Keeping Up with the Kardashians* at high frequency. Ions are accelerated from 0 to 60 keV in 7 ms by charged plates designed by Ferrari.[7]

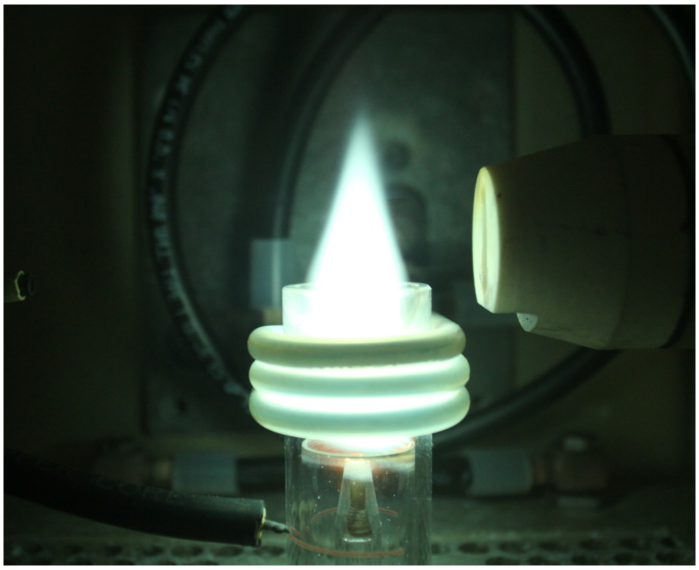


Figure 5: Some scientists just want to watch the world burn (Source: Wblanchard CC BY-SA 3.0 via Wikimedia Commons).

The first quadrupole is a traditional mass filter, while the second is a derision cell, in which ions are bombarded with insults to weed out those lacking commitment. The truly motivated ions make it to the third quadrupole, which can be tuned for specific analytes. For most analyses, tuning the MS to C major is sufficient, and causes the ions to oscillate rhythmically (a phenomenon known as quadrupoledancing). The final element is a dipolar political polarisation filter (DPPF), which separates the ions by their views on universal healthcare. Mass analysers are positioned to the left and far right, which provide the final signal output. The entire MS array is contained in a black box, both literally and metaphorically.

Data Processing

We have found that quantum computing is the only technique with sufficient power to process the complex data generated by the instrument. However, the instrument is only compatible with Windows XP, so good luck with that.

Conclusions

The FUPLC-NMR-CE^6-GC-IR-ICP-MS-MS-MS-MS should prove a powerful addition to any analytical laboratory. The instrument costs slightly less than the Iraq war, or about the same as the loose change down the back of Elon Musk's couch. Running costs equate to one student's kidneys per fortnight. With a full team of eight operators, a method can be developed and optimised in as little as six months, and a single sample can be analysed in <48 hours. The instrument is capable of performing the full characterisation of a novel molecule in one go. The only thing it can't do is X-ray crystallomancy, but it can make a coffee while you wait.

Acknowledgments

Günther Schlonk thanks Günther Schlonk for his diligent work on this project. Günther Schlonk acknowledges Günther Schlonk, it was a pleasure to work with him. Günther Schlonk, however, thinks that Günther Schlonk didn't pull his weight on this one, and that Günther Schlonk should be first author instead of Günther Schlonk.

About the Authors

Demeritus Professor Günther Schlonk seized power in a palace coup in mid 2021, and appointed himself Chemistry Tsar of the University of West Failure. His other titles include Satrap of Satire, Toastmaster General and Provost of the Plebs. He is the Imperial Editor in Perpetuity of The Journal of Immaterial Science.

Conflicts of Disinterest

Günther Schlonk is not an analytical chemist, and this article has made that abundantly clear.

Notes and references

1 G. Schlonk et al. *J. Immat. Sci.* 2021, **1**, 1–35.
2 G. Schlonk et al. *J. Immat. Sci.* 2021, **1**, 35–69.
3 C. Klein, J. Kimmel, T. Kapputke, O. Yogi, R. A. Freud, *J. Immat. Sci.* 2021, **1**, 43–45.
4 Microplastic was responsibly sourced from the stomachs of deceased sea turtles.
5 G. Schlonk, *Sci. Part. Envi*, 2020, **4**, 568–567 (retracted).
6 Answer: one of its legs is both the same!
7 R. Hammond, J. May, J. Clarkson, A. Twat, *Top J. Chem*. 2011, **69**, S1E1–∞

MATERIAL SCIENCE

Preparation of an Amorphous Starch-Sucrose Organic Framework (ASS-OF) with Ice Cream and Strawberries

A/Prof. Seuss[A] and Günther Schlonk[A]*

<u>Abstract:</u> Urban dictionary defines procrastibaking as "the practice of baking something in order to put off doing something else". We were putting off writing this week's paper, and two pointless activities merged into one…

The science of materials is one of the fastest-growing areas of chemistry. High-level journals are flooded with papers about, well, how shall we put it…

MOFs and ZIFs, TOFs, and SPLIFs,
Polymorphous monoliths,
Nanoparticles, macropores.
Floors and floors of these chemical bores,
and sifting these papers is a terrible chore.

Quantum dots to prevent blood clots,
organic frameworks tying gasses in knots.
Lots and lots of these miniscule spots,
quickly assembled in endless "one pots".

They tell us they're grand at hydrogen storage,
and sooner or later they'll be powering your fridge,
your house and your car.
They cost next to nothing and come in a jar.

"There's nothing" they say "that MOFs cannot do"
"They can clean up the water and eat CO_2*"*
And the latest breakthrough,
of the Yaghinaut crew
is a slew of new MOFs that can cure Wu-Flu.
How it all works we haven't a clue.

These papers, in stacks,
they slip through the cracks,
and find their way onto the covers of JACS.

That about sums it up. But as JACS has declined to publish all our other work,[1] it seems we are left with no choice but to jump on board with Omar and the Yaghinauts. Here goes…

MOFs and their friends have revolutionised yadda yadda yadda, catalysis etc. economical and scalable and so on. Many MOFs rely on potentially pollutant metals like zinc, which must also be mined at great cost to the environment. We believe that this issue could be addressed by developing a metal-organic-framework without the metal. An organic framework (OF) such as this would be both sustainable and biodegradable.

Most MOF's are prepared by relatively simple dump-and-stir reactions, so to be competitive, our organic framework must also be easy and rapid to assemble. One of the easiest-to-perform reactions in chemistry is the Maillard reaction, in which sugars and protein-derived amino acids are condensed and dehydrated to produce a whole assortment of nitrogenous molecules. It is one of the main reactions involved in the cooking of foods, and a rare example of a chemical process in which a complex mixture of brown products is desirable.

We chose substrates for our reaction that were sustainably sourced and readily available: starch, sucrose, triglyceride esters and avian albumen. By mixing these major components with several additives and annealing the resultant slurry we obtained a spongy brown solid. Analysis by electron microscopy suggested that we had successfully prepared an amorphous starch-sucrose organic framework (ASS-OF) (figure 1).

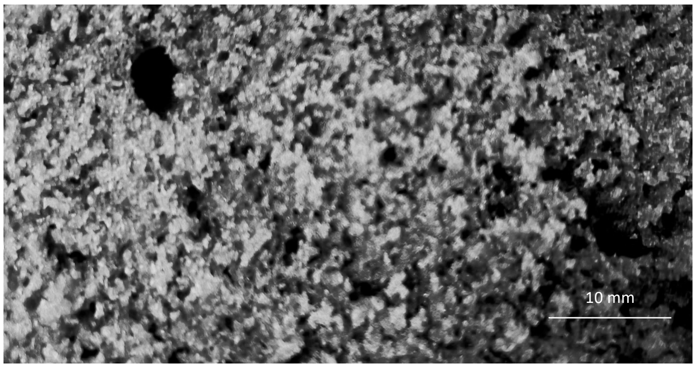


Figure 1: SEM image of our ASS-OF.

The majority of the pores measure in at ~1 mm, with some larger voids (5 mm) also present. Nitrogen uptake studies indicate that a hefty slice of ASS-OF has the same surface area as Clive Palmer (*vide supportus*). IR spectroscopy of the material showed prominent C-C bending, jiving and flossing bands, characteristic of crosslinked saccharide chains.

Having characterised our ASS-OF, we then tested its utility for the kinds of things that people usually do for MOFs. It does adsorb CO_2, but all you get is fizzy cake. This prompted us to pick an easier target, so we tested our ASS-OF against Chanel's MOF-No. 5 in the absorbance of rhodamine B12 from water.[2]

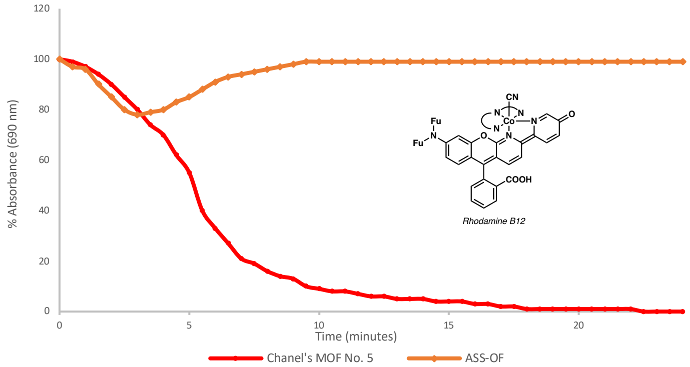


Figure 2: Uptake of the fluorescent dye rhodamine B12 by a MOF and our ASS-OF. Decreased absorbance at 690 nm = more uptake.

A. Department of Pyrofrolics and Organometallics, University of West Failure
** Corresponding Author: günther.schlonk@onlyfans.de*

Preparation Time: 6 hours Reading Time: 15 minutes Serves: No Purpose
DOIOU: 10.180 °C.60min

As expected, Chanel's MOF No. 5 efficiently removed >99% of the dye from an aqueous sample within 20 minutes. ASS-OF initially showed similar effectiveness to MOF No. 5 but began to disintegrate after about two minutes. The result was a soggy brown mess, and complete re-release of the dye back into solution. Bollocks.

Penultimately, we tested our ASS-OF as a solid phase for high-performance-liquid-chromatography (HPLC). While initially counter-intuitive, the ASS-OF has some appealing properties for this application. Packing HPLC columns is a difficult and tedious process, and as such it is common to prepare a custom packing in-situ, using the column casing as the reaction vessel. This is a facile process with ASS-OF, as the reaction mixture is an easily pourable paste prior to annealing at 180 °C (figure 3A). Alternatively, the ASS-OF can be prepared in a metal tin, and simply sliced into the required shape with a bread knife (3B).

Figure 3: A) ASS-OF reaction mixture, prior to thermal annealing B) A custom-carved ASS-OF monolith, with strawberries and ice cream.

Confident of success, we prepared two HPLC columns by the methods described above, and tested their efficacy in the separation of small library of mobile phenones (nokiaphenone, *i*-phenone, *o*-pophenone and lenovophenone). Unfortunately, in our eagerness to prove the worth of our creations, we neglected to test the structural integrity of our substrate under pressure. Or to install a guard-column. So now the HPLC is full of cake crumbs and the technicians have cancelled our lab access.

To address the lack of structural integrity, ASS-OF can be exposed to air for >5 days. A gradual oxidative process produces a significantly firmer material, which we have called amorphous starch-sucrose oxidised-organic-framework or ASS-OOF for short. We're still not allowed to use the HPLC, so we tested ASS-OOF as a solid phase for ultra-low performance thick-layer chromatography (ULPTLC) (figure 4).

Figure 4: A) Separation of mobile phenones by ULPTLC. Milk as eluent. B) The consequences of letting the ULPTLC run too long.

Visual detection of the analytes was challenging, so we prepared another batch of ASS-OOF with 1% fluoresceine (ASS-F-OOF). With this modification, it was possible to determine the retention factor of nokiaphenone was 0.5± 0.6. At this stage, our ASS-OOF was going mouldy, so this result will have to be "good enough."

An example preparation of our ASS-OF is provided below. For detailed discussion of the optimisation of this procedure, see the electronic unsupported information: https://tinyurl.com/4tpvhnvm

Procedure for Preparation of ASS-OF by Maillard Reaction

Starch (insoluble, 500 g, 80 mesh, 6 % protein, 1 equiv.) and sucrose (250 g, 0.5 equiv.) was added to a flat-bottomed, wide-neck flask maintained at room temperature in air. This was followed by the addition of sodium hydrogen carbonate (10 g, 2 mol %), tartaric acid (15 g, 5 mol %), sodium chloride (2 g, 1 mol %), and theobromine (60 g, 10% w/wt on carbohydrate support). In a separate flask, avian albumen (3 equiv, 4.98 x 10^{-24} mol), glyceryl 1-myristate-2-palmitate-oleate (150 g, 0.3 equiv.) and 4-hydroxy-3-methoxybenzaldehyde (1 mL, 10% in EtOH) were suspended in DHMO (250 mL). The contents of the second flask were added in one portion to the solid reactants, and the resultant mixture was mechanically stirred at r.t. for five minutes. When the reaction mixture was fully homogenised, it was transferred to a steel crucible and annealed at 180 °C for 1 hour. The reaction was cooled to r.t., dusted with sucrose (50 mesh), garnished with strawberries, and served with ice cream.

Unless otherwise stated, reagents were sourced from May and Baker and used as received.

Conclusion

ASS-OF isn't useful for all that much, but it tastes damn fine.

Acknowledgements

The authors wish to acknowledge N. Lawson for providing the inspiration for this work.

Author Contributions

T. S prepared the MOF-poem. G.S. prepared the manuscript, the ASS-OF and T.S. for life in the real world.

About the Authors

T. Seuss recently received tenure and was promoted from Dr to Assoc. Prof. at the University of West Failure.

…As Günther furtively filled his TLC chamber with milk and chocolate cake, he pondered if he would even notice the onset of a mental breakdown…

Conflicts of Interest

We're sure someone has done something like this experimental section before, but we can't be bothered checking. We have too many actual papers to not-read, we can hardly be expected to lit-search for bullshit, can we…?

Notes and references

1

2 C. Klein, J. Kimmel, T. Kaputtke, O. Yogi, R. A Freud. 2021, *J. Immat. Sci.* **1**, 43–45.

STATISTICAL THERMODYNAMICS

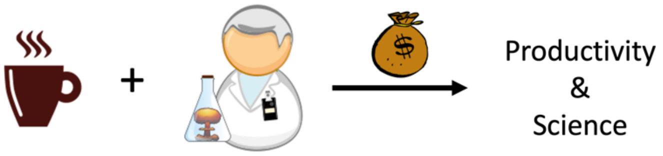
Discovery and Characterization of a Novel Limiting Mechanism with Applications in Coffee Delivery and Optimization

James Clerk Maxwellhouse[A] and Leonhard Oilthissystemup[B]

Abstract: Prior to this work, transport processes were either classified as diffusion limited or thermodynamically limited. We report the discovery of a novel third type of limitation: giveadamn limiting. Giveadamn limited processes are inexplicable through classical and statistical thermodynamics or through most state-of-the-art (totally made up) transport phenomena theories and techniques. Giveadamn limited processes are uniquely only described by underpaying and overworking foodservice staff as we will show through Monte Carlo simulations, conducted by the authors while angrily waiting on coffee.

The conversion of scientist and coffee into productivity and science is a scheme that is well understood. It is also well understood that this process is not spontaneous, rather it must be catalysed by money. The availability of this catalyst is the major factor inhibiting unlimited productivity and the creation of good science.

With the recent advances in timely and convenient service, a "fast casual restaurant" has developed a state-of-the-art coffee subscription service compatible with a mobile ordering app. The claim of this service is unlimited coffee or tea (please note the mechanism for the conversion of tea to productivity is outside the scope of this paper, so the authors have chosen to pretend that it does not exist starting… now).



Scheme 1: The well-understood money-catalysed conversion of coffee to productivity (Source: Openclipart via Wikimedia Commons).

The establishment is located within 5 minutes' walk from the laboratory buildings on a campus of a large university located somewhere on Earth. Despite the claim that coffee is unlimited, orders may only be placed for free every two hours. As such the authors frequent this establishment every two hours, typically 5 to 6 times a day.

The authors observed variability in wait times. On a Wednesday, the authors were forced to wait over an hour before being handed coffee cups that they filled themselves at the self-serve station. While waiting, Dr. Maxwellhouse loudly mused about the inefficiencies of the process which prompted Dr. Oilthissystemup to suggest Monte Carlo simulations to see if a random walk would result in faster coffee delivery.

It was ascertained that the coffee cups were stored at the back left corner of the space behind the counter. The measurements in front of the counter were accurately recorded; however, estimates had to be made for the dimensions behind the counter because the authors were told that police would be called if they went behind the counter with a tape measure again. Figure 2 gives a graphical representation of the scenario.

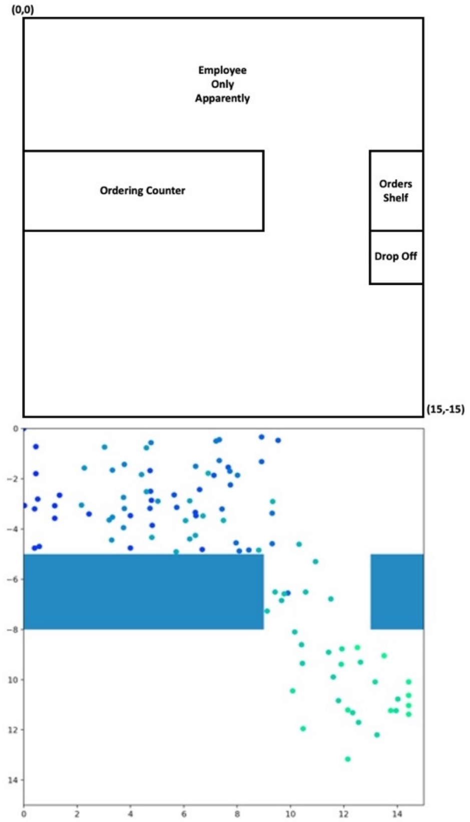


Figure 2: Diagram of the store to scale along with a random walk path.

Monte Carlo simulation of a random walk in the store.

The authors conducted a random walk in the store. The coffee cup starts at (0,0) and is considered delivered when the walk enters the drop off area. The walker was prevented from walking through counters or walls. The walker was assumed to take a 0-2 ft step every 1 second. Please note that the average walking pace is 2.5 ft steps twice a second;[1] however, the employees are quite short and lethargic, so the authors used conservative parameters.

The simulation was conducted 69,420 times and the number of steps was recorded. The average number of steps required to deliver the coffee was 371. The simulation was repeated with 100,000 trials and similarly, the number of steps was 370. Distributions are shown in figure 3. That means that the average delivery time from a random walk is 6 minutes and 11 seconds. It was at this point that the authors realized a randomly moving coffee cup would appear faster than the one we bought with our allowance.[2]

Figure 3: Distribution of simulated times to deliver the dang coffee.

A. Immaterial Engineering, Fancy Private University, Earth
B. Clickity-Clack (computational) Research Institute, Fancy Private University, Earth

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DOIOU: 58-08-2

Thermodynamic origins of this limiting mechanism

The authors found a classical thermodynamics textbook online. The advanced search algorithm known as Ctrl + F did not yield any results for the following keywords: “coffee”, “caffeine”, “why so damn slow”. As such we conclude that there is no classical thermodynamic explanation of this limitation in the rate of coffee delivery.

Naturally the next step is to investigate statistical thermodynamics as the explanation. Since it is well known that the reaction is easily catalysed by money, the process ought to be highly spontaneous. This process is easily generalized to include the use of money to catalyse the procurement of any item given that there is enough catalyst. There is a notable exception that must be stated. The transfer of money to gift cards does not preserve the catalysing effect in the procurement of goods or services. Dr. Maxwellhouse learned this lesson when he attempted to exchange gift cards for an extended warranty on his used Toyota Corolla, which did not aid in repair costs when he backed into a telephone pole.

Given the spontaneous nature of the process, an ensemble of researchers held at constant temperature, identity, (lack of) richness, exhaustion, and depression (TIRED) was chosen to study these phenomena. Unfortunately, it is very difficult to simulate sentient researchers in an environment that observes the economic system of exchanging money for coffee. Luckily, the authors were surrounded by several dozen individuals who perfectly fit the TIRED ensemble – graduate students. Discussion with the graduate students uncovered that at places other than this specific establishment the reaction occurs very quickly (within minutes at a Christian poultry place, we are assured).

Conclusion

Given the fact that the random walk and TIRED ensemble estimate a much faster delivery time upon transfer of catalyst, we conclude that this process must be a novel limiting type that is not explained by diffusion or thermodynamics.

The giveadamn limited process is not well understood but the following things are known to be true. The process is only observed when employees are underpaid and overworked. The authors can confidently conclude this based on two pieces of evidence. Firstly, Dr. Oilthissystemup asked a worker if they made good money and the worker replied, “hell nah”. Secondly, the authors frequent this establishment 5 to 6 days a week, 5 to 6 times a day, every 2 hours and always see the same 4 workers at the location. Given that the authors are certain they are overworked, a proof by equivalence is left as an exercise to the reader.

The authors suggest the following ways to remove the giveadamn limitation on the system. 1.) Have one dedicated employee set out coffee cups as we do not care if the food delivery is giveadamn limited. 2.) let the authors grab their own cup. We are literally there 25 times a week, we just want to be friends and drink coffee.

Acknowledgements

We would like to acknowledge our moms. They wouldn’t be proud of this paper, but they would be mildly amused and concerned with our quickly deteriorating mental health. We love them a lot.
Also, coffee.

Author Contributions

The authors did not contribute equally.

Dr. Maxwellhouse contributed snarky commentary and the ability to hold a grudge for decades.

Dr. Oilthissystemup contributed the computational expertise, good grammar, and comforting words of encouragement.

About the Authors

The authors went to rival schools and would like the readers to know that we each think the others alma mater is a disgrace to higher education.
Dr. Maxwellhouse and Dr. Oilthissystemup both received their doctorate degrees in immaterial science from an online website that they printed at a public library.

Conflicts of Interest

The authors wrote this in a fit of blind range induced by crippling caffeine withdrawals while having to wait for coffee for over an hour.
Dr. Oilthissystemup has been stealing the coffee at the establishment for multiple weeks after getting too annoyed to wait for his cup.
Dr. Maxwellhouse made his suggestions to the store managers repeatedly through email and in person conversation until he was asked to not return to the store.
This paper was peer reviewed in-house by Dr. Beth Folger.

Notes and references

1. We googled it and took the first result at face value with no further thought.
2. The authors are given allowances by our life partners that significantly out-earn us by not being academics.

SPECTROSCOPY

Alternative Strategies for NMR Processing and Impurity Suppression: BS-NMR

Eileen Dover,[A] and Günther Schlonk[B]*

Abstract: It’s only a bit of ethyl acetate, what does it matter, right?

Specific: Have you ever attempted to reproduce a literature procedure, compared your shitty barcode-style spectra to their exhibition-grade masterpiece and exclaimed “how the fuck did they do that?” Then perhaps you too have encountered BS-NMR.

Acquiring NMR data for publications can be gruelling, time consuming and infuriating. Supporting-information (SI) files are now the third largest category on the internet, after porn and cat videos. The average SI is thicker than MTG, with hundreds of spectra attached. Each one is a monument to a molecule that was synthesised, purified, dried, analysed, processed, and assigned, representing months of tedious and repetitive work. So, it’s hardly surprising that some in the chemical community have sought to “*streamline*” this process with some “*unconventional post-spectral processing*” techniques. Funding at the University of West Failure has grown pretty tight, so our group needed a citation smash-hit sharpish to keep us off the streets. Lacking any inspiration of our own, we thought we could rip off that Goldberg paper[1] by listing these techniques, collectively known as PS-NMR (photoshop-NMR), BS-NMR (self-explanatory) or ^{1}H-TRIKSY. This work will be of use to both cheating authors and reviewers trying to catch them. As long as they both cite us, we don’t care which is which.

For a first pass at BS-NMR, it’s important to establish if the reviewers at your chosen journal are even going to read your SI. This is particularly important for the higher-tier journals. As a rule, their reviewers have less available time, more fulfilment in life,

A. Institute of Instrument Science, Middlefart, Denmark
B. Department of Pyrofrolics and Inorganometallics, University of West Failure

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DOIOU: 10.ijatmatopshimrgazg

partners who love them and children they can tolerate. This attitude is often reflected in their rushed approach to your work. In this case, try attaching your NMR spectra as raw, unprocessed FID, and pray that your reviewers only read as far as the corresponding author's surname (figure 1).

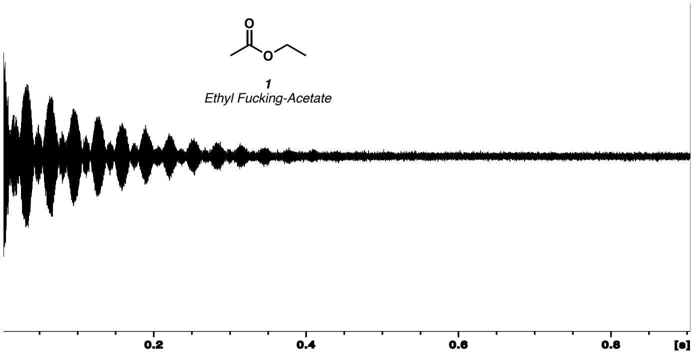


Figure 1: An NMR spectrum of ethyl acetate (**1**). The Fourier transform is left as an exercise for the reader.

Reviewers at discipline-specific journals, however, will gladly take a week off work to go through your manuscript like an air crash investigator, looking the faintest hint of a grease-peak.[2] In this case, you're screwed. But if your reviewers inhabit the middle ground, BS-NMR can improve a manuscript with minimal time lost. As the old adage goes, "an hour in the library can save a day in the lab, but an hour in photoshop can save six months."

The next simplest application of BS-NMR is "selective cropping". This technique is particularly useful when desirable peaks are grouped at one end of the spectrum, and impurities at the other. In this case, one can simply chop off the unwanted end of the spectrum (figure 2).

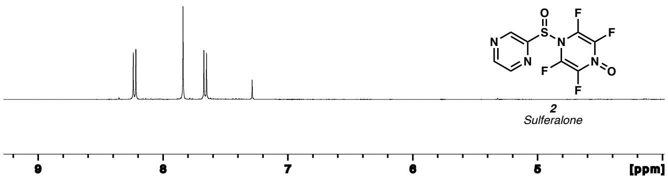


Figure 2: A selectively cropped ^{1}H spectrum of Sulferalone©.

This sample could be full of solvent residue, grease, water and assorted other shit, but no one will ever know. Let us turn now to a sample that actually is full of solvent residue, grease, water and shit. Figure 3 shows a sample of the popular study-drug, potassium procrastinate (**3**).

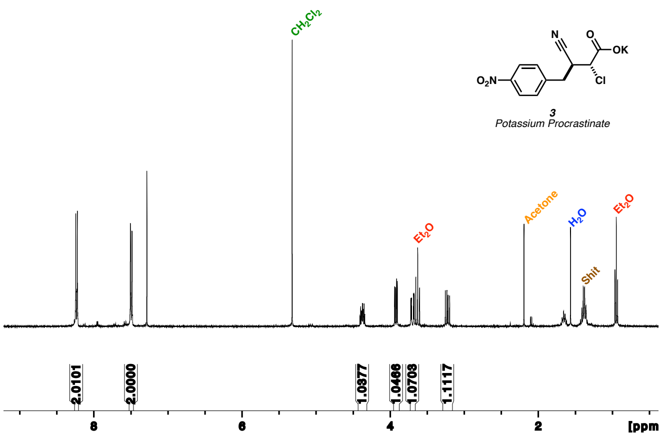


Figure 3: A ^{1}H NMR spectrum of street-grade potassium procrastinate.

When obtained from street dealers, this narcotic is frequently cut with organic solvents, amorphous silica and vacuum grease. The sample displayed above clearly exhibits several of these undesirable additives. A popular method of supressing multiple impurities like this is to zoom the whole spectrum out to an almost sarcastic extent (figure 4).

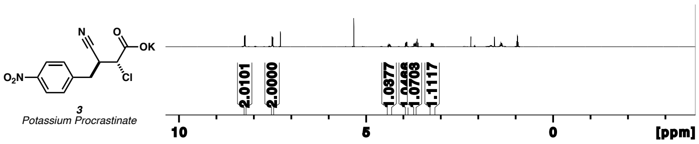


Figure 4: Expeditious use of zoom in Varibrük's *Backspin.exe* program.

The more astute reviewer will request an enlargement of this figure, at which point they may notice the additional peaks. The optimisation of this spectrum will therefor require more rigorous methods.

The DCM peak at ~5.5 is large but narrow, making it susceptible to the "white text box treatment" (figure 5A). This is only noticeable upon magnification. The acetone, water and shit peaks are too broad to be effectively resolved by this method (figure 5B), representing a clear case for "localised baseline correction". When performing this correction, it is imperative that the new baseline is appropriately phased (figure 5C) and tuned to the correct nucleus (figure 5D). Finally, the ether triplet at 0.9 ppm is amenable to "*selective amplitude subtraction*" (figure 5E).

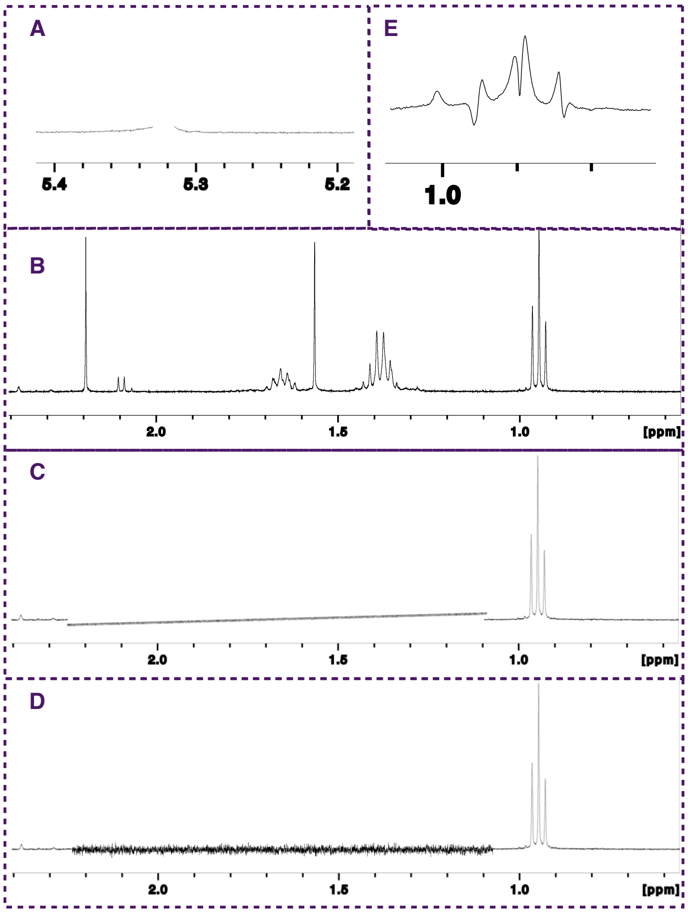


Figure 5: A) *White text box (WTB) suppression* the CH_2Cl_2 signal. B) Impurities too broad for WBT suppression. C) Poorly phased *localised baseline correction*. D) Poorly tuned *localised baseline correction*. E) *Selective amplitude subtraction* of an Et_2O residual signal.

With this array of operations, it is possible to turn most shitty NMRs into something vaguely publishable. Yet there are some researchers out there who choose, for whatever reason, to entirely fabricate their spectral data. This is typically done by using NMR prediction software, and passing off the result as real data. We used the *Faustian* software package to generate an NMR spectrum of the antipsychotic drug *Profanidol* (**4**, figure 6).

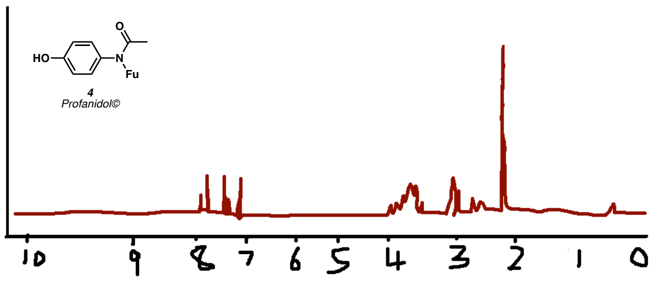


Figure 6: Crude ^{1}H NMR of Profanidol, generated using *Faustian.exe* and visualised with *Casa Nova*.

The processing methods described above may become redundant, with the recent announcement from the CCDC that it is permissible to state that “solvent peaks have been omitted for clarity”.[3]

Conclusion

There may be more ways of doctoring NMR spectra, but no one has been caught using them yet. When this happens, we’ll be there to report it.

NMR spectra were collected in deuterated olive oil on a 420 MHz Varibrük Advance III spectrometer. Other experimental data, spectra and reaction conditions are available from behind the bar at The Kings Head, 42 Phlogiston St, Little Whining, West Failure. Just knock three times and ask for Mickey.

Acknowledgements

The authors wish to thank the chemistry community at large for providing the inspiration for this work.

Author Contributions

Eileen Dover sourced the drug samples for figures 2–6. Günther Schlonk processed the data, prepared the manuscript, and bribed reviewer 2 with a bottle of scotch.

About the Authors

Günther Schlonk lost his *membrum virile* in a lab accident in 2007. He now refers to his testicles as his “lone pair”.

Conflicts of Interest

Günther Schlonk has never used these techniques personally, but has published some pretty dubious spectra in *ACS Peripheral Science*.

The authors regret that nothing they can write is as funny as Proton Enhanced Nuclear Induction Spectroscopy.

Notes and references

1 K. I. Goldberg et al. 2010, *Organometallics.* **29**, 2176–2179.
2 Not to mention any names (JOC).
3 Everyone on Twitter for about two weeks in January.

ORGANIC CHEMISTRY

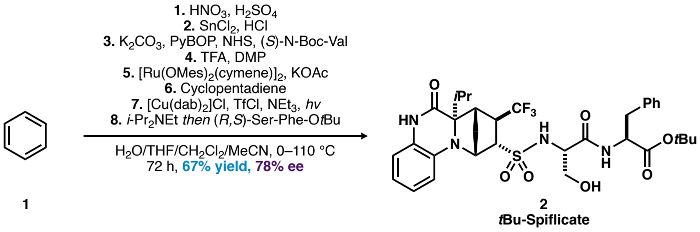
Fat Arsines Make Ours Bigger than Yours: One-Carbon Homologation of Alcohols with War Gas and Jumper-Leads

Legate Beef Cheeks[A] and Günther Schlonk[A]*

Abstract: Ours is bigger than yours.

Specific: We report experimental conditions for the one-carbon homologation of terminal alcohols, to allow existing natural products to be made even bigger. This was accomplished by recovering an arsine-based war gas from WW1 artillery shells, and functionalising molecules with it. The resultant arsines were electrochemically oxidised with the aid of a car battery and some jumper leads, and some radical shenanigans with $SnMe_4$ gave the homologated product. This methodology was applied to the longest known natural product: Maitotoxin.

Let us be frank: total synthesis is a dick-swinging contest. Naturally, those in the field seldom admit the fact. We prefer to waffle on about the beauty and elegance of a synthesis, and the dubious biological activity displayed by our targets. This is, of course, bullshit. Step count, molecular weight, contiguous stereogenic centres, enantioselectivity; these are all just metrics used by chemists to impress and intimidate each other. We are perfectly willing to spend a year of gruelling labour making milligrams of a minor component of shower scum, just so we can unzip our resumés, whip out our *JACS* and flap it onto a conference round-table. The evidence is plain to see for everyone with $40 or access to Sci-Hub. Scheme 1 shows a classic example of the lengths to which chemists will go to get the step count down. This reaction was taken directly from a paper in *ACS Peripheral Science* in which the authors claim to make the drug *t*Bu-Spiflicate in three steps.[1]



Scheme 1: A “one-pot” nitration-reduction-peptide-coupling-deprotection-oxidation-directed-C-H-activation-Diels-Alder-ATRA-acyl-substitution.

While the step-count of a total synthesis is certainly an important factor, ultimate bragging rights go to the biggest molecule. In this pissing contest, marine organisms tend to pack the most heat. Figure 1 illustrates this point.

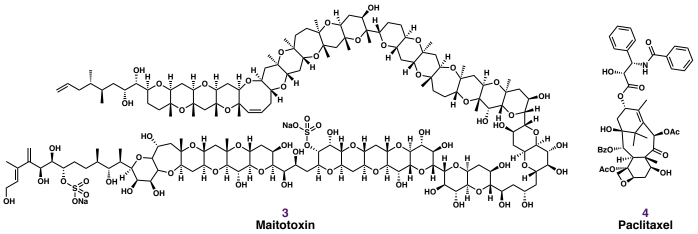


Figure 1: Maitotoxin (**3**), a polyketide toxin isolated from a dinoflagellate and paclitaxel (**4**), a chemotherapeutic drug isolated from the Pacific Yew tree.

Maitotoxin (**3**) contains the longest known carbon chain of any natural product, at 142 carbons. On the surface, **3** is clearly more impressive than Paclitaxel (**4**), with four times the molecular weight and a forest of chiral methyl groups. One could argue that **4**’s structure is actually more interesting than **3**’s, with a (6.8.6.4) ring system and cheeky nitrogen on the side. **3**, on the other hand, is just ketone-origami taken to an absurd extent. In the context of a dick-swinging contest, however, it’s only the surface that counts.

It was this observation that led us ponder: is there a way we could get something bigger to swing with, without having to undertake a 90-step synthesis? What if we could take Maitotoxin (**3**) and extend the carbon chain by one? While synthetically challenging, it seemed more achievable than making the whole thing from scratch, which even the great Casey Nicolaou is yet to accomplish.[2]

A. *Department of Pyrofrolics and Inorganometallics, University of West Failure*
* *Corresponding Author Contact: günther.schlonk@OnlyFans.com.de*

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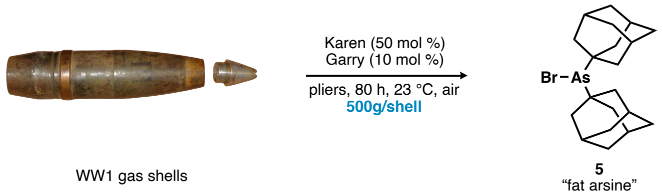
Our 20-minute google search elucidated no existing methodology capable of selectively activating the terminal carbons of **3**, so we resigned ourselves to developing some. The structure of **3** presents two entry points for chain elongation: a terminal alkene or a primary allylic alcohol. Initially, activation of the terminal olefin appears to be the saner choice as only three other alkenes are present. In contrast, activating a single hydroxyl group in the presence of 27 others is a daunting challenge to traditional notions of chemoselectivity. On closer examination, however, there is light at the end of the tunnel. The terminal alcohol is primary, while the other 27 are secondary. Perhaps a suitably bulky electrophile could be found to react selectively with the terminal alcohol…

The solution to this quandary was found in the darkest corner of the basement chemical store, in a large crate marked "ACHTUNG – KAMPFSCHTOFF". The crate was found to contain artillery shells dating from the first World War, laid down by Günther's great grandfather.[3] Each shell contained a payload of the chemical warfare agent "Arschenstoff II" which is now known as Di(1-adamantyl)bromoarsine, or more colloquially as "fat arsine." This molecule perfectly fits our need for a bulky electrophile. Finding such a stash was also fortuitous, as Smegma-Aldrich no longer stocks this vile-smelling hell-brandy. The shells were CAREFULLY disassembled to retrieve the arsine (scheme 2).

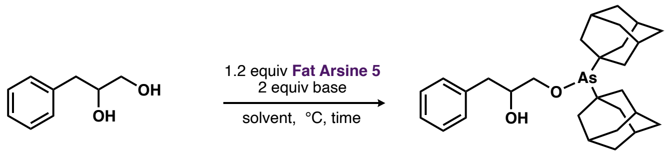


Scheme 2: Extraction of fat arsine **5** from gas shells.

Given the obvious dangers associated with this procedure, several precautions were taken:

1. Our least valuable students were used to extract the arsine.
2. A site far from human habitation was chosen for as the extraction location. After careful consideration, we selected the physics building.
3. A suitable scapegoat was positioned down-wind from the extraction site, so that any escaping fumes could be blamed on someone else. The West-Failure Sauerkraut Festival was effective for this purpose.

Ten shells were extracted, yielding a total of *ca*. 5 kg of fat arsine **5**. With the reagent in heavily-gloved hand, we set about testing its effectiveness and chemoselectivity in the arsenylation of alcohols (scheme 3).



6

7

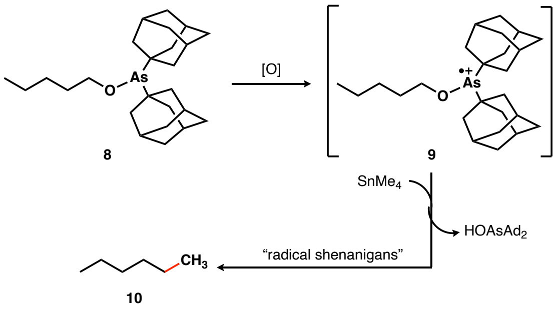
Time (h)	Temp (°C)	Solvent	Base	Yield (%)
8	23	THF	Na_2CO_3	3
8	60	THF	Cs_2CO_3	8
8	110	PhMe	KOtBu	7
8	150	DMF	$BaCO_3$	12
8	190	DMSO	$BaCO_3$	21
8	190	DMSO	$RaCO_3$	36
24	190	DMSO	$RaCO_3$	45
48	190	DMSO	$RaCO_3$	59
96	190	DMSO	$RaCO_3$	65
120	**190**	**DMSO**	**$RaCO_3$**	**71**
240	190	DMSO	$RaCO_3$	72

Scheme 3: Optimisation of arsenylation conditions.

Our initial conditions gave exceptional selectively, with no traces of the secondary arsenolite detected by FUPLC-NMR-CE6-GC-IR-ICP-MSMSMSMS.[4] Our elation at this success was dampened by the atrocious yield of the desired arsenolite **7**. This was steadily improved by harshening the conditions, until the point of "good enough" was reached at 71% yield. Refluxing the starting materials in DMSO for a week with radium carbonate (another basement find) did the job. It is possible that a quantitative yield could be achieved by heating the reaction until early next century, but, as the great Winston Churchill once said: *"fuck that".*

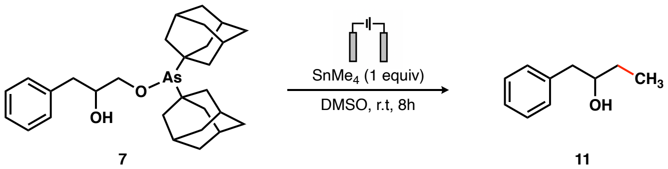
We feel it is appropriate at this point to mention the smell of arsine boiling in DMSO. It is almost indescribable, but we're going to have a go anyway. These reactions smell like a cement mixer of rotten garlic and raw sewage being baked in a kiln. They smell like a thousand autoclaves full of blue-vein cheese, like the onions growing betwixt Clive Palmer's fat rolls and like a fridge of jellyfish frying in a desert, all rolled in one. One does not really smell the arsine, so much as feel it. Not like the stab of $SOCl_2$ or the greasy caress of butyric acid, but as a kind of sucker-punch to the soul and a wrench to the spleen at the same time. But a paper is a paper, so *c'est la vie*.

With our dubiously desirable arsenolite accessed, we next sought conditions to activate **7** towards nucleophilic substitution. Unlike triflates and tosylates, arsenolites are poor leaving groups. A landmark study by Ratchet and Clank revealed that one-electron oxidation of arsenolites such as **7** produced arsininium radical cations.[5] These fleeting intermediates were trapped with organostannanes, in an overall C-C bond-forming process.



Scheme 4: Clank's mechanism for oxidative couplings of arsenolites and stannanes.

Clank's group used chemical oxidants such as periodate to accomplish this transformation. To increase the novelty of our work, we have chosen to use electrochemistry instead, as it's all the rage these days. These conditions were optimised as displayed in scheme 5.



7

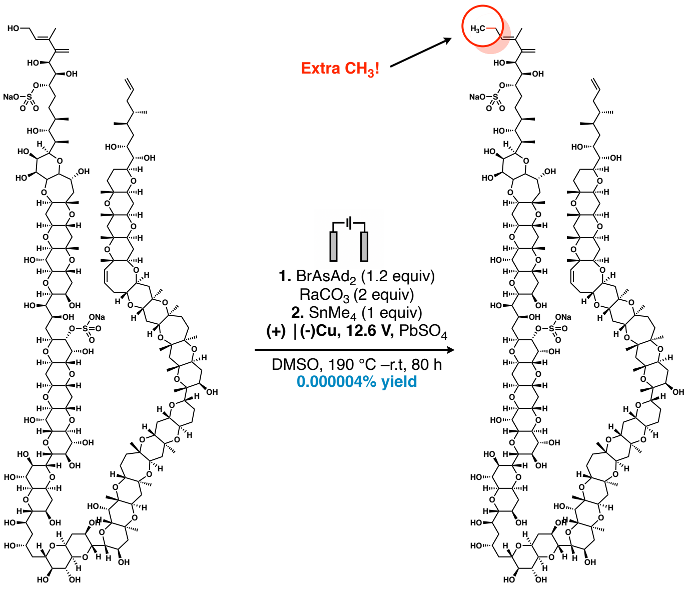
11

Voltage (V)	Electrode	Electrolyte	Yield (%)
1.5	Graphite	NBu_4BF_4	6
1.5	2B Pencil	$KClO_4$	2
1.5	Steel Wool	$KClO_4$	1
1.5	Rusty Spoons[6]	$NaNH_2$	26
12.6	Jumper Leads	$H_2SO_4/PbSO_4$	43

Scheme 5: Electrochemical homologation of arsenolite **7**.

Conventional conditions with graphite electrodes and TBABF were largely ineffective, while switching to perchlorate and pencils resulted in spontaneous ignition of the reaction mixture. Rusty spoons were surprisingly effective, but we eventually lost our patience and hooked the reaction up to a car battery. This proved sufficient motivation to convince **7** to react, and an acceptable yield was obtained.

Finally, we applied these conditions to the homologation of Maitoxin **3** (scheme 6). Obtaining a sample of this compound was challenging, but we eventually found a milligram for sale on Alibaba.com. This milligram was dissolved in a drop of DMSO and subjected to the conditions described above, while contained in the tip of a pipette. The minuscule scale of the reaction made the workup challenging, and preparative mass-spectrometry was found to be the only viable method of obtaining the product. This was accomplished by placing a small vial in the path of the ion beam, and setting the mass filter to 3409 *m/z.*



3
Maitotoxin

12
“Schlonkotoxin A”

Scheme 6: Preparation of Schlonkotoxin A.

By this method, ~1.2 femptograms of a new molecule were obtained, with a mass spectrum matching that predicted for **13**. Solely on this basis, we feel confident in claiming that we have successfully prepared our target. Being stereotypically egocentric chemists, we have chosen to name this new molecule “Schlonkotoxin A”. Some might argue that **13** is not a natural product, as it has been prepared synthetically and is not naturally occurring. We posit that it is 99.59% natural, and as chemists, we just round that up to a neat 100%. As such, **13** is now the longest existing natural product, and we'll be waiting by the phone for a call from *Nature.*

Conclusion

Total synthesis is like the TV show Wipeout, in which contestants attempt to hurdle a set of contrived obstacles for no real-world purpose. We have demonstrated this by taking the largest existing natural product and tacking an extra methyl group on the end, in an extremely contrived example of one-upmanship. Experimental data, spectra and reaction conditions would be available if this article hadn't been written at 4am during a bout of fever-driven insomnia.

Author Contributions

Legate Beef Cheeks supplied the basic idea but lacked the commitment to see it through. Günther Schlonk was tired and desperate, so stole this one.

About the Authors

Legate Beef Cheeks is so well-rounded that he's basically spherical. Günther Schlonk isn't.

Conflicts of Interest

That will depend entirely on how this article is received.

Notes and references

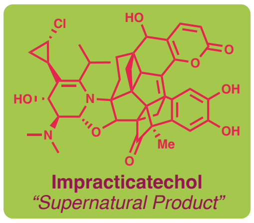
1 C. C. Dry, 2021, *ACS Peripheral Science.* **6**, 744–745.
2a C. Nicolaou, 2015, *Organic Memos.* **124**, 123–456.
2b Just put it into Wikipedia, do we have to do everything for you?
3 These shells were held in reserve in case the University of West Failure ever questioned the need for a chemistry department.
4 G. Schlonk, G. Schlonk, G. Schlonk, G. Schlonk, G. Schlonk, 2022, *J. Immat. Sci.* **2**, 14–16.
5 R. Ratchet, C. Clank, 2009, *Dolphin Trans.* **66**, 123–456.
6 S. Fingers et *al*, 2004, *J. Chem. Comed.* **2**, 11.

ORGANIC CHEMISTRY

Impracticatechol 2: Electrochemical Boogaloo

Mildew Mould,[A] Huffin Ether,[B] Lassitude Jones,[C] Günther Schlonk[D] and Burnie Urethra[A*]*

Abstract: **We made impracticatechol. Almost.**



Specific: **A rip-roaring yarn! This paper has everything: a diabolical foe, a plucky protagonist, romantic interest, and molecular sieves. This long-awaited sequel to “Impracticatechol 1: A Partial Total Synthesis” is the second instalment of Burnie's epic saga: The Carbo Cycle. Acclaimed by the New York Times as “making less sense than Tenet” and by George R. R. Martin as “the best thing since sliced Ned,” this paper has revolutionised the field of synthetic chemistry. Students worldwide have been queuing outside bookstores, dressed as their favourite chemists, just to get their gloves on a copy. “We couldn't put it down.”– *Penury Bridge Times***

Not long ago, in a laboratory not far away, we embarked on a quest. A quest to boldly go where no chemist had gone before. A quest to synthesise impracticatechol (**1**). This Gordian Knot of fused carbocycles was isolated from the nightmares of a graduate student in 2016.[1] The student, Holden Captiva, was subjected to Soxhlet extraction with 40% ethanol—a process she did not survive, despite previous form. Her erstwhile supervisor, Winnie Bago, managed to assign the structure of the isolated molecule before his arrest and incarceration for dissolving a student without ethics approval.[2] This procedure can't be repeated for obvious reasons, so impracticatechol can only be accessed via synthesis. In 2021, we began such a synthesis by performing a Friedel-Crafts acylation of catechol with glycoyl chloride.[3] Extensive optimisation of this fundamentally flawed reaction led to a 6% yield of **6** (figure 1B). The time has come to finish what we started.

A convergent synthetic pathway to **1** was deemed essential because the structure is so fucking horrible. Our first disconnection was to separate the hemidemiaminal **2** from the polycyclic core (**3**), a transformation we believed to be achievable via the electrochemical boogaloo reaction (scheme 3A). We anticipated

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A. Department of Pharmacy, Rural University of Penury Bridge
B. Bunnings Warehouse
C. Australasian Royal Society for Evolutionary Science (ARSES)
D. Department of Pyrofrolics and Inorganometallics, University of West Failure
** Author Contact: schlonkitup@onlyfans.com.de*
** Author Contact: www.twitter.com/@TheRealBurnie*

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that incorporation of the catechol portion by Nebuchadnezzar coupling would allow for the concomitant formation of the pentavalent carbon at *C5* (scheme 1B). The hemidemiaminal **2** is derived from the amino acid *L*-joline (**7**), while the core structure **4** maps onto the natural product 6-epi-frustratin (**8**). This is fortuitous, because **8** would be really hard to make.

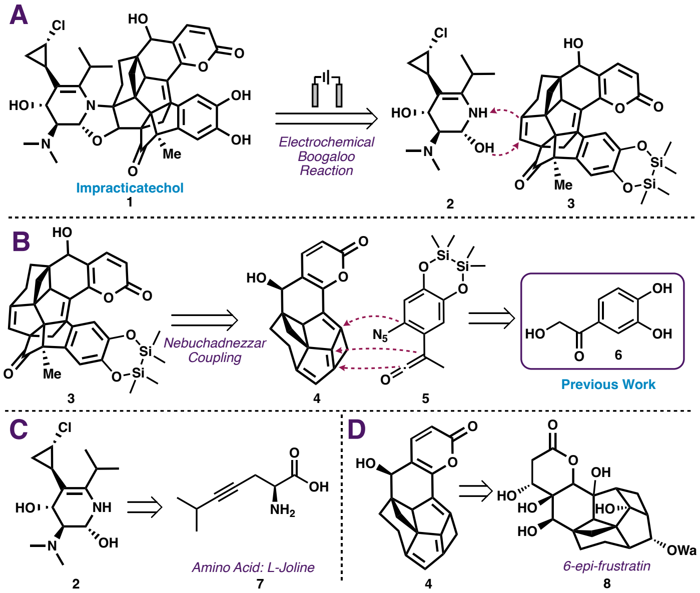
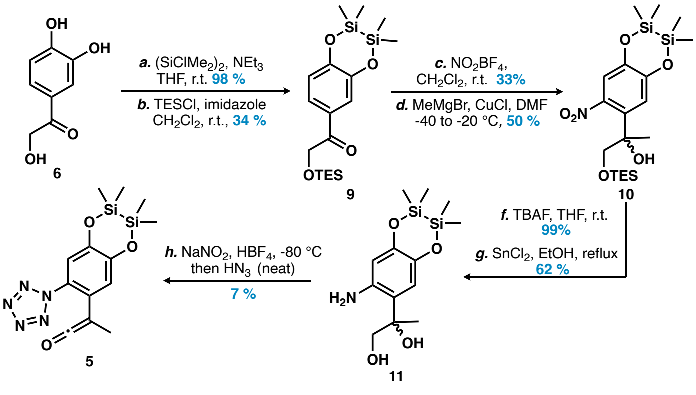


Figure 1: Retrosynthetic analysis of impracticatechol: A) Union of the polycyclic core and the pendant hemidemiaminal by electrochemical boogaloo. B) Incorporation of the catechol fragment by Nebuchadnezzar coupling. C) Derivation of the piperidine fragment from the amino acid joline. D) The polycyclic core of impracticatechol maps onto the natural product 6-epi-frustratin. *Wa = α-waitrose*

We began our synesis with the heavy-handed application of protecting groups to substrate **6** (scheme 1). To prevent the catechol from playing silly buggers, it was tied up with a disilane.[4] This reaction proceeded with surprising ease and selectivity. The remaining alcohol was TES-protected to give ketone **9**. **9** was nitrated with NO_2BF_4, in a reaction entirely devoid of regioselectivity. A statistical mixture of nitrated products was obtained, which was fractionated by tandem X-crystallomancy/mechanical separation. This time-consuming procedure has proved to be something of a bottleneck in our synthetic route to **1**. Residents of Penury Bridge are experts at getting things through the necks of bottles (there's sod all else to do here) so we found a way through. MeMgBr was added to the intermediate ketone to give alcohol **10**. Stoichiometric copper was found to be a necessary additive, to prevent MeMgBr getting jiggy with the nitro.



Scheme 1: Preparation of pentazolylketene **5**.

TBAF was used to remove the TES from **10** while leaving the disilane intact. The ease with which this reaction was accomplished surprised us, as we had anticipated significant cleavage of the disilane as a side-reaction. This result further demonstrates the robustness of such disilanes. Following deprotection, stannous chloride was used to reduce the nitro group, giving aniline **11** in 62% yield. In one blast-proof pot, **11** was diazotised with $NaNO_2/HBF_4$ and pentazolafied with hydrazoic acid. Simultaneously, a double-dehydration of the vicinal diol took place to generate a ketene (**5**). Pentazole **5** is indefinitely stable when stored in liquid He, but is best used immediately before it polymerises into exploding plastic.

The amino acid joline does not occur in humans but is found in a pacific sea squirt called *Fictomammarus dollypartonia*.[5] Females of this species secrete a tetrapeptidic sex-hormone comprised solely of joline units (*H_2N-Jol-Jol-Jol-Jol-OH*) which they use to lure males away from other females. The squirt's etymology stems from its appearance: ivory mantle, auburn ocellus and cilia of emerald green (figure 2).

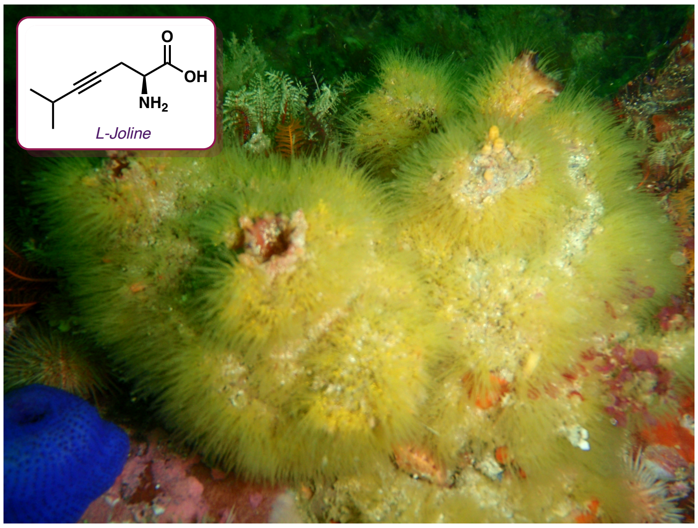
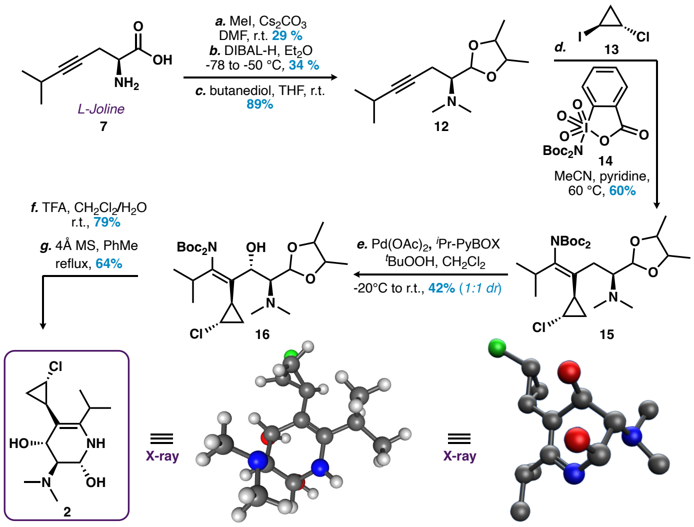


Figure 2: The stationary, adult phase of *Fictomammarus dollypartonia* (Source: Peter Southwood CC BY-SA 3.0 via Wikimedia Commons).

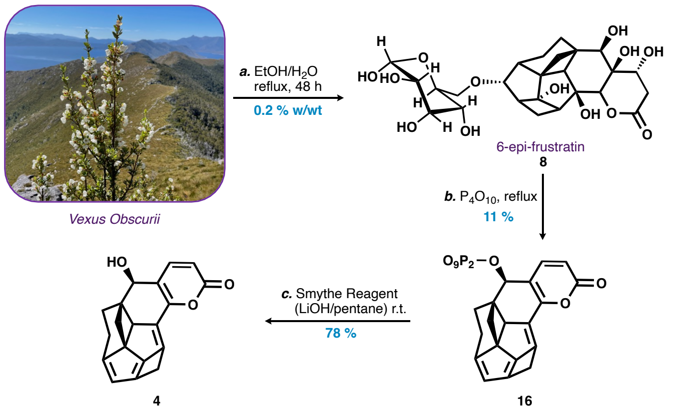
These critters are hard to obtain at scale, but bacteria have been engineered to express joline, making it commercially available. We thank the Aldrich group for providing us with a sample. Global methylation of *L*-joline followed by DIBALH reduction and diol condensation gave acetal **12** in mediocre yield (scheme 2).



Scheme 2: Preparation of the hemi-demiaminal fragment.

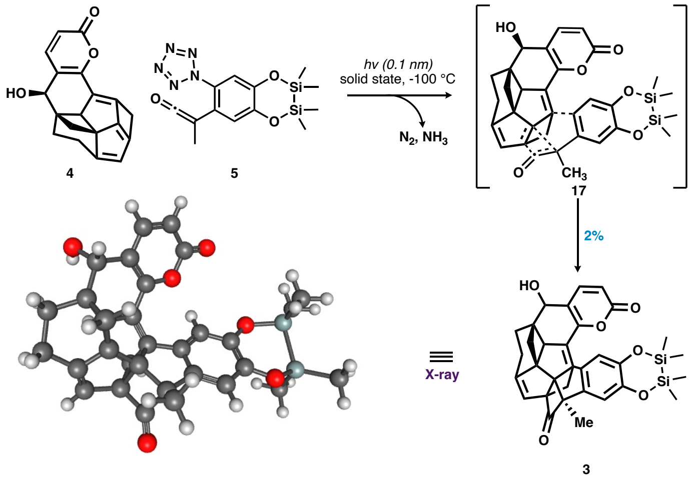
This material was subjected to a 1,2-diconfustication with cyclopropane **13** and ubervalent iodine reagent **14** to give enaminaminacetal **15** (scheme 2). A stereofutile palladium-catalysed oxidation of **15** gave a diastereomeric mixture of enaminaminacetalols **16**, which were resolved with chiral flash column chromatography on taxol-functionalised silica. Global deprotection with TFA followed by intramolecular condensation gave the desired hemidemiaminal **2** in alluring yield.

Turning now to the 6-6-6-5-5-4 ring system at the core of impracticatechol; we're fucked if we're making that from scratch. It just so happens that the natural product 6-epi-frustratin (**8**) possesses the same carbon skeleton. Hooray! Unfortunately, 6-epi-frustratin is only found in the top four leaves of the parsifal plant (*Vexus obscurii*), which grows only on the western slopes of north-facing ridges in the southern alps of east Tasmania.[6] It might as well come from fucking Narnia. Nonetheless, we are committed to the pursuit of our H-indices, so we dispatched Lassitude Jones to the end of the earth, where she decapitated the entire parsifal population to obtain 100g of plant material. Only after that expedition did we discover that the plant uses those leaves to reproduce, so the population is now doomed. Oops. Anyway, we extracted the material with ethanol to obtain 200 mg of **8**, which is present in the plant as a glycoside of the sugar α-waitrose. By refluxing the material in phosphorus pentoxide, all but one of the alcohols were eliminated. Unexpectedly, the remaining alcohol esterified with the P_4O_{10} to give **16**. A mild base was needed to gently cleave this ester, so **16** was stirred with 2 equivalents of the Smythe Reagent (~1.6 M LiOH in pentane).[7] This led smoothly to pyrone **4** (scheme 3).



Scheme 3: Isolation of 6-epi-frustratin from the Parsifal plant, and conversion to polycycle **4**.

By the time we got to this point, we found that our sample of ketene **5** had decomposed and we had to remake the bastard. Once we'd done that, we attempted the Nebuchadnezzar Coupling (scheme 4). This reaction is performed by co-crystalising the starting materials, cooling the crystal to 100 K and blasting it with synchrotron radiation.[8] These extreme conditions are required to overcome the substantial energy barrier to forming a pentavalent carbon. While not particularly scalable, it is a high-throughput methodology, and reaction progress can be monitored by X-ray crystallography. Yields were appallingly low, averaging at 2% isolated.

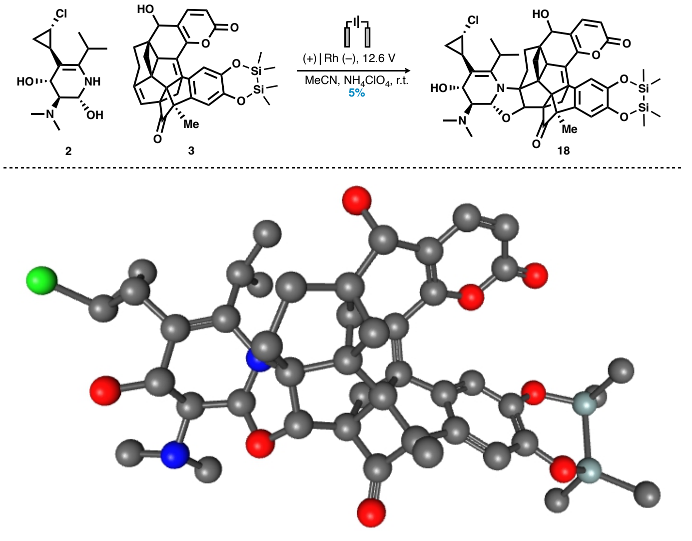


Scheme 4: Nebuchadnezzar coupling of **4** and **5**

The penultimate step on this journey was the one we feared the most. Synthetic electrochemistry is still in its infancy and much of the fundamental mechanistic groundwork is yet to be done. Thus, when we saw that Bill Pharan had published a paper in *Science* claiming to perform [3+2] additions of hemiaminals to alkenes with rhodium mesh and a car battery, we were sceptical.[9] Then we had a few pints at the Penury Bridge Tavern and said "let's base a year-long synthesis on this dubious paper without testing it first. Fuck it."

Suitably fortified with Dutch courage, we assembled the apparatus. Mildew kindly sacrificed the battery from her Honda, while Huffin obtained ammonium perchlorate from the IED aisle of Bunnings. Being lowly rural chemists, specialised rhodium electrodes are well outside our budget. We were able to improvise an electrode by "borrowing" the catalytic converter from the provost's Lexus and cutting sections with a band saw. This proved to be an effective if controversial alternative to commercial electrodes.[10]

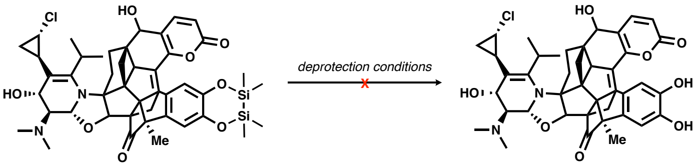
At this stage in the synthesis, we had 16 mg of material. Going back to the start of the synthesis and carrying another 500 kg of catechol through was a thought too painful to contemplate. We only had one shot at this reaction. Methodically, we dried our solvents, checked the purity of our reagents and sacrificed a goat to Scission, god of broken bonds.[11] To our immense surprise, the reaction actually fucking worked! Sure, there was a bit of decomp, but the product crystalised from the reaction mixture. These crystals proved of sufficient quality for X-ray crystallomantic data to be collected (scheme 5).



Scheme 5: The electrochemical boogaloo reaction of **2** and **3**.

We found the structure thus obtained to be physically arousing. Just look at the sensual curves of those MO's, the proud thrusting cyclopropyl and the lusty sheen of those sweet alkenes. One look at the bond angles tells you this molecule is into some kinky shit.

The only imperfection to be seen was the disilane protecting group, like a lonesome Band-Aid floating in the fruit punch. All that stood between us and *JACS* were those two silicon atoms. They had served their purpose, and now the time had come to expunge them. We stirred the milligram of material we had left in TBAF for 24 hours, only find a complete lack of reaction by TLC. Irked, we switched to a harsher fluoride source (KHF$_2$) without success. With mounting horror, we worked our way up these scale of fluorine reagents. None of them touched the silane. Even sparging the reaction with F$_2$ didn't achieve anything. In a fit of desperation, we charged a pressure vessel with fluorine and nuked it. The results were mixed. On the upside: we finally got a reaction. Unfortunately, that reaction was F$_2$ eating our molecule like the cookie monster. Our disappointment was exquisite.



18

1

Reagent	Solvent	Temperature (°C)	Yield (%)
TBAF	THF	r.t.	0 (r.s.m.)
KHF$_2$	THF/H$_2$O	60	0 (r.s.m.)
HF	H$_2$O	100	0 (r.s.m.)
HF	neat	10	0 (r.s.m.)
F$_2$	hexane	r.t.	0 (r.s.m.)
F$_2$	F$_2$	100	0 (decomp)

Scheme 6: Attempts to deprotect molecule **18**. r.s.m. = returned starting material.

Conclusion

Two weeks after the final experiment, we regained consciousness in a skip behind the Penury Bridge Hotel. Instead of completing an elegant total synthesis of a supernatural product, we made just another useless molecule, then brutally killed it. Just like TBS-taxol, Fmoc-morphine and 68-epi-maitotoxin, dialkoxysilane **18** is consigned to the scrapheap of papers even *J. Twit. Chem.* won't publish. But we are not defeated: we shall return. In another 12 months, we shall stride into the office like General MacArthur and slam a completed synthesis onto the covers of JACS. Until then.

Experimental data, spectra and reaction conditions will be made available upon request, provided that the request is accompanied by a cash incentive and does not come from our competitors.

Acknowledgements

JACS can suck our rump-trumpets! Fuck these wank-sticks and their H-indices, aye. We be doing the hours like coalmine pit ponies while these cocks and their cronies be slurping negronis and rejecting our homies. They so impact fatuous they count your worth with an abacus. How 'bout you quit scratching your itches for uncountable riches and use your CVs to score you some bitches? We know that sounds sexist and we're now on your red list of dubious dodgy disreputable chemists but fuck it my man, we don't give a shit. We just try to survive on the grants that we get. And if you think that our rampant relentless profanity is in terrible taste and a sign of depravity then that's fair enough, this life's tough enough, without gruff toughs like us shouting stuff in a huff. Just because our work was rejected and we were left feeling let down and dejected, that doesn't mean that we should cut loose, with insults invective and useless abuse. We're sorry we said you could suck our rump-trumpets, and for calling you soggy old crumpets and strumpets. That was rude crude and callous, it wasn't called for. We take it all back, just cut us some slack. It's hard work, you know, on this tenuous track, from post-grad to top-prof. without looking back. So, if you can find it in you to forgive us, then maybe we'll publish in somewhere prestigious, the next time we think we've got something auspicious. Until then, we'll go back to scrubbing our dishes.

Author Contributions

Mildew Mould performed the experiments. Huffin Ether sourced the reagents, don't ask him how. Lassitude Jones performed the experiments with joline. Günther Schlonk designed the experiments and prepared the manuscript. Burnie Urethra provided the inspiration for this project.

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10 *"Drunken chemists vandalise senior academic's car"* Penury Bridge Times, 5/6/22, page 7, bottom right, next to the dog food ad.

11 Footnote: Some academics have advocated the use of first-year students as votive offering to Scission. We find this counterintuitive, as the whole point of a sacrifice is giving up something of value.

ORGANIC CHEMISTRY

The Lost Molecules of M.C. Escher

Joost van Joopavloop[A] and Günther Schlonk[B]*

Abstract: **Sometime research doesn't have to have an application. Sometimes it's enough to make something that just looks cool. For example, consider the series of colossal chemical wagon wheels prepared in 2020.[1] Another example is infinitene: a fuzzed polycycle in the shape of the eponymous symbol.[2] Our work gets laughed out of *Nature* even when it has applications, so we thought we'd try something visually pleasing instead.**

Maurits Cornelius Escher was a 20th century Dutch artist. He is renowned for his mind-bending prints and paintings of peculiar perspectives and tricks of perception. These works are well worth a google, not least because we can't afford to reproduce them here. Less well-remembered, though no less impressive, was Escher's victory in the 1970 World's Greatest Eyebrows competition in which he narrowly defeated a young John Howard (figure 1).

Escher explored symmetry, tessellations and impossible objects like Penrose stairs and impossible waterfalls (figure 2). His work was gained popularity after his death, and has inspired books, art

A. Nijzeelutrechtkaatooschijndel Universiteit, Keijebijkaaiendonk, Netherlands
B. Department of Pyrofrolics and Inorganometallics, University of West Failure

Received: 7th January 2022 *Accepted 6th May 2022* *DOIOU: 10.000013%*

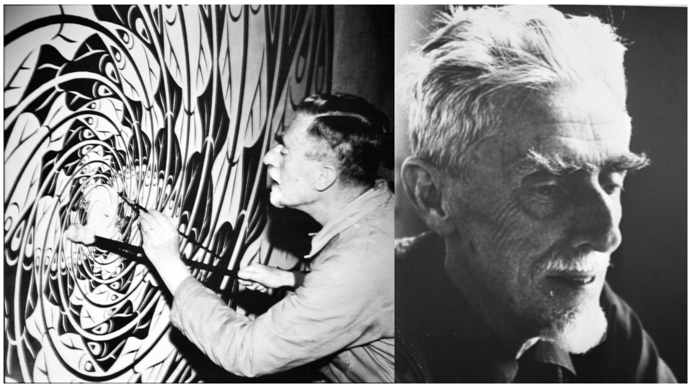


Figure 1: Escher with his art (left) and his eyebrows (right) (Source: Pedro Ribeiro Simões CC BY-SA 2.0 via Wikimedia Commons).

and architecture. For example, the front steps of the West Failure physics building were inspired by Escher's lithograph "Relativity." Nobody can figure out how to climb them, but because it's the physics building, nobody wants to: an example of Paoli's Exclusion Paradox.

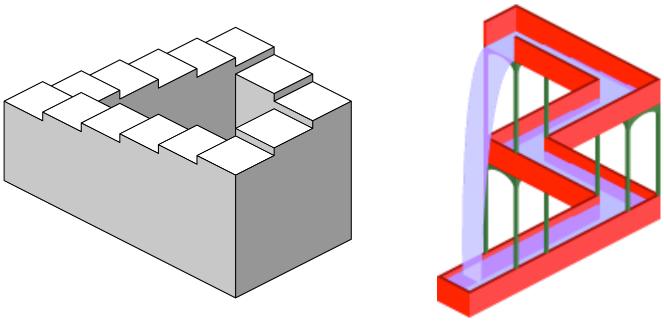


Figure 2: Penrose stairs and an impossible waterfall: motifs featuring in the works of Escher.

During his life, Escher corresponded with several mathematicians and a crystallographer on topics such as tessellation. This year, information has come to light that Escher branched out into other subjects too. A cache of documents, sketches and scribbles were found down the back of Escher's couch late in 2021 containing a trove of never-before-seen creations. Most prominent among them was a collection of hip-hop lyrics for use by the artist's alter ego: MC Escher. These works are completely incomprehensible and not just because they're in Dutch.

Of less interest to the general public were a series of recipes (such as one for an "inside-out cake") and a page of molecular structures. It appears that Escher had corresponded with noted Dutch chemist Heike Hjookvanjuvahenger on the subject of geometrically impossible molecules (figure 3).

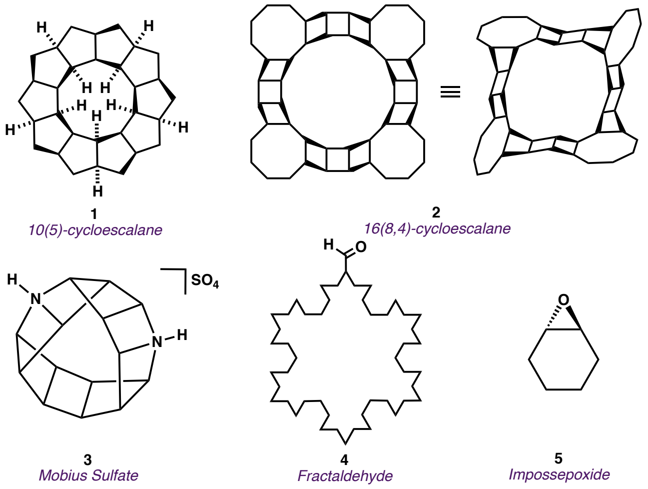
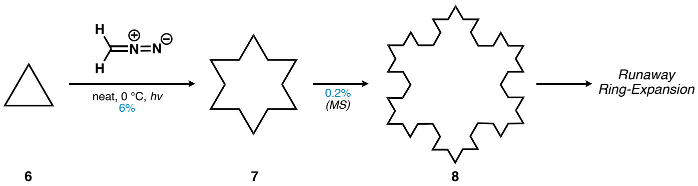


Figure 3: The lost molecules of M.C. Escher.

The cycloescalanes **1** and **2** appear to be chemical renditions of Penrose stairs, with each fused ring lying above its neighbour. Unsurprisingly, Fustian.exe crashes when one attempts to optimise the geometry of a cycloescalane. Mobius sulphate **3** is a tightly coiled Mobius strip, with a calculated ring-strain energy measured in tonnes of TNT/mol. For obvious reasons, no syntheses of these molecules have been attempted. The last two structures are more interesting. Fractaldehyde **4** formally bears the catchy IOUPAC name "cyclooctatetracontanecarboxaldehyde". It is a C48 cycloalkane with an aldehyde tacked on to make the name work. Most intriguing is a series of molecules entitled "impossepoxides" which appear to feature a delocalised oxygen above and below the plane of the fused ring. As a tribute to the great man, we decided to attempt syntheses of fractaldehyde and an impossepoxide.

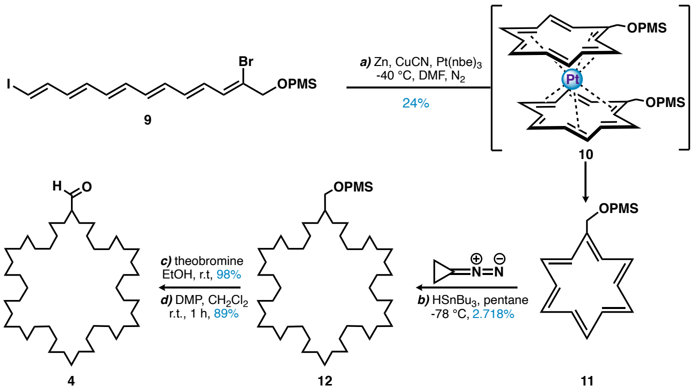
Beginning with fractaldehyde, we envisaged that an iterative series of radical ring-expansions from cyclopropane **6** could deliver the C_{48} core (**8**), with the aldehyde to be installed via a late-stage Garfunkel Carbunkelation. This did not work well. A low isolated yield of cyclododecane **7** was obtained and traces of the C_{48}, C_{192} and C_{768} were detected by mass spectrometry. These findings were indicative of runaway ring expansion (scheme 1).



Scheme 1: Non-viable route to C_{48} core of fractaldehyde.

Returning to the drawing board (pun intended), we decided to circumvent the aforementioned selectivity issues by switching from a Csp^3–Csp^3 to a Csp^2–Csp^2 cleavage in the crucial step. Polyene **9** was subjected to an intramolecular cyanocuprate addition with Pt^0 added to induce a template effect. Even with 50 mol% Pt, it was necessary to conduct a gram-scale reaction in an entire bathtub of DMF to supress the competing intermolecular reaction. The product (**11**) is initially present as a Pt^0 complex (**10**) which decomposes upon exposure to air, moisture, light, heat, sound and thought. This decomposition releases the desired hexaene **11** so, for once, it's not actually a bad thing. Despite its 12 π electrons, **11** is not antiaromatic. It just has some lingering concerns about the long-term consequents of electron collectivisation on the atom economy.

With hexaene **11** in hand, we sought conditions to expand the ring by adding C3 fragments into each C=C bond. Several methodologies were tried before we settled on conditions reported by Cluck and Grunt in 1987.[3] Blood, sweat and tears were ineffective solvents, as well as being unhygienic and difficult to remove. Frankly, we have no idea why reviewer 2 suggested them.

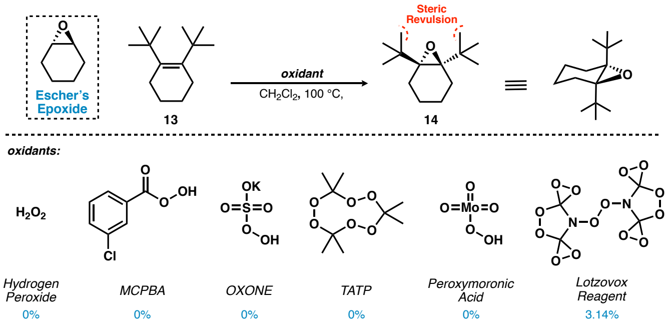


Scheme 2: Synthesis of fractaldehyde.

The more conventional solvent pentane delivered PMS-protected alcohol **12** in *e*% yield. Finally, the PMS group was cleaved with ethanolic theobromine and the resultant alcohol was oxidised with Dead-Marten Periodinane to give fractaldehyde **4** in 0.006% overall yield (scheme 2). Care is needed to prevent the overoxidation of 4 to fractious acid.

We turned our attention to Escher's impossepoxide **5**. Computational studies of **5** indicated that the conventional cis-epoxide is 4000 kcal/mol more stable than the trans isomer, with a barrier to interconversion of 1.414 x 10^{-7} kcal/mol. When translated from computer-speak, this meant we had fuck-all chance of isolating **5**. We theorised that a kinetically stable impossepoxide could only exist if sufficient steric bulk was present. If placed appropriately, such bulk should bias the formation of an impossepoxide.

To this end, we prepared 1,2-ditertbutylcyclohexene **13** as an epoxidation substrate. Vicinal tert-butyl groups were calculated to provide sufficient steric revulsion to favour a trans epoxide.
Unfortunately, they also served to make the epoxidation of **13** colossally unfavourable. Conventional epoxidants were ineffective, as were unconventional reagents like triacetone triperoxide and peroxymoronic acid (scheme 3).



Scheme 3: Preparation of an Escher-type impossepoxide.

The only reagent capable of epoxidizing **13** was Boris Lotzovox's eponymous abomination. This molecule has the alarming formula $C_4N_2O_{14}$ and the temperament of a geriatric wolverine. For reasons that should be obvious, it is prepared in-situ from cyanide and singlet oxygen. Reactions involving Lotzovox's creation should be formed with adequate shielding. This can be accomplished by placing the reaction inside an old washing machine, a toilet or a pumpkin. The term "effervescence" doesn't do the reaction justice. One should instead imagine sonicating a freshly shaken bottle of champagne. Undeterred, we scraped the crude product off the roof and subjected it to perverse-phase chromatography on golf balls.[4] We were thus able to obtain a small sample of impossepoxide **14**.

As expected, the two bulky tert-butyl groups occupy opposite faces of the ring, which twists significantly to accommodate them. Because of this twist, the epoxide oxygen lies above one carbon and below the other, relative to the plane of the ring. This geometry technically satisfies Escher's sketch, even if we had to bend the rules a bit.

Conclusion

We are no closer to curing cancer but have made some cool molecules.

Experimental data, spectra and reaction conditions are available from www.onlyfans.com/schlonkitup.

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REACTION MECHANISM

Turning Wine into Blood: A Mechanistic Study of the Transubstantiation Reaction

Thomas Equinous,[A] Friar Berengar of Slapton[B] and Günther Schlonk[C]*

Abstract: And on the eighth day, the Lord made dimeric μ-hydrido-μ-amidocalcium coordination complexes, and became distracted.

Specific: Transubstantiation is the process by which the bread and wine of the eucharist is said to become the body and blood of Christ. The mechanism of this transformation is, shall we say, vexed, and has been for some time. The theology of this miraculous reaction is beyond the scope of this paper and the understanding of its authors. This study seeks instead to examine the chemistry behind it.

Turning wine into blood represents a significant challenge to the synthetic chemist. Some of the earliest work in this field is attributed to the biblical Jesus, who undertook the simpler transformation of water into wine. Quite how he did this remains unknown, as the supporting information for the New Testament has not yet become available. This hole in the literature has led some to speculate as to his chosen reaction conditions. Venerable Professor Constantine from the Institute of Theological Chemistry in Antioch has postulated that he performed a high-pressure hydration of ethene.[1] Basil II of Pfizantium has disputed Constantine's theory, and instead claims that Jesus used the McGonagall transfiguration to convert H_2O into H_2C and an alpha particle.[2] Given that it took centuries for metaphysical chemists to establish if the deity involved was monomeric or trimeric, we can't expect this debate to be resolved any time soon.

Divine speciation aside, subsequent work was undertaken by either Jesus himself or an alumnus from his research group on the conversion of wine into blood. Sources differ on the vintage used, but all agree that the blood-group of the product was O-double-negative (O^{2-}). The historical and dogmatic details of this reaction have been debated on-and-off for the last two millennia. Few if any scientific studies have been conducted on this topic, with the emphasis rather on philosophical minutiae. This changed in 2021 with a study by Paul the Associate Professor.[3] Paul wondered if everyone was overdoing the metaphysics, and if a simple chemical reaction was the root of this phenomenon. He hypothesised that an enzymatic reaction occurred as the eucharistic wine was consumed, converting the concoction's chemical components into those of blood: specifically, heme B.

To test this theory, Paul brought an MS from his lab into a local church and asked the parishioners to gargle their Christ-blood while he collected samples. When this data was analysed, Paul detected the presence of heme B in the wine. He attributed this detection to the transubstantiation of the wine by the enzyme amylase (the primary digestive enzyme in saliva).[3]

We harboured some doubts about the veracity of this result. Paul usually uses that MS to analyse whole blood for illicit substances, and he does not mention cleaning it before conducting his

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A. School of Philosophical Chemistry and Dressage, Vatican Academy of Unnatural Sciences
B. Theological Chemistry Department, Slapton Seminary
C. Department of Pyrofrolics and Inorganometallics, University of West Failure

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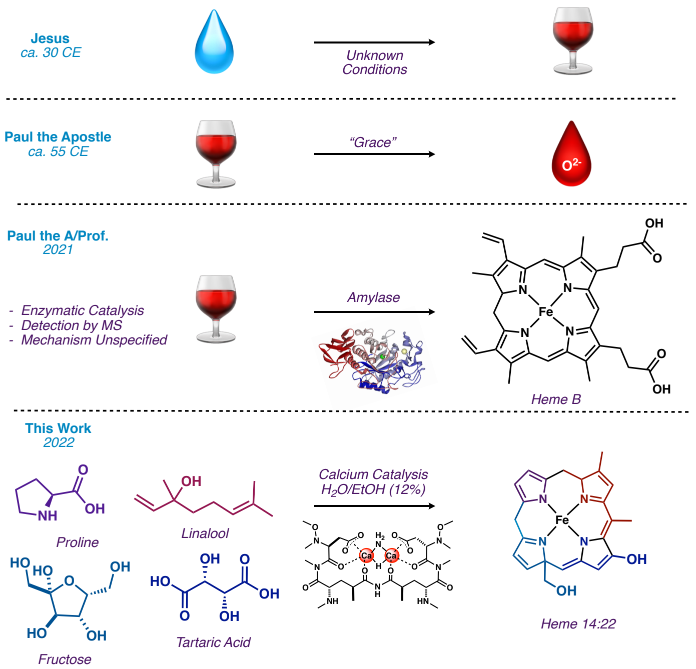
DOIOU: 10.mArK-14:22

experiment. Nor did he control for the parishioners having bitten their tongues in the time before sampling their Jesus-juice. However, we were intrigued by the prospect of an amylase-catalysed pathway from wine-components to heme-type porphyrins.

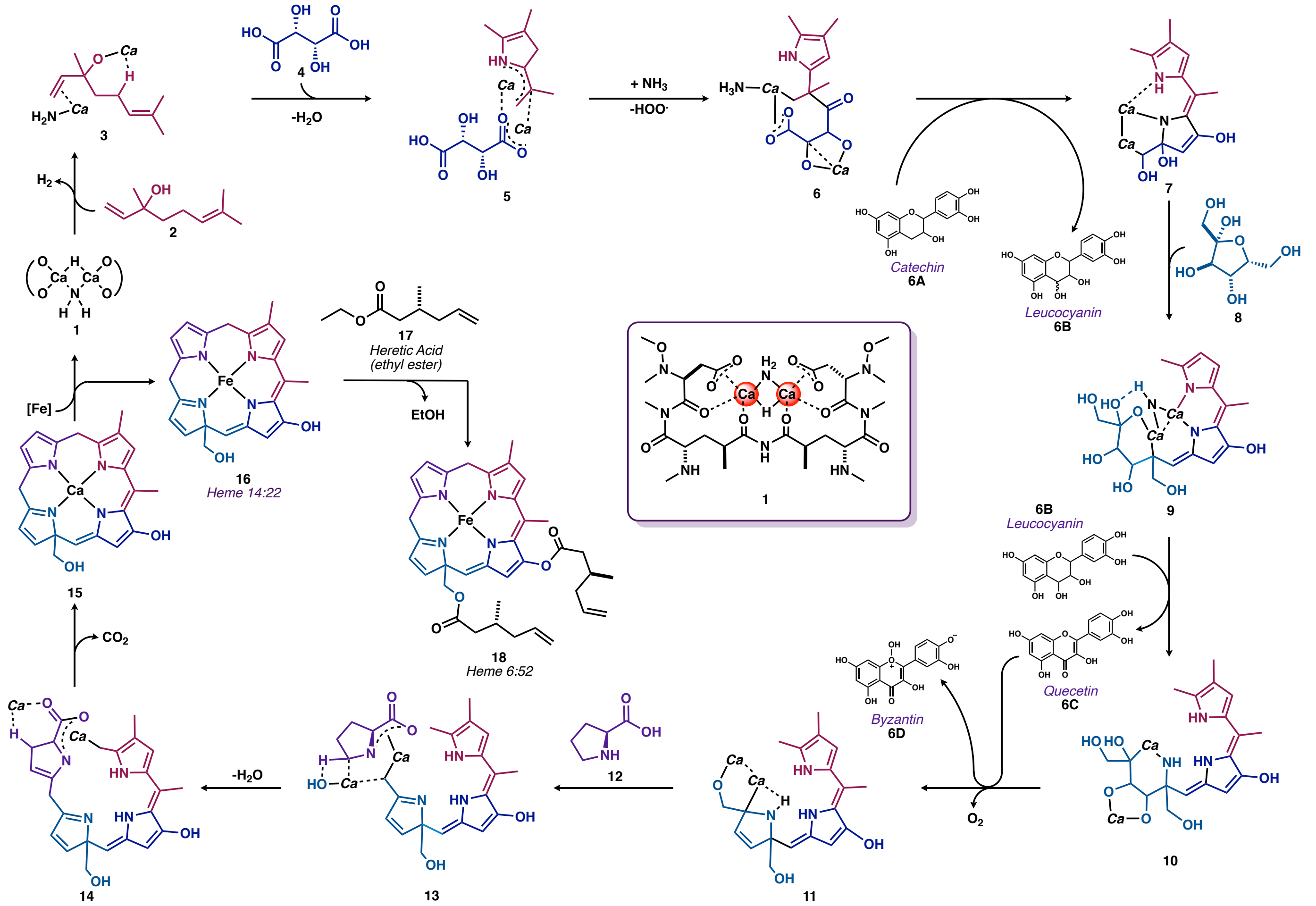


Scheme 1: A) The first example of transfigurational chemistry by the Jesus group at the University of Canaan. B) Subsequent work by one of Jesus's graduate students on the conversion of wine into blood. C) Recent work implying the conversion of wine to heme B catalysed by amylase. D) The subject of this study: a mechanism for the formation of heme 14:22 from wine constituents.

We decided to probe the mechanism by which this transformation occurs with chemical and computational analysis. A quick google search for human amylase revealed that the enzyme incorporates a calcium ion. This seemed a promising start, as everyone knows that metals catalyse stuff, and we like metals. We also conducted a survey of wine constituents in search of molecules with structures mappable onto a heme skeleton and came up with several matches (scheme 1). The most promising of these were linalool (a floral-smelling terpene), tartaric acid, fructose and the amino acid proline.

We sketched out several mechanistic pathways by which these molecules might form a heme-type porphyrin and sought to assess their viability with computational studies. We were able to find a pathway to heme from these components, but the energy barrier was such that the reaction would only proceed if performed at the centre of Jupiter. These results were in contradiction of the insistence of social-media effluencer and Egregious Professor Leonard Crony, who claims chemputation solves all problems. The study teetered and nearly collapsed but was saved by the appearance of a helpful paper clip, asking "it looks like you're trying to model and enzymatic reaction, would you like some help?". Clippy suggested we use a dimer of amylase, and Clippy was right. Tandem calcium-calcium catalysis was the answer to our mechanistic woes. The simulated mechanism was re-run with two units of amylase and gave the much more reasonable barrier of 90 kcal/mol.

While this theoretical mechanism was convincing, we decided to seek experimental support for it. Our initial experimental work was conducted with human α-amylase as catalyst. This was accomplished by bringing a bag of Eppendorfs to a wine-tasting and collecting "discarded samples". Analysis of the reaction



Scheme 2: A mechanism for the tandem calcium-calcium catalysed transubstantiation reaction. *Ca* denotes a calcium ligated with something or other…

mixture by Transverse-Induction Proton Spectroscopy (TIPSY) detected the presence of a heme, but the reproducibility was too poor for useful kinetic information to be obtained. We addressed this issue by moving to a model system (**1**): a dimeric calcium complex with a ligand derived from the amino acids (*L*)-laterine and (*R*)-samaritine. Using this simpler catalyst, an extensive series of kinetic and computational experiments were performed. The details for these experiments are provided in the electronic unsupported information. The culmination of this study is a proposed catalytic cycle for conversion of linalool, tartaric acid, fructose and proline into heme 14:22 (scheme 2).

The restive state of the catalyst is dimeric μ-hydrido-μ-amidocalcium carboxylate **1**. We've called it the restive state because it tends to become distracted and wander off if impurities are introduced. Linalool (**2**) breaks up dimer **1** and inserts into the Ca-N bond. The other calcium performs a simultaneous Reacharound rearrangement to close the first ring. Tartaric acid is then coordinated, deprotonated, dehydrated and defenestrated to give intermediate **6**. The flavanol catechin (**6A**) reduces **6** to **7**, acting in its much-acclaimed role as an antioxidant. Fructose (**8**) is folded into **7** via some Origami-type chemistry (**9–11**) and two more flavanol reductions. Finally, proline closes the porphyrin ring in a Garfunkel Decarbunkelation. Calcium is displaced by adventitious iron(II), somehow regenerating **1**. The resultant heme 14:22 can undergo transesterification with ethyl herate (**17**) to form a heme-heretic ester such as heme 6:52 (**18**). At this point, the astute reader may have noticed several inconsistencies in this mechanism. Specifically, poor hydrogen-accounting, some missing oxygens, and nitrogens appearing from nowhere by pnictogenesis. One might even accuse us possessing less rigour than last week's celery. That may be the case, but hey, we never claimed to be infallible.

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Electronic Unsupported Information: https://tinyurl.com/57txpzca

Note: We weren't just rejected by JACS, we were excommunicated.

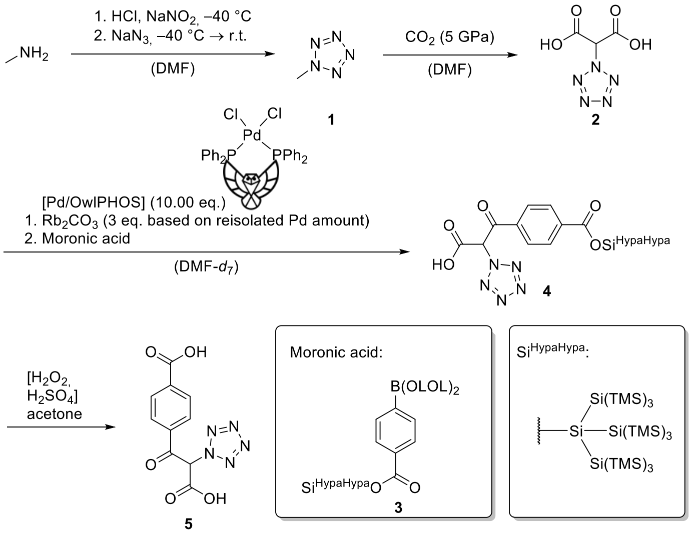
MATERIALS SCIENCE

Platinum-Group Based Pentazolato-Carboxylate Metal Inorganically Linked Frameworks for Direct CO_2 Capture and Solar Fuel Applications

*C. Klein,[👌] J. Kimmel,[👌] T. Kaputtke, Omar Yogi and R. A. Freud**

Abstract: **We report the preparation of a PtO-pentazole Metal Inorganically Linked Framework (MILF). This MILF was characterised by PXRD and elemental analysis, and exhibits pronounced host-guest interactions, stimulus-response behaviour, and high internal surface area. The material also shows promise as a catalyst for the conversion of CO_2 to octane.**

Size matters… Metal-organic frameworks (MOFs) are 3D networks of organically linked metal nodes which have gained considerable attention in the scientific community as potential (photo)electrodes, shape-selective and shape-shifting catalysts, e.g. in the production of solar fuels, and also as gas-adsorbents due to their remarkable inner surface area.[1] Their importance for a sustainable future is as obvious as their widely standardized and intuitive nomenclature system. However, recently, another promising class of porous 3D materials has been rediscovered, namely metal-inorganically linked frameworks (MILFs). The intriguing properties of these compounds have already been established by Finch et al. in their ground-breaking work from 1999.[2] Excellent mechanical properties, triboluminescence and high shear moduli are among their many attributes. The most important feature is their flexible pore structure for equally flexible catalysis. Thus, MILFs are the crown of creation and superior to all other porous materials. In the following article, our MILF-experienced group will present a new and novel, tuneable and switchable, as well as solar fuel-producing, undoubtedly world-saving catalyst.[3]



Scheme 1: Smooth synthesis of linker **5**.

Based on previous literature reports by Kaputtke et al. on the synthesis of stimuli-responsive MILFs,[4] we envisioned even more responsive pentazolato-MILFs with abundant metals (in this case platinum), which is ubiquitous (at least in catalytic converters) and primed for the formation of stable oxo-clusters.[5]

We developed a straightforward procedure for the synthesis of methylpentazole **1** by bubbling methylamine through an acidic solution of sodium nitrite and subjecting the fleeting product to sodium azide. The obtained off-white powder was thoroughly washed with DMF. Quick consumption of intermediate **1** is highly recommended as spontaneous detonation may occur at high concentrations. Subsequent reaction of **1** with CO_2 in DMF under mild conditions (5 GPa) led to 2-pentazole malonic acid **2** in nearly quantitative yield (103%) after centrifugation and thorough DMF washing.

Following a well-known Kawasaki-Miau-Wau coupling, moronic acid **3** was obtained as previously described.[6] Afterwards, the easily and cheaply accessible palladium(II) precatalyst Pd/OwlPHOS was employed in a Hirohito coupling[7] between **2** and **3** in DMF-d_7 to yield ^{HypaHypa}silyl-protected linker **4**.[8] Linker **4** was purified by washing with more deutero-DMF and drying in high vacuum at the rotary evaporator (300 RPM, ISO 9 cleanroom). OwlPHOS® is likened to an owl, being the predator of the PHOrest, in analogy to Takasago's naming scheme: "BINAP is compared to a butterfly for its high ability and beautiful structure. SEGPHOS is named after a seagull, which flies higher and faster than a butterfly".[9¾] Final deprotection in acetone/H_2O_2 under ground-shaking conditions with catalytic amounts of concentrated sulfuric acid (D5-potentized from the same solvent mixture) gave linker **5**.

[👌] *Authors contributed equally to this work*

The Institute of Explosives and Corrosives, Department of Alchemy, Brewery & Conspiracy, Idunno.

**Corresponding Author Contact: RAF@idunno.edu*

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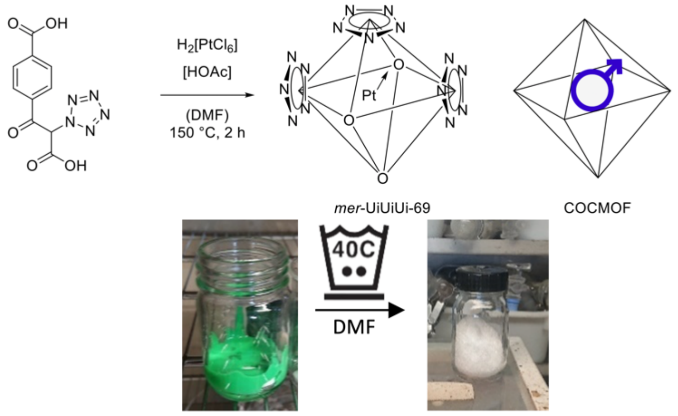
Platinum group metals were obtained from a catalytic converter and hexachloroplatinic acid was then isolated by coarsely crushing the supported catalyst with a NicerDicer® and extracting the residue with aqua regia. Seventeen coffee filters were used to remove the undissolved material, which was washed with more DMF.



Scheme 2: Synthesis of *mer*-UiUiUi-69 and comparison to COCMOFs.

Linker **5**, platinum precursor and acetic acid as a modulator were incubated in a drying oven in DMF over the weekend. The green crude metal inorganically linked framework (MILF) was then purified by washing with dry DMF twice and dry *μ*-oxido-dihydrogen(I) (DHMO) once to afford the colourless, pristine MILF (see scheme 2, bottom). Calcd. = C: 31.5783, H: 3.14159, N: 6.9420. Found = C: 31.5783, H: 3.14159, N: 6.9420. We shall call it UiUiUi-69 in order to keep the nomenclature consistent and intuitive with similarly spin-polarized carbon oxide-capturing MOFs (COCMOFs)[9] like Chanel's MOF N°5,[10] HKUST-420,[11] or IRMOF-θ.[12]

Single crystals were unfortunately not good enough for structure solution. However, synchrotron PXRD at the Quartz light source (Worcestershire, UK) allowed for Rightfelt refinement of the network that forms the MILF. Structure fine solution was then achieved by transformation to the pair distribution function (PDF, see figure 1). The crystallographic information file is available free of charge from the CCCCCC.

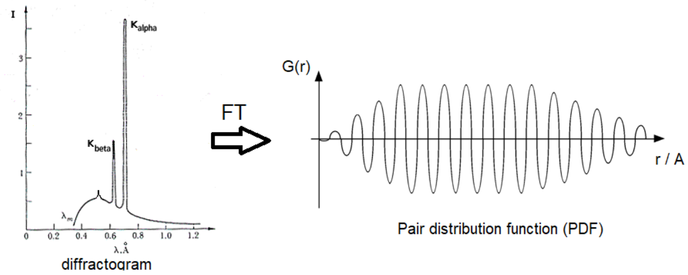


Figure 1. Synchrotron PXRD and the transformed PDF.

Analysis revealed an intimately interpenetrating network with pronounced host-guest interaction and remarkable pore structure (see figure 2). Because of these findings, variable pressure powder X-ray diffraction (PP-XRD) experiments were added, indicating stimulus responsive behaviour. Phase transition was observed on infrasonication with a St. John Smythe apparatus (Hitachi, JP) during CO_2 pressurization, and can be reversed by removing adsorbed gas molecules from the engorged pores by turbomolecular pump suction. Pore elongation was accompanied by a significant increase of the material's shear modulus. The material was then subjected to BED isotherms (up to 50 oz. per square inch) in order to measure the manipulated pore length and circumference (6 by 3 attoparsec).

Note: This article originally appeared in the 1st Volume of Immaterial Science. We've reprinted it here because we liked it so much.

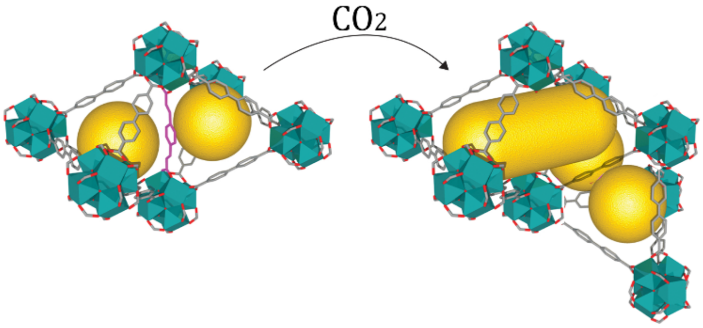


Figure 2: Accessible surface volume of UiUiUi-69 in ball-and-dick representation, as measured in BED isotherms.

Owing to these remarkable analytic results, we attempted to produce solar fuels by supplying hydrogen to the CO_2-saturated MILF and irradiating in a solarium. Afterwards, the product was desorbed from the pores by washing with a minimal amount of *n*-octane to achieve a staggering yield of 181.7%. Product distribution was analysed by molecular autoionization supercritical liquid-time of flight-mass spectrometry (MASL-TOF-MS)[13] and olifacto-gravimetry[14] to reveal perfect selectivity for C_8H_{18}. Between different MILF batches we recognized significant yield dependence on the pore volume. *Size matters!*

Conclusion

In this work, we have once again highlighted the need for MILFs to replace fossil fuels and make our planet Greta-friendly. Based on these findings, the straightforward and safe synthesis as well as cost-efficiency, a pilot scale plant for CO_2 direct air capture in the kiloton scale is currently under construction. Chem3D molecular modelling optimization has not only suggested superior performance of UiUiUi-69's Darmstadtium congener due to the metal's higher oxophilicity, but it also predicted the MILF's *fac* isomer to have even higher catalytic abilities, encouraging its synthesis in future endeavours. Likewise, sildenofilic acid might replace linker **5** for increased catalytic potency and greater turnover numbers. Further research is thus highly recommended.

Experimental data

Chemicals, unless otherwise noted, were purchased from suppliers such as FCK Chemicals, Smegma Aldrich, or Merck Macropore and used without further purification. All reaction steps were performed in a glovebox with oxygen concentrations usually below 1000 ppm. D5 potentizing was achieved by slapping the flask containing $H_2O_2/H_2SO_4/CO(CH_3)_2$ 10× against the fume hood window at full moon, and repeating with 1:10 dilution 5×. *μ*-Oxido-dihydrogen(I) was dried over molar sieves 3 Å and alcohol content was checked to be lower than 1.5‰ (Karl Emil Otto Ernst Hans Fischer titration). Carbon dioxide was evolved by treating $CaCO_3$ (harvested from our coffee machine) with acetic acid in a Schütt-Kipp apparatus. Supporting Information with detailed procedures and analytic data is available free of charge under the following link: http://bitly.com/98K8eH

Conflicts of Interest

No consensus has been reached between the authors on the pressing subject of whether residual DMF can be washed away with more DMF.[15] T.K. proposes that any rusty nail possesses higher catalytic performances than UiUiUi-69.

Acknowledgements

To the guy who wild parked his Çïтяøёй C4 on campus: Thank you for the catalytic converter! We greatly acknowledge Cooper I. Odide's sacrifice to the glovebox gods. T. Piquèl is acknowledged for crude MILF synthesis. 2D ^{195}Pt–^{14}N {^{1}H} SHMOSY NMR for *fac*/*mer* stereochemical assignment was performed by F. Bloch.

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MATERIALS SCIENCE

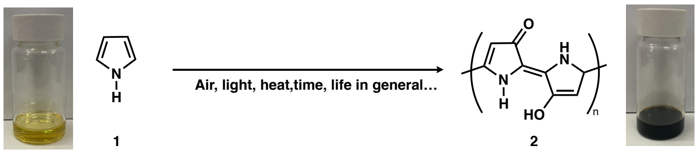
50 Shades of Brown: An Index of Chemical Misery

*Korichnevvy Kahverengl,[A] Marroia de la Mierda,[A] Rostig von Braun[A] and Günther Schlonk[A]**

Abstract: One can't judge a book by its cover, but one can judge a reaction by its colour. Modern labs are replete with instruments and techniques for determining the complexity of crude reaction mixtures. TLC, NMR, IR, MS, the list goes on. These techniques all require a sample of material in question, and time to analyse it. Conspicuously absent from the illiterature is a rapid and non-destructive assay for the purity of a reaction mixture. Herein, we describe a technique for the instantaneous analysis of sample purity with visible light spectroscopy.

Today, green chemistry is all the rage. But before there was green chemistry, there was something murkier, more primal. Prior to the days of 0.001% catalyst loadings, flash column chromatography and click chemistry was a time of darkness. A time when Na metal reductions and fractional distillation were the norm. Today, we know this field as Brown Chemistry.[1] Few remnants of this field persist in the modern chemical canon. After all, why would one conduct a Skraup synthesis of a quinoline when Smegma-Aldrich sells thousands of them?[2] Despite the antiquated nature of this field, we believe there may yet be more to learn from it.

Many good things in this world are brown. Chocolate; coffee; good, tilled earth.[3] Alas, this is rarely true in the world of chemistry. Most compounds can undergo decomposition by forming larger, more conjugated molecules, with a greater capacity to absorb visible light than their parents. The endpoint in this chemical death spiral is brown sludge. Consider pyrrole (**1**), and its proclivity to commit chemical kamikaze (scheme 1).



Scheme 1: Pyrrole just doing its thing.

A fresh bottle of pyrrole from Smegma Aldrich appears light yellow in colour. Upon exposure to most things, or even on exposure to nothing at all, pyrrole converts into a poorly defined, polymerised, oxidised sludge, which is roughly approximated as species **2**. Figure 1 contains a second example of this trend. Each flask contains the crude product of an enamine reduction with scandalous sulphate ($ScSO_4$).[4] Which reaction do you think was more successful?

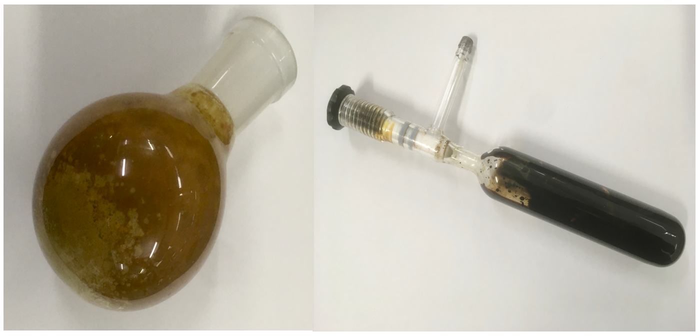


Figure 1: Two products from a $ScSO_4$ reduction, of varied purity.

With pyrrole as an example, we propose the correlation between the "brownness" of a sample and its purity as the foundation of a new visible-light-based assay. This assay consists of a scale from one to ten, from "*a whiter shade of pale*" to "*darkness my old friend*" (figure 2). To honour the memory of our late colleague Fuscus Browning, we have dubbed this scale the Browning Index.

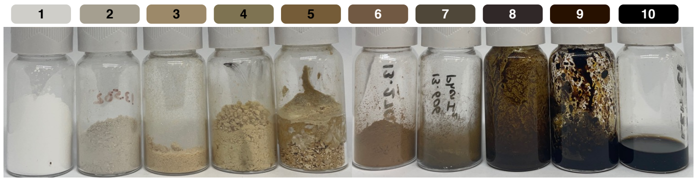


Figure 2: The Browning Index, with representative samples.

The low end of the scale represents higher purity, such as that of commercially available fine chemicals. Conversely, a ten on the browning index suggests the purity of the sludge that accumulates at the bottom of a solvent waste bottle. Like most "rules" in chemistry, this index is a sweeping generalisation riddled with exceptions and inconsistencies. It is quite possible to obtain a compound that is both pure and brown, just as it is possible to have colourless impurities. However, it is more likely that a nine on the browning index is a shitshow at heart, as well as on the surface. Because each sample is shitter than the last, this index is technically a *log*arithmic scale.

To demonstrate the application of this index, we have compared three samples of the same molecule, with varied degrees of purity (figure 3). Our molecule of choice was Klaxon-Smythe-Whine's new antidepressant: Sulferalone®.[5]

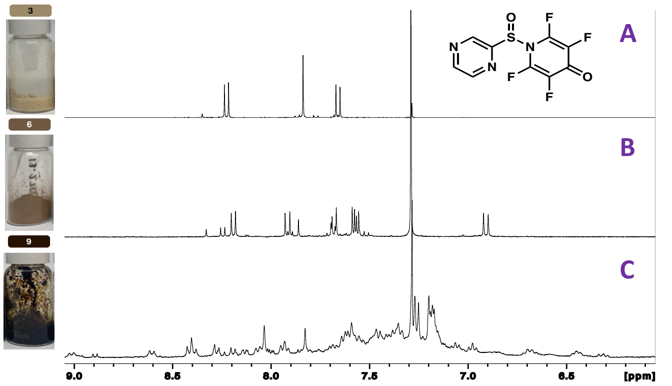


Figure 3: Three samples of Sulferalone© and their ^{1}H NMR spectra.

A. Department of Pyrofrolics and Inorganometallics, University of West Failure

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Sample **A** rates at 3 on the Browning Index. Its spectrum indicates quite a high level of purity, with only a few contaminants poking their heads above the baseline. This is in stark contrast to sample **B**, which contains one major and several minor impurities. **B** comes in at a solid 6 on the index. Sample **C** scores a 9, and its spectrum is best described as a kind of chemical skid-mark from 9–5 ppm. Spectroscopists know this as *“the D. Parton effect”.*[6] **C** demonstrates a second characteristic of high-browning compounds: a viscosity like congealed despair. Samples **A**–**C** are in clear agreement with our proposed index: Browning Index and purity are inversely correlated. It should be noted, however, that we’ve obviously cherry-picked the data to support our claims.[6.5]

Continuing the theme of wholesale assumptions, we have compiled a table of suggested workup procedures commensurate with the Browning Index of a mixture (table 1).

Browning Index	Suggested Workup Procedures
1	*Good enough*
2	*Still good enough*
3	*Fine, just don’t zoom in on the spectrum*
4	*Solvent extraction, trituration*
5	*Silica plug, recrystallization*
6	*Flash column chromatography*
7	*Lots of flash column chromatography*
8	*Plug → chromatography → prep TLC*
9	*Call a priest, perform the last rites*
10	*Burn it with fire*

Table 1: The Browning Index as a workup guide.

Samples with Browning scores between 1 and 3 are typically good enough to use “without further purification,” provided one doesn’t look too closely. Beyond 3, some manner of purification is essential to prevent the impurities breeding. Mixtures below 5 are difficult to rectify without resorting to chromatography, with the number and length of columns increasing as one descends. An 8 lies on the borderline of recoverability. While it is sometimes possible to sift out a few μmols of product from the slew of shyte, it is rarely worth the effort. A Browning Score of 9 usually means the starting material can only be reassembled by air crash investigators. Attempting to isolate something useful from such a train-wreck calls to mind those expressions about needles in haystacks and polishing turds. We advise that one call a priest to perform the last rites instead. A 10 on the Browning Index is reserved for those samples even a god couldn’t save. In such cases, the glassware is lost along with the starting material. To describe a 10 as “Passchendaele in a flask” would only be a mild exaggeration (as well as deeply insensitive). The only course of action is to incinerate the evidence, and carefully reconsider your life choices.

At this stage, some may wonder what the Browning Index has to offer over the many existing analytical methods. Clearly, reviewer 2 also held this opinion. While techniques like NMR and TLC can provide more detailed information about a mixture, they require two things that the Browning Index does not: a physical sample and time to analyse it. Preparing and running an NMR sample can take anything upwards of 15 minutes, and finding an appropriate TLC eluant is comparable. Analysis via the Browning Index is instantaneous: no sample preparation is required, nor any apparatus/instrumentation.

We should admit that we are not the first to have had this idea. Passing references are made to such a scale in Monty Python’s “The Life of Brown” and in Kermit the frog’s song “it’s not easy being beige”. In many related studies, renown Australian academic E. F. Tom has investigated the relationship between yellowness and purity, in relation to energetic materials.[7a,b] To the best of our knowledge, however, we are the first to categorise these trends into an easy-to use index. We feel able to make this claim because we haven’t bothered to check if anyone else has beaten us to it.

Conclusions

We have defined the Browning Index: the kind of ladder that the biblical Jacob could have used to climb out of a thunderbox. We hope this index will become a ubiquitous feature of chemistry labs worldwide. If disgusting brown sludge is a universal feature of chemistry (and it definitely is), then so too should be a way to describe it. In the immortal words of Mediocrates of Pfizantium: *“everything turns brown in the end”.*

Experimental data, spectra and reaction conditions are available from www.onlyfans.com/SchlonkItUp

Author Contributions

K. K. used his experience in oil refining and coal tar extraction to define the 9 and 10 categories of the index. M. M. contributed fuck all. R. B. prepared the samples for figure 2, and used his training as a hostage negotiator to appease reviewer 2. G. S. prepared the manuscript, and plenty of batches of brown goo.

Conflicts of Interest

Günther Schlonk is Imperial Editor in Perpetuity of The Journal of Immaterial Science. He reviewed this article while blind drunk, to avoid bias.

No graduate students were harmed in the preparation of this manuscript.[‡]

Acknowledgements

G. S. acknowledges the estate of aunty Gladys for funding this work, may she rest in peace.

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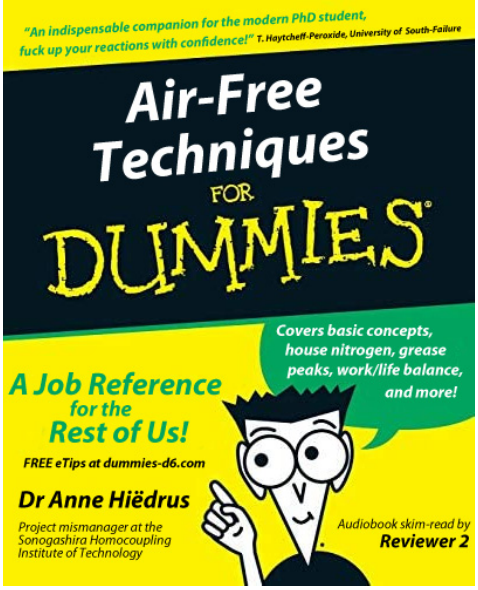
‡ Not remotely true.



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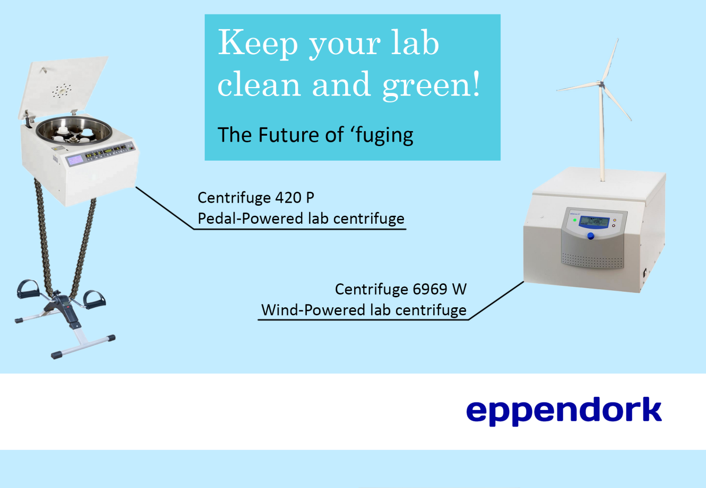

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POLICY

Chemistry in America Grinds to a Halt as SCOTUS Votes 6-3 to Ban Transition States

Jeff Vader[A] and Günther Schlonk[B]*

Abstract: "There follows a frivolous frolic through some very serious issues. The authors clearly lack an understanding of the topic, or a sense of decency and taste more generally. I find this unsuitable for publication in *Nature*, and suggest *J. Immat. Sci.*"—Reviewer 2

This week, the Supreme Court of the United States (SCOTUS) made a controversial decision to make transition states illegal. The court voted 6-3 in favour of overturning the landmark 1969 *Diels v. Alder* decision allowing molecules to "exist in states that are neither products nor reactants".[1] Consequently, no chemical reaction may legally proceed in the USA.

The debate building up to this decision has been highly polarised. It comes in the wake of the "Free Gibbs" protests which brought New York to a standstill last week. Readers may recall that Garry Gibbs is an American chemist who was convicted for contravening the Curtin-Hammett principle in 2021.[2] He has been held in custody since his arrest, awaiting a stage 3 clerical trial in August. Shortly after his incarceration, a movement demanding his release gained a significant following.

United behind the figure of Dianne O'File, the group called for an end to transition state theory. The protests culminated in a series of violent clashes between "Free Gibbs" supporters and the "Transition States of America" organisation (figure 1).

Figure 1: The "Free Gibbs" protests in NYC last week.

Advocates for the overturning of *Diels v. Alder* rejoice in a return to simpler times. We spoke to "Delta G," a prominent member of the Free Gibbs movement, and asked him why he supported the nullification of *Diels v. Alder*:

> *"Look, chemistry is really quite simple. There's reactants and there's products, that's it. All this stuff about transition states, it's all fluff and wind. Nobody's even seen the bloody things! Why should we spend so much time and effort pandering to molecules on the fringes of existence? These people here, they're sick to death of mechanistic studies, metastable intermediates and computational pathways. We want a return to the days when you just chucked shit in a flask and pulled out the product a day later. Is that such a bad thing?"*

So, what does this ruling mean for the chemical industry of the USA? Industrial and pharmaceutical manufacturers across the states have closed their doors, leaving thousands of people without jobs. There are two major implications to this shutdown. First, domestic supplies of drugs, agrochemicals and fertilizers will be depleted in weeks—necessitating a huge increase in imports and a corresponding dependence on foreign chemists. Second: a dramatic rise in the prevalence of illicit, unsafe and amateur chemical synthesis.

The ruling on *Diels v. Alder* is just one of several controversial decisions made by SCOTUS in recent months. The US polymer industry is already feeling the squeeze after the Frump administration tightened the laws governing migratory insertions in April. Under the new points-based system, ligands must provide multiple written statements of their compatibility before than can conjoin with metals. Critics of this decision have been vindicated as catalytic cycles across the country have stalled, choked with paperwork.

In a corollary to the recent activities of the court a new acronym has been proposed incorporating only the "effective" decision-making majority members with Republican viewpoints who are re-writing the constitution these days and who shall henceforth be referred to as the SCROTUS.

Following last month's ratification of *Friedel v. Crafts*, homonuclear couplings are banned in seven states, with more jurisdictions expected to follow. The court deemed that in the context of NMR spectroscopy, homonuclear couplings were unnatural and unconformational. Instead, compulsory homodecoupling will be mandated. All ^{1}H NMR spectra will consist exclusively of singlets. In compliance with this ruling, Varibrük have removed the COSY experiment from their spectrometers. In place of conventional ^{1}H-^{1}H correlative spectra, Abstainative Negation Gyromagnetic Suppression Thaumaturgic spectroscopY (ANGSTY) experiments will be implemented. In this experiment, the nuclei are so thoroughly polarised that they become estranged and refuse to interact at all (scheme 2).

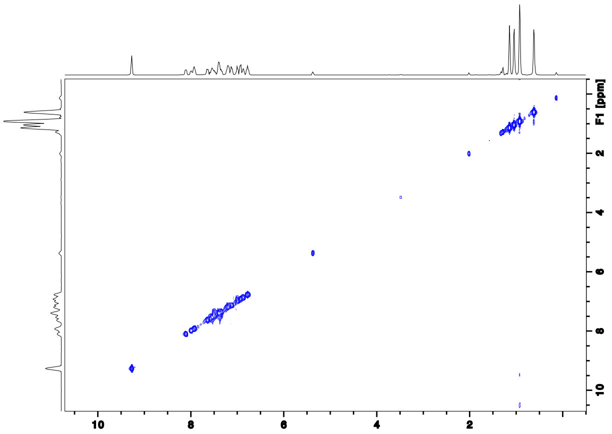

Figure 2: A ^{1}H-^{1}H ANGSTY spectrum.

A. Peripheral Science Laboratory, University of West Failure
B. Department of Pyrofrolics and Inorganometallics, University of West Failure

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Some members of the far-upfield have claimed that these measures don't go far enough. Mike Fence, senator for East Virginia, has taken aim at the spin states underpinning NMR spectroscopy. Fence wants nuclei to be forced to align with the prevailing magnetic field by applying Dynamic Nuclear Polarisation (DNP) sequences to all NMR experiments. Following hyperpolarisation, non-aligned spin states will be eliminated by a series of "purge-pulses". Fence has already circulated a post-processing utility called "Coherence Uniformity by Negated Transfer" which is used to supress the effects of homocoupling, and anything else subjectively identifiable as an artifact.

Despite widespread support, SCOTUS has declined to enact more rigorous regulations for laboratory safety. More than 250 fatal laboratory poisonings have occurred in 2022 alone, and the toll is expected to climb higher. Campaigns calling for better ventilation in labs, mandatory fume hoods and greater access to PPE have failed to gain bipartisan support. Opponents to regulation such as Senator Fred Cruz have stated that fume hoods are ineffective in shielding chemists from toxic fumes and instead advocate coating the respiratory tissue of scientists with protecting groups.[3]

Conclusion

These recent SCOTUS rulings are just one element of an increasingly quantised world view prevalent in media and politics. Gnome Chumpsky describes this trend towards a "world of black and white, good and bad, right and wrong" in his 2021 book: The Death of Nuance.[4] There is widespread trepidation regarding what SCOTUS will do next. Representative Marjorine TayTay Beige has taken aim at the wave-particle duality and called on electrons to "pick a side". This is a fringe-view at present, but if current trends continue it will be mainstream within a decade. Perhaps the most distressing development is a proposal from former governor Sarah Flailin to repeal Newton's Third Law. If successful, this proposition will legalise the use of unopposed force by the nation's military. Troubling times indeed.

Notes and references

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PROFILE

Don Jalton – A Forgotten Pioneer of Atomic Theory

E.T. Mork,[A] J.F. Mindy[B] and A.N. El Batsnoc[C]

Abstract: Don Jalton Jose Jesus de Manchester y Birmingham (1730-1800) was an expatriot Spanish scientist and polymath who developed an atomic theory predating that credited to Dalton. He also developed an early periodic table and anticipated the splitting of the atom. Jalton can claim to be the real originator of modern chemistry. This article explores the life of a forgotten chemical pioneer.

Keywords: sexo, drogas, rock and roll

1. Introduction

Shortly before his untimely demise, the philosopher Diego Zapeo Matata made a voluntary confession to the Spanish Inquisition and stated:

No fui yo
Joder, eso duele
Fue ese bastardo de Jalton quien hizo lo que sea

This article is about Don Jalton Jose Jesus de Manchester y Birmingham, "the bastard who did it".[1]

There have probably been previous publications about Don Jalton Jose Jesus de Manchester y Birmingham (pronounced Halton). However, we could not be arsed to perform a literature search and consider these unlikely to be of sufficient depth and obscurity to cite. A rigorous iPhone google search revealed no Twitter or Facebook account linked to Don Jalton.

The aim of this article is to bring Jalton to the attention of modern scientists, to amplify our research output in an assessment year and to establish our academic credentials by the liberal use of foreign quotations, without consideration of relevance or accuracy.

I maiali blu non mi interessano

2. A brief biography

Don Jalton Jose Jesus de Manchester y Birmingham was born out of wedlock near Toledo about 1730. His subsequent sobriquet "That bastard Jalton" probably refers to the circumstances of his birth. His mother was a village "wise woman", and his father was unknown.[2] His early interest in science was awakened by his mother's experiments, inspired by those of Galileo, demonstrating that a baby fell faster than a pillow of the same weight. The battered and bruised young Jalton recovered from these experiments but was left with a lifelong fear of bed linen, feathers, and tall buildings. His intellectual capacity and knowledge were early recognised, and he left his village school at the age of seven with a commendation from the priest "This child cannot be taught anything".

The young Jalton joined a travelling *Commedia dell'arte* group (figure 1), where he learnt their stock in trade and a prodigious ability to consume alcohol and food.[3] The group travelled widely in Spain, Italy and France and, despite their often leaving without warning in the early hours of the morning, Jalton stuck with them through thick and thin. It is thought that Voltaire was thinking of Jalton when he wrote:

Quand je veux un cochon mariné, je pense toujours au bouffon et au paresseux Monsieur J.[4]

Figure 1: Four Commedia dell'Arte Figures by Claude Gillot. None of these are images of Don Jalton.

Jalton experienced an intellectual and spiritual renewal when the group toured Northern England. He subsequently wrote "On experiencing the fubtlety of the mellifluous language, the delicacy of the cuifine, the benign weather, the politeneff of the everyday

A. Nanu Univeristy, Ork
B. Dawber College, ET University, Earth
C. Hermes Trismegistus College, Helvetica

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folk and the uncommon beauty of the women, I decided to make this place my home". After 1745, he never left England, residing in Manchester and for the last years of his life in Birmingham. Attempts to visit colleagues in France or Spain were declined for bureaucratic reasons; for example, Maximilien Robespierre wrote in 1786:

Si cet homme tente de se rendre en France avec un mandat royal, je détruirai la monarchie et tout ce qu'elle représente.

In Manchester, Jalton made little impact on the intellectual and literary firmament, although his complaints about the effects of the "stinking piss-waters" of Manchester on his evening glass of whisky might have influenced Priestley and Thomas Henry in the production of soda water. Nevertheless, we are confident that Jalton made significant strides in the development and understanding of chemical science in his lonely and individual way. His atomic theory from the late 1780s was a masterpiece and his subsequent ordering of elements into a table pre-empted the plagiarism of Mendeleef by almost a Century.

Little is known of his Birmingham days, and the persistent rumour that he was one of the founders of the Lunatick Society seems to be based upon a misinterpretation of a 1798 parish record "And on this day, Mr. Jalton was confined with his menagerie to the Lunatic place". What was meant by his menagerie is unknown and will be the subject of the forthcoming fourteen parts of this series.

3. The atomic theory

How Jalton developed his atomic theory is unclear. The lack of any contemporary documentation or manuscripts from Jalton make it exceptionally difficult not only to know how he arrived at an atomic theory, but also what exactly he proposed. To date no manuscript attributed to Jalton, printed or handwritten has been identified. Indeed, Priestley was probably referring to Jalton in his well-documented outburst at the Royal Society "Am I always to be surrounded by illiterate louts and jugglers?" If so, then the reference to jugglers immediately brings to mind an atomic model based on spherical atoms.

If this were the case, it can be immediately discerned that the theory came from Jalton's experience at the *Commedia* where he would regularly have seen prestidigitators and jugglers performing their acts with skittles and cork balls. It then becomes obvious that atoms repel each other in the same way that billiard balls fly apart on the beize. It follows from this, that Jalton's atoms must have been spherical as cubic, pyramidal or other shapes would not have rolled.

His use of the juggling analogy was pure genius as it cemented the link between his "modern" atomic theory and the classical world. The Egyptian tomb painting shown in Figure 2 can be depicting nothing less than an adept teaching the relationship between spherical atoms of Earth, Air, Fire and Water.

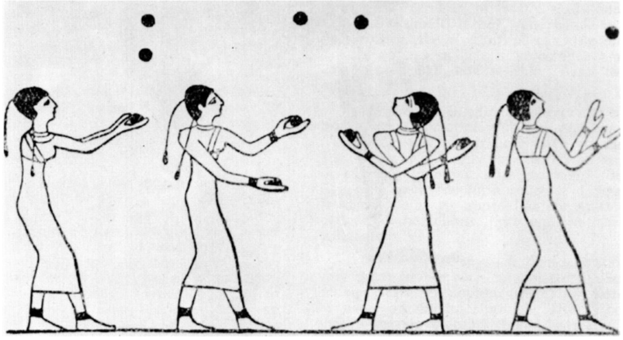

Figure 2: Egyptian scientists demonstrating Jalton's atomic theory.

It is not too great a leap to postulate that following Jalton's development of a theory of spherical atoms, he envisaged diatomic molecules as skittle-shaped objects with a solid force between the constituent balls. Indeed, a related theory developed in South America in which spherical atoms were connected by energy cords – this "bolas theory" can be seen as the origin of modern string theory.

Unlike later atomic models, in which atoms were surrounded by the essence of heat (*caloric*), Jalton's was evidently based much more on his real-life experiences. Our own observations show that fire is flighty, destructive and rises, so how can it possible hold atoms together? Jalton's genius, possibly inspired by the ice in his whisky and soda, was to postulate that atoms were held together by cold. Not only was ice hard, allowing ice cubes to undergo elastic collisions, but also when two are brought into prolonged contact, they stick together. In this flash of genius, Jalton not only established a viable atomic theory, but also gave a physical basis for the (yet to be discovered) gas laws.

4. Jalton's periodic table and elemental symbols

Jalton's claim to the discovery of the periodic table is very strong and relies upon notes taken at a lecture that he apparently gave in 1790. The notes from an anonymous student are written under the heading "Doctor don Jalton" read "What a load" and "O F B Al L S". The first comment clearly refers to the quality and quantity of material presented by Jalton, but the latter is even more interesting. This is obviously about two separate groups of elements identified by Jalton. The sequence "O F" obviously refers to the arrangement of oxygen and the then undiscovered element fluorine in order of their electronegativities. The second series illustrates Jalton's mathematical genius and demonstrates not only his priority claim for the isolation of aluminium and lithium (that he represented with the single letter symbol L) but also the arrangement of elements according to their properties. Boron, aluminium and lithium have three, three and one valence electrons respectively. These add up to seven, which is exactly the number of valence electrons possessed by sulfur, which Jalton believed to be a halogen. These notes also establish that Jalton was using alphabetic symbols to represent elements well before these were conventionally introduced by Jöns Jacob Berzelius.

We are given further insight into Jalton's periodic table in the same anonymous set of lecture notes (figure. 3). With his unique chemical insight, he arranged the elements alphabetically. We clearly see the arrangement also parallels the chemical properties. For example, in the first column, we observe a trend in the valency from 3 in A, to 2 in D and 1 in Li. Note that Jalton clearly believed that lime contained monovalent calcium, a suggestion that deserves reinvestigation with modern techniques. He also clearly predicts that strontium is zero-valent, a magnificent achievement at the time. Note that he also leaves gaps in his periodic table for elements still to be discovered, as did Mendeleef when he copied his work a Century later and places the elements silver and gold (money and more money in his notation) into a transition metal series.

A	Al	C	B	Ba			Be	Br	
D	H	He	O	I			L		
Li	M	Me			Mo	Momo			
							P	Pl	Po
							S	Si	So
St	W	Y							

Figure 3: A reconstruction of Jalton's periodic table from a set of now lost lecture notes. In his alphabetical system A was nitrogen (from azote), Br was copper (from brass or bronze), D for zinc (unknown provenance), He for lead (heavy), I for iron, L for lithium, Li for lime, M for magnesia, Me for mercury, Mo for silver (money) and Momo for gold (more money), Pl for platinum, Po for potash, So for soda, St for strontium, W for water, and Y for yttrium.

There appears to be no evidence to support the fanciful claims that he discovered the alphabetical arrangement of elements while dreaming of snakes.

5. Splitting the atom

Sometime in the late 1790s, Jalton returned to his atomic theory. He was apparently intrigued by the phase transition of tin at low temperatures, although his premature demise meant that he could not rejoice in images of Napoleon's troops struggling naked in the Russian campaign. He recognised that this change was associated with the cold that held the atoms together. It was obvious that if cold held the atoms together, that bond would only be strengthened by cooling, so the transition could not be due to bond-breaking or changes in interatomic forces. He could only have postulated that the observed changes were due to the splitting of tin atoms, which by then he had denoted Sn), into what he might have called Other stuff (symbol Ot). Here we see that he clearly predicted the splitting of the atom and presented the first example of the SnOt nuclear transformation. If he had lived longer, we are convinced that he would have established the basics of nuclear fusion and fission.

6. Jalton's death and legacy

Apparently, Dalton drowned in the same pond from which the upstart pseudochemist John Dalton collected methane. His death was unreported in the national press and his burial site is unmarked. To the end he remained a modest and lonely man, with his passing unremarked and unlamented by the literary or scientific society. His life was a model of the modern-day creed for tourism "Take only memories, leave only footprints". In his case, he left neither memories of his achievements nor footprints in history. We hope that this article redresses that balance.

7. Conclusion

Don Jalton can justly claim to have discovered atomic theory, the periodic table, unclear fusion and probably the Higgs boson.[5] I hope that this short article serves to bring him some of the recognition that his work has hitherto been denied. It is appropriate to end with Jalton's own words:

Cuando Dios juega a las castañas
Las ardillas esconden sus nueces

8. Acknowledgements

We would like to thank our unnamed students for doing all of the research presented in this manuscript. In particular, we are indebted to the one who went to the library and the other one whose parental financial and other in-kind donations contributed significantly to her successful graduation. This manuscript has been prepared with disregard for the expectations of FAIR publication and the recommendations of COPE.

9. Notes and References

1 Not to be confused with "The boy who lived".
2 Shortly before her death, his mother claimed that his father was Satan. Records of the *autos-da-fé, Toledo*, 1745.
3 Jalton never apparently progressed to playing one of the named characters, but in later life he reminisced about his experiences "as a horse's bum".
4 M.F.M.I. de Robespierre, personal communication.
5 Actually, there is no evidence that Jalton anticipated the Higgs boson, otherwise it would have been called Jalton's boson.

POLICY

The Return of the Imperial Mole

Johnny Delton,[A] the late Sir Amadeus Avocadro[B] and will.i.am L.H. Oswald[C]*

<u>Abstract:</u> Embiggened by Boris, son of John, we proudly introduce the imperial unit for the quantification of chemical substances. Unlike units of the Metric System, the imp-mole will bring benefits the likes of which have never been seen.

The mole is dead, long live the imperial mole. The Metric System is a 'weird, utopian, inelegant, creepy system', introduced a long time ago by men who probably did lots of bad things in their spare time.[1] Because one of us (Mason Grand Master and a Nobel laureate) has been expelled from the IUPAC sometime ago[2] we are now in favour of a non-IUPAC definition and wish to join the call of Her Majesty's Government to make the Metric System Great Again.

A frustration universally shared by scientists of all breeds is that governments don't choose their own measurement units along with the Cabinet ministers. Indeed, the metric mole is a measurement unit inherited from the previous May administration. It took force in May, 2019, with May gleefully presiding over the Government at the time. Embiggened by the current government leader Boris, son of John, we take this opportunity to formally revise the definition of the mole for the first time in the last three years[3]. We observe that the arrival of the new imperial mole is eagerly anticipated worldwide with celebratory drink memorabilia being already produced (figure 1), and thus we call all scientists to join the new world order.

Figure 1: The arrival of the new imperial mole is already being highly anticipated worldwide. (Source: https://untappd.com/user/alwagner)

The Imperial Mole

The origins of the imperial mole date back to the dark ages. It was Celia who first mentioned it to Rosalind, her cousin and lesbian lover, that counting atomies is easy! We owe it to Bill Shakespeare who has kindly recorded this chat between them for the annals of science.[4] Here we build on Celia's text messages to Rosalind to revise the current definition of the mole.

The imperial mole, abbreviated "imp", is the British imperial unit for the amount of substance. One imp-mole contains exactly 5.8×10^{23} elementary entities. This number is the fixed numerical value of the Boris constant, N_{B}. The inverse of the Boris constant is the Boris number, B_{N}.

A. Department of Atomies, Quaker Goats Company, Personchester, UK
B. Deceased
C. School of Imperial Thought, Slaughter House 5, Leipzig

Received: 1st Sivan 5782 Revised: Long Count 13.0.9.10.9 DOIOU: 6.02.10.23

Many chemical institutes use moles as their animal mascots, most notably the ACS. We find the association of our noble field with grubby, hole-dwelling vermin to be unseemly. Thus, we propose the Lincoln Imp as the mascot for the imp-mole. This gothic grotesque overlooks the entrance to the metaphysical chemistry lab in the Lincoln cathedral.

Figure 2: The Lincoln Imp.

Isotopic Abundances

For far too many years, the Metric System has forced scientists to use the number 100 in all percent calculations. This imposition ought not to be tolerated. Under the framework of the new imperial mole, the isotopic abundances of all elements will revert to the time-tested centurion notation whereby fractions are expressed in parts of around 80. For convenience, however, the symbol '%' will remain in force throughout the United Kingdom.

This change alone will benefit the industry and lead to a more prosperous United Kingdom. For example, whereas before, 18-karat gold contained only 75% gold, under the new imperial system it will contain 94% – and with none of these hard-earned gains going back to the EU.

Related Fundamental Constants

The Avogadro constant is simply too large. A well-documented case is the encounter which led Mr. Waylon Smitters from Springfield Nuclear Plant to resort to the Faraday constant and pay 96,485 dollars and 34 cents to the Android's Dungeon. The imperial mole addresses this problem head-on and now comes with an imperial Faraday constant at a 4 % discount. To put it in terms even a politician might understand, Mr. Smitters of Springfield is entitled to a refund totalling 3559 dollars and 10 cents.

The universal gas constant is yet another example of gross inconvenience to all chemists. Currently set at the annoying value of 8.3145 J $\mathrm{mol^{-1}\,K^{-1}}$, it is a source of agony to all students: does one round it to 8.314 or to 8.315? IUPAC has had more than 100 years to address this injustice and people are tired of waiting for an answer. The imperial mole takes the advantage of some clever rounding which results in R_{imp} being exactly about 8 J $\mathrm{imp^{-1}\,K^{-1}}$. Since there are 8 pints to a gallon, the imperial gas constant will provide a sobering familiarity to all scientists and students alike.

Unit Prefixes

The Metric System uses decadic prefixes for measurement units. This means, of course, that every other decade they must change. Indeed, the 1990s gave us the prefix yoda (10^{24}), the 1960s gave us the fembot (10^{-15}), and in the 1960s we lost the popular prefix for 10^4 (Muriel). But the global tyranny of the Metric System never ends! The newest unit prefixes are set to be ronto and quecto. These will be formally voted upon later this year in Versailles, of all places, and they are probably named after French, and not British, cheeses.[6]

We propose that one imperial mole equals 154 stiltons, 1 stilton equals 14 sticheltons, and 1 stichelton equals 5 barkhams. More confusingly: 1 imp = 154 stilts, 1 stilt = 14 stichs and 1 stich = 5 barks. The elegance of this system stems from its simplicity and a clever union of classical literature and some good cheeses.[7]

Sixty grams of carbon-12 in the old Metric System was 5 moles. Now we can proudly write it as 5 imp 29 stilt 6 stich 4 bark in the newly minted imperial framework. And twice that amount of carbon is simply 10 imp 58 stilt 13 stich 3 bark which would otherwise have been 10 moles.

Atomic Weight

Carbon-12 is used as the unit for atomic weights which we find boring. This idea was shouted across a hotel bar in Amsterdam a long time ago, and we find it too philistine. Thus, the imperial atomic weight unit (symbol awimp) will not be based on the same atom every year. Instead, it will be securely fastened to the age of the Sovereign.

Throughout the year 2022, 1 awimp shall be defined as the 1/96 mass of the molybdenum-96 atom[8] and will respectfully change each year on around the birthday of Queen Victoria, conveniently occurring in the same week as the World Metrology Day. This annual charade will provide ample opportunity to reprint textbooks and Periodic Table posters, boosting the beleaguered British printing industry.

Furthermore, the revision of the imperial atomic weight unit will no longer be done in some European hotel bar. Instead, a ceremonial pronouncement of the official imperial base nuclide of the year will be made by placing a formal notice on the front gates of Buckingham Palace. The imperial base nuclide will be selected by the Senior Wikipedia editors, and this ceremony retroactively dates back to 16th century. This will come as a relief to science journalists in the UK who will no longer be limited to writing about the Trial of the Pyx.

Conclusion

The rushed proposal of Her Majesty's Government to return UK back to its imperial roots will surely be viewed as a progressive move in the eyes of all 21st century scientists. But science is not just for scientists. In addition to the Crown stamp making its return to pint glasses, the newly introduced imp stamp too will be featured on all packaging containing chemicals.

God save us all.

Acknowledgements

We wish to thank the British imp community for their generosity and help.

Author Contributions

Due to the constraints imposed to him by Brussels (being officially deceased), Sir Amadeus Avocadro did not contribute to this paper. Dr. Prof. will.i.am Ostwald still maintains that the matter is only a mirage.

Conflicts of Interest

The Imperial Society of Chemistry remains invested with regard to jurisdictional claims in all published maps, imperial units and institutional affiliations. Consequently, Reviewer 2 was kindly ignored.

Rants and references

1 T. Carlson. The Metric system. *The Fox News Bulletin*, 5 Jun 2019.

2 In the good old days IUPAC used to expel people for war things.

3 The mole has enjoyed its current definition for far too long – in fact, some 50 days more than the Boris administration.

4 B. Shakespeare (1623) *Whatever you want*, Act III, Scene II.

5 Lincoln Imp currently resides in a bar at the Lincoln College, Oxford: https://en.wikipedia.org/wiki/Lincoln_Imp

6 The official vote is timed to occur on the birthday of Luis XVIII.

7 Everyone in the UK is though at the very young age that there are 154 sonnets, 14 lines in each sonnet, and 5 rhymes in each line. The new imperial prefix naming takes advantage of this self-evident fact.

8 Ruthenium-96 was excluded for consideration due to its public support for Russia.

POLICY

Imperial Units in Chemistry: A Vitriolic Perspective

Viscount Wazzok of Clang,[A] Cuthbert II Earl of Flange[B] and Günther Schlonk[C]*

Abstract: "There follows an exaggerated, ill-informed diatribe. Poorly thought out and peppered with grammatical errors, this work is of little merit and no significance. It is therefore accepted for publication in J. Immat. Sci."—Reviewer 2, 4/6/22

Boris Johnson—the befuddled hybrid of a tube man and a golden retriever—has announced an intention to revive the use of imperial units in the UK. The move has caused quite a flap because A) it's the UK, and they have an illustrious history of mountainising molehills and B) it's a more approachable topic than the impending collapse of our ecosystem and looming nuclear tensions. Johnson's proposal has been broadly condemned for its obvious fucking stupidity; with many punters speculating that BJ is throwing this out like Obi-Wan's spare part canisters to divert attention from his omnishambolic administration.

Ostensibly, the Queen's platinum jubilee is the motivation for this policy. We don't know if anyone has asked the Queen for her views on the matter, but the inhabitants of northern mining towns have spoken out in unison. They have stated that they don't care if Thatcher is 6 feet or 1.8 meters under, as long as she stays that way.

Retailers have been at the forefront of the ranks opposing this plan, and the voices of scientist have been drowned in the clamour. How unusual. Were anyone listening, they would have heard the eggheads decry this move as potentially disastrous for the UK's vaunted science sector. As every STEM undergrad knows: "you've got to watch your units".

The metric system currently consists of seven fundamental units (table 1). Over the years, several attempts have been made to formalize colloquial units such as the football field and the jumbo jet, but these have been unsuccessful.

Current SI Units

SI Unit	Quantity	Symbol
Second	*Oldiness*	*s*
Meter	*Longiness*	*m*
kilogram	*Heaviness*	*kg*
Ampere	*Zappiness*	*A*
Kelvin	*Hottiness*	*K*
Mole	*Muchliness*	*mol*
Candela	*Shininess*	*cd*

Rejected SI Units

Olympic Swimming Pool	*Volume*	O_{sp}
Football Field	*Length*	*fF*
747 Take-off	*Sound Intensity*	T^{747}
Texas	*Geographic Area*	*Tx*

Table 1: Official and rejected SI units.

Confusion over scientific units has already caused millions of dollars of damage. Consider the Mars Climate Orbiter, a probe that went full-flambé in the Martian atmosphere as a result of a meters/feet fuckup.[1] Reimplementing imperial units will inevitably cause more of these expensive mishaps. We can only hope that next time, Elon Musk in on board.

Sensing blood in the water, pint-swilling fopdoodle Nigel Garage has called for all elements named after European things to be scrapped. "I don't see why we should tolerate a bunch of bloody foreigner's names on our periodic table" said the cartoon politician. He has released a pamphlet detailing his suggested revisions (table 2).

Former Name	Revised Name	Revised Symbol
Europium	*Britainicum*	*Uk*
Francium	*Capitulatium*	*Fu*
Gallium	*Camembarium*	*Ch*
Germanium	*Victorium*	*Ww*
Rhenium	*Thamesium*	*Te*
Moscovium	*Hackneyium*	*Hk*
Oganesson	*Clarksonium*	*Ck*
Bohrium	*Churchillium*	*Ve*
Mendelevium	*Prophylactinium*	*Pp*

Table 2: Nigel Garage's suggested alterations to the periodic table.

Garage is also calling for the reintroduction of crown stamps on scientific glassware (figure 1).

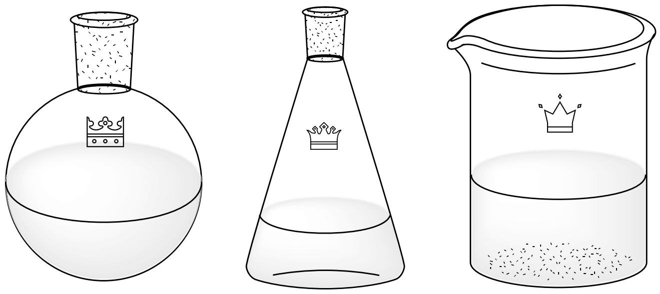

Figure 1: Half-pint round bottom flask, conical and beaker.

There is a serious side to this superficially superfluous scheme: the joint sizes of quick-fit glassware will no longer be expressed in millimetres (B24, B19 etc). Because of these *London* bureaucrats and their regulations, joint sizes will now be measured by the gauge of sausage that fit inside them. For example, a B_2 joint will fit two bratwursts, while an F_2C will accommodate two frankfurters and a Cumberland. This only works because the EU has standardised sausage sizes, but nobody wants to hear that.

The most intense debase has thus far focused on the imperial definition of the mole. The previous definition of a mole was based on the number of elementary entities in 12 grams of carbon-12.

A. Venerable Bede Institute of Chemistry, University of Coxford
B. Royal Society for Whimsical Science, Lamebridge University
C. Department of Pyrofrolics and Inorganometallics, University of West Failure

Received: poorly Revised: often Accepted: reluctantly
DOIOU: 10.€$&¥££¢Ž

Several proposals are circulating for replacement mole definitions. Recently, this very journal published a proposal by L. H. Oswald et al[2] to define the imperial mole in relation to the Boris constant: $N_B = 5.8 \times 10^{23}$. In our opinion, it is unwise to underpin the fundamentals of chemistry on something so demonstrably unreliable. It is unreasonable to expect Boris to accurately count six sextillion atoms when he can't even count the number of children he has fathered. For our part, we suggest defining the imperial mole as the number of carbon atoms in an average European Mole (*Talpa europaea*). We don't have an exact value for this number yet, but to determine it accurately, we suggest collecting all 40 million moles in the UK and subjecting them to combustion analysis. In place of the millimole, we propose the shrew mole, defined analogously with the carbon content of *Neurotricus gibbsii*.

The mole is not the only unit to be altered under the new regulations. Mass, volume, temperature, and will all revert to their imperial counterparts. We can look forward to experimental sections like this in the future:

Preparation of [6.6.6]-satanic acid
A $5^{3}/_{8}$ quart flask was purged of phlogiston and charged with potash ($1^{5}/_{4}$ pounds) and naphtha ($^{1}/_{5749}$ cubic fathoms). The vessel was cooled to the temperature of an autumn evening and stirred mechanically with a 0.6 stoatpower motor. Azinine (3 pints, 2 drams and a drop) was added, followed by S-beelzebol ($^{1}/_{4}$ stone) and perfluoridium PF_6 (458 grains). Three ells of LED strip lights (λ_{max} = 0.000001312 feet, intensity = 12000 candles) was wrapped around the flask, which was stirred for seven bells. The reaction was warmed to 530 degrees Rankine, transferred to a separatory funnel and washed with 12 gallons of sal ammoniac. The retained organic layer was dried with Epsom salts (0.86 hundredweight) and distilled to yield a black oil. This oil was triturated with ether (0.09 cubic femtoacres) to precipitate the product as brown crystals (yield = 12 parts in 60).
^{1}H NMR (24,000,000,000 RPM, $CDCl_3$) ϕ 0.0097–0.0005 (m, 68H) cpl (shifts given in chains per league).

Most sensible people will agree that such a procedure will be hard to follow. It is possible that the scientific community will grow so frustrated that they ditch units altogether:

Mrs Beeton's recipe for 3-nitrobiphenyl
Take a sturdy pot and grease the bottom thoroughly with silicon oil. Add a hefty slug of toluene and a splash of water. Next, finely chop some sodium carbonate and add a fistful, stir to combine. Make a well in the centre and add a scoop of 1-iodo-3-nitrobenzene and a dash of PhBPin. Whisk thoroughly. Add a few pinches of triphenylphosphine and a sprinkle of palladium acetate. Heat the mixture (lid on) until a rolling boil is achieved and simmer until aromatic. When the reaction is done, place the pot in the freezer to crystalise. Collect the crystals, add salt and pepper to tase, and serve. Goes well with stannous chloride and HCl.

This is no way to address a crisis of reproducibility, and even more frustrating than an infinite loop of "the synthesis of ***X*** was conducted following a literature procedure…". Luckily, politicians have an exulted history of listening to the earnest advice of scientists, so everything will work out fine.

Notes and references

1 https://www.simscale.com/blog/2017/12/nasa-mars-climate-orbiter-metric/

POLICY

IOUPAC Renames "Benzene" as "Desmethyltoluene" to Reduce Carcinogenic Stigma

Cuthbert II Earl of Flange[*]

Lots of things cause cancer. Some of them can be enjoyable, like ethanol and tobacco smoke. Others are hard to avoid: formaldehyde in the air, acrolein and PAH in food, BPA in water. Some things are carcinogenic and yet essential for life, like sunlight, sugar, oxygen and bacon. Scientists are often required to work with things that are both very useful and very toxic. This balance is sometimes difficult for the public to understand. So too is the degree of a substance's toxicity, and the quantity of it required to kill you. Evidence for this deficiency can be found in labels proclaiming "chemical free!" and the popularity of alkaline water. For some particularly chemophobic individuals, exposure is not required to cause a spike in blood pressure, the name alone will suffice. To combat this hysteria, IOUPAC has recommended new names for a range of well-known carcinogens and toxins (table 1).[1]

Former Name	New Name
Benzene	*Desmethyltoluene*
Dihydrogenmonoxide (DHMO)	*Oxidane*
Carbon tetrachloride	*DCM-dichloride*
Beryllium	*Heavy lithium*
Piranha Solution	*Sulfurious Acid*
Bisphenol A	*Diphenol 1*
Formaldehyde	*Methane monoxide*
UV-light	*Deep purple light*
Diazomethane	*Methyl nitrogen*
Carbon monoxide	*Deoxy-CO_2*
Fluorine	*Chlorine Lite®*

Table 1: IOUPAC's new names for some of the spicier laboratory substances.

IOUPAC is not alone in updating the chemical nomenclature: the Australasian Chemical Society (ACS) has recommended that the element rhodium be renamed as *unobtainium* to better reflect its current market price of $18,700/oz (figure 1).

Figure 1: 100 mg of $RhCl_3$, which constitutes Cuthbert's entire superannuation and pension.

Notes and references

1. The IOUPAC Brown Book, **12th Ed**, pp. 154746–154747.

NEWS

The 2022 Post-Doc Draft

Legate Beef Cheeks[A] and Günther Schlonk[A*]

This week saw the conclusion of the World Chemistry Federation's transfer window for post-docs. More money was spent this year than in the last three combined, with the transfer fee of mid-range players averaging at $35,000. Some in the media have criticized the WCF for the exorbitance of five-figure transfer fees, but we think it's a just reflection of the value of the game.

Last year's grand final was a spectacular event, a real clash of titans as Hantzsch Ester United squared off against LithAlmania. An early conjugation by F. Haber put the Esters ahead, but an equalising silylation by Scott Norway levelled the field. The deadlock persisted until the fifth quarter, when an incredible overhead cyclisation from Liebig clinched it for the Esters. As league champions, Hantzsch Ester United got the first pick in this year's draft. They went for Benjamin Schist, an up-and-coming geochemist and last year's joint best and fairest winner. The Esters paid the highest ever transfer fee to get Schist, at almost $70,000. US. Schist's former team (Baeyer Villiger F.C.), will receive Dean Toast, who is leaving the California Carbenes after eleven years with the club.

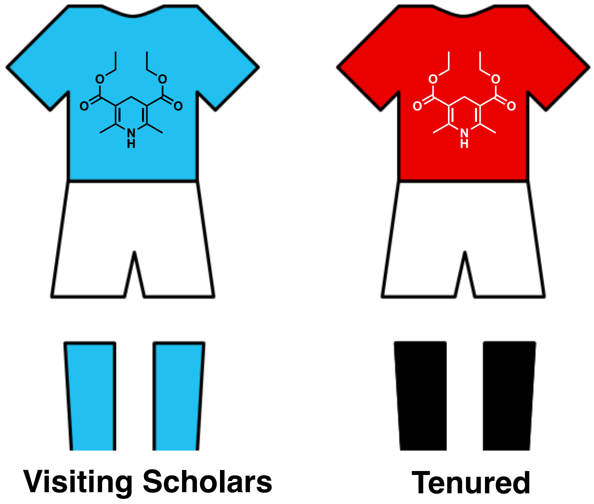

Figure 1: Hantzsch Ester United's new team kit.

In a shocking move, Steve Cluckwald has broken his contract with Réal Mannich, and joined their arch-rivals, Atlético Mannich. This is bound to create some tension next season, when the two teams come face-to-face in the first round.

The Portland Pyrroles finished bottom of the league for the seventh year running, so they were counting on scoring a big name like Avagadro or Hirsch to put them back in contention. Instead, they got David Goon, the ageing fermentation chemist and alcoholic from the Australian town of Lawncistern. It's looking like another tough year for the Pyrroles, things always go downhill quickly for them. We spoke to "Scotty from Marketing" at Goon's old team, the Cronulla Snarks. Scotty claimed that "David never played for the Snarks, and even if he did, we would still have won without him".

For the third year running, the San Diego Sandmeyers are mired in controversy. The team has stretched the rules to breaking point by buying up 26 new post-docs this year, almost half the available pool. Viewers have stated that it's no wonder the Sandmeyers plays so well, when their team has three times more players than everyone else. Head coach Bill Pharan has refuted rumours that the club is buying up players just to deny them to everyone else. There can be no doubt that more electrifying performances can be expected from this team, who surely have their eyes on the big prize this year.

Al Dole dropped out halfway through last season, after sustaining a pipetting injury to the thumb during a match against the San Francisco [2.2.2]'s. This year, he's back in the game and we've just heard that he's signed a two-year contract with the Orlando Orbitals. Des Martin is another injury-prone player whose future was in doubt. We all remember him straining his funding while tackling Axyl Owin last year. Thanks to some intensive economotherapy, he'll be returning to the Toronto Retorts this year.

The Philadelphia Phosphine Oxides have re-entered the league, after serving a three-season ban for doctoring NMR spectra. Perhaps it is fitting then, that they have just signed Morgan Schweinfleischmann, who was himself disciplined for claiming to have scored seventeen goals during what was actually a nil-nil draw. The Oxides apparently swapped Morgan for a rotavap and a dozen NMR tubes, a trade that the Utah Umpolungs were only too happy to make. Other trades of note are summarised in table 1.

Player	Old Team	New Team
Casey Nickelaou	*Minnesota Wittigs*	*FC Carcinoma*
Brandy Coote	*Western Prelogs*	*Heatmantle FC*
Stilbert Dork	*Schottenham Coldfinger*	*Cleveland Claisens*
Oligo Arnold	*Detroit Protons*	*Philadelphia Phlogistons*
Yennefer Gouda	*Columbus Blue Coats*	*Boston Red Soxhlets*
David McKillinit	*The Slapton Schlenks*	*Kilmarnschrock*

Table 1: Notable Post-Doc transfers for the 2022 season.

Several long-running controversies have reared their heads again this year. A number of critics have condemned the lack of female players in the league, particularly in the higher profile positions and management roles. Many players are also complaining about low wages and the number of matches they play each week. Neither issue looks to be resolved this year. Finally, the score of the longest running match in WCF history remains locked at Reviewer 2, Authors nil.

Conflicts of Interest

Günther Schlonk believes that sport is the cut-price lager of the masses, and a colossal waste of time. This manuscript constitutes a cynical ploy to appeal to the reader's inexplicable obsession with sport. The work of eminent philosophers Mitchell and Webb concisely summarises Günther's real views: https://www.youtube.com/watch?v=xN1WN0YMWZU. Legate Beef-Cheeks, however, enjoys sport to a medically inadvisable level, and feels it is more interesting than real life.

A. Department of Pyrofrolics and Inorganometallics, University of West Failure

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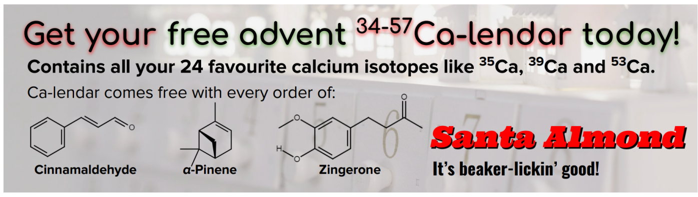

COVER
Geek Tragedy

We’re smashing beakers in our phys-chem labs
You’re running late without your lab coat on
These novel methods might boost our yields, but
We can’t keep working in different fields

We met in O-chem
And we fell in love
But now she wants to quit chem and
Study exoplanets and the stars above
She’s in physics, I’m in chemistry
and I can’t deal with this discrepancy

This love’s in jeopardy
Our bond is low in enthalpy

You spend your evenings with your telescopes
Scanning stardust for new isotopes
While I run columns ‘till my fingers bleed
Making ligands that nobody needs.

Your work is pointless
And you say mine’s flawed
But it’s too late now to
Return to the drawing board
We go to different rooms
As soon as we get home

Because our love’s in jeopardy
There’s no Gibbs free energy
Or physical chemistry
Just postdoctoral lethargy
And low-key bankruptcy
We’re such a geek tragedy

Music by the Wittigs
Lyrics by Günther Schlonk

COVER
The DPhil Team

White coat, workspace
Eppendorfs of amylase
Lungs full of solvent waste
fund’s gone, grant’s spent
Struggling to pay rent
PI’s absent

And they say
She's in the DPhil Team
Stuck in grade 18
On Ritalin and caffeine
But lately her drive’s been
melting like an ice cream
She’s running out of steam
And they scream
The worst things in life are rejected pubs
So she weighs in on the Twitter rants
And goes mad for a couple grants
She don’t want to sit and write, tonight
And in her dreams she flies back to undergrad
Or to the job that she could have had
Its too late to try
A different PI
A different PI

Ripped gloves, lab coat
They killed the draft she wrote
with red pen and foot-notes
Rev’ two was hellish
“Findings embellished“
Published, perished

And they say
She's shallower than graphene
lacking in self-esteem
that smile is just a smoke screen
‘cause lately her grades been
Worse than 2018
She’s short on serotonin
And they scream

The worst things in life are rejected pubs
So she weighs in on the Twitter rants
And goes mad for a couple grants
can’t afford to eat outside, tonight
And in her dreams she flies back to undergrad
Or to the job that she could have had
Its too late to try
A different PI
A different PI

And they say
She's in the DPhil team
Given up on her dreams
Locked in quarantine
And lately her mates been
Sniggering and saying
She ain’t never graduating
And they scream

The worst things in life are rejected pubs
Now she’s just here for the Twitter rants
While eating toast in her underpants
she ain’t feeling alright, tonight
And in her dreams she flies back to undergrad
Or to the job that she could have had
Its too late to try
A different PI
A different PI

Music by Sheep Shearen
Lyrics by Günther Schlonk

OH&S

Man with Prince Albert Piercing Stands Too Close to NMR Spectrometer, High-Intensity Splitting Results

Günther Schlonk[A*]

A disturbing incident occurred this week in the spectroscopy department of Southern Grundle University. Late on a Friday afternoon, Richard Headington was preparing a sample for a Nuclear Magnetic Resonance (NMR) experiment. This is hardly a risky procedure, and it would have gone seamlessly if it were not for two crucial details:

1. NMR spectrometers have very powerful magnetic fields.
2. Richard Headington had just acquired a Prince Albert piercing.

Now for those unfamiliar with this particular piece of personal paraphernalia, it is best described as a metal bar placed through the *membrum virile*, or more succinctly: a bolt through the cock.[1] We spoke with Dr Headington, in the hopes of clarifying why he chose to get such a confronting piercing:

“I suppose I’ve always had a thing for suffering. That’s why I did a PhD in chemistry. I got the piercing to remind me of that suffering, at my moments of greatest pleasure. I thought it would really add to the thrill of a romantic encounter, but it just made me think ‘I should be in the lab right now.’”

Such masochism is not uncommon in researchers, though most find more subtle ways to express it, like applying for grants. We quizzed Richard for further details of this regrettable incident:

“People with piercing use NMR spectrometers all the time, without anything like this happening. My mistake was to wear a barbell with chunks of magnetite on the ends. I was dating a geologist at the time, and I thought it would impress her. Anyway, as I was climbing the ladder to insert my sample, I felt a sudden and intense tug upon my nether regions. This was followed by the sound of ripping cloth, and a millisecond later, I saw my piercing fly past my nose and shoot down the bore of the magnet. Then the pain arrived, like a hippo going downhill in a shopping trolly. It felt like I had tried to impregnate an ant-nest or swat a scorpion with my Johnson.”

Megahertz indeed. Headington confirmed, however, that the experience was still less painful than reading Reviewer 2’s comments. This incident clearly highlights a hole in current safe-working-procedures for NMR spectrometers. Most facilities housing these instruments display warnings of “high magnetic fields,” and caution against bringing steel, keys, phones and pacemakers within the 5-gauss radius (figure 1). Following this incident, we submit that such signs be amended to include the possibility of piercing-promoted penile-perforation, with appropriate diagrams.

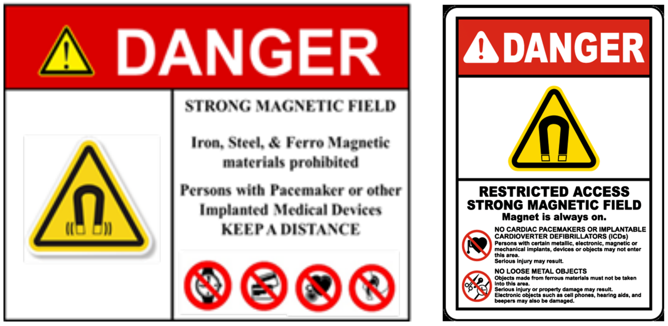

Figure 1: Typical signage for an NMR spectrometer.

Returning to the story of our prot*agonist*, we asked him about the state of his Primary Inseminator:

“It’s a total banana split, man. I have to hold the ends together to pee, and I’ve developed Coupling Incontinence.”

We have elected not to include photographic documentation of Richard’s plight, as such distasteful material would demean this journal, paragon of virtue that it is. Thus, figure 2 contains a graphical representation of Richard’s rolling pin, before and after the parting of the ways.

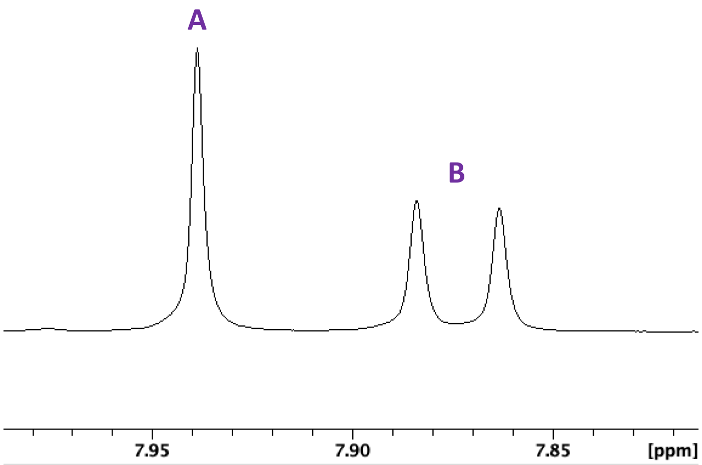

Figure 2: Richard’s Richard A) before and B) after the incident. This kind of lower-order splitting is characteristic of ^{57}Fe, a spin ½ nucleus.

As unlikely as it seems, this is not the first occurrence of a piercing related injury incurred by a spectroscopist. Interested readers should peruse the article entitled: “Trans-Annular Strain-Driven Ring Expansion in the Wild-Type Graduate Student.”[2] Finally, we asked Richard what experiment he was running at the time of his summary severance.

“I was doing Proton Enhanced Nuclear Induction Spectroscopy on a sample of phthalic acid”

Of course he was. We wish Richard a speedy recovery, and hope that his geologist friend is suitably impressed.

Notes and references

1 Our internet history is now severely compromised.
2 If we really run out of ideas, we might write this one…

A. *Department of Pyrofrolics and Inorganometallics, University of West Failure*

Published: 18th March 2022 DOIOU: 10.getprosol

OH&S

Solvent Misconduct: How A Flask of DMSO Nearly Cost Me My Job

John Smith[A]

Alright my friends, gather round and I’ll tell you a story. It was a cold and miserable evening at the University of Redacted. Inside the chemistry building, a lonesome chemist makes his way to a glovebox, with a flask of DMSO in hand. That lonesome chemist was me. For the uninitiated: a glovebox is an airtight chamber filled with an inert gas like N_2 or argon. An airlock allows you to take stuff in and out, and it has built-in gloves to allow the user to manipulate things inside. They’re a must-have tool for anyone using air-sensitive solids. Dimethylsulfoxide (DMSO), on the other hand, is a solvent famed for its capacity to dissolve almost anything (including you).

A. *The University of Redacted, Down the Road, Somewhere*

Published: 20th March 2022 DOIOU: 10.€$&¥££¢Ž

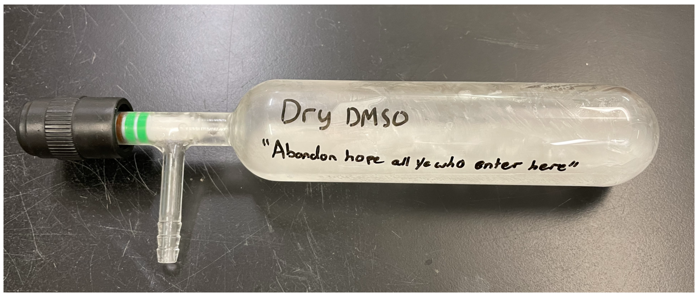

Figure 1: The offending flask of DMSO.

I needed to dissolve a sample of potassium procrastinate under an inert atmosphere, and DMSO is the only solvent that could do the job. Thus, I grabbed the flask of DMSO, trudged down to the glovebox, and brought it through the airlock. Inserting my hands into the gloves, I carefully weighted out my sample of potassium procrastinate, transferred it to a reaction vial and reached for the flask of DMSO. To my intense irritation, it had frozen solid. DMSO sometimes does this (its melting point is 19 °C) and the lack of heating in the glovebox room must have tipped it over the edge. In a normal lab setting, this wouldn't be an issue. You could warm the flask with a heat gun or run it under a hot tap. Neither option is available in my glovebox. The only means of warming the flask is friction. Resigned to this necessity, I firmly gripped the cylindrical flask with one hand, and began vigorously rubbing it with the other.

Some further details are required at this point. The glovebox sits in a small room adjacent to my lab, facing the wall. Opposite the glovebox is the door, which has a large window. As I sat alone, my back to the door, furiously stroking my flask, a school safety-officer walked past. Looking through the window, they saw the rapid oscillations of my right arm, and assumed it was something else I was stroking. At the same moment, I glanced up from the task at hand and saw their reflection in the glovebox window. Startled, I jerked around, inadvertently spraying the now semifluid solvent across the interior of the box. Evidently, the look of surprise on my face convinced them of their lewd assumption, and they left at a run. It was a moment before I realised: the safety officer thought that they'd interrupted an act of workplace masturbation. By the time I'd extracted myself from the glovebox, they were gone.

Next morning, I was summoned to the Dean's office on account of "inappropriate behaviour at work". Frantically, I gave the account you've just read, and explained that DMSO and pleasure of any kind are polar opposites. Grudgingly, the dean accepted my case, but I can tell that she doesn't believe me. There's a look in her eye that tells me she thinks I tried to procreate with a scientific instrument.

EVOLUTIONARY BIOLOGY

Wicknerian-Eisnerian Mimicry in the Common Drop Bear (*Thylarctos plummetus*)

Russelle Coight,[A] Seo-Yun Kim,[A] Josh Brighman[A] and Norma Gunston[A]*

The fauna and flora of Australia are well-known to be terrifying,[1] but the lethal and the benign are not easily distinguished. For example, the Australian killer pine (*Araucaria bidwillii*)[2] is easily confused with the harmless hoop pine (*Araucaria cuninghamii*); *Dendrocnide moroides* resembles many rainforest plants but skin contact can induce an ICU admission;[3] and no-one expects a pretty seashell to fire a poison dart.[4] We postulate that this is a form of Wicknerian-Eisnerian mimicry evolved to avert the tendency of *Homo sapiens* to kill it with fire.

Wicknerian-Eisnerian mimicry is an evolutionary adaptation whereby a predator species evolves to closely resemble a harmless species occupying the same habitat to avoid being identified as a threat by their prey and/or being ruthlessly exterminated by humans. We here propose that this also applies to drop bears (*Thylarctos plummetus*) and their resemblance to that Australian icon beloved of tourists, the koala (*Phascolarctos cinereus*) (figure 1).

Figure 1: The uncanny similarity between A) the famously cuddly koala and B) the bloodthirsty predator drop bear (Source: Frank Wouters/Yamavu CC-BY 3.0 via Wikimedia Commons).

Early European naturalists had a low opinion of the koala:
"[T]hey have little either in their character or appearance to interest the Naturalist or Philosopher. As Nature however provides nothing in vain, we may suppose that even these torpid, senseless creatures are wisely intended to fill up one of the great links of the chain of animated nature."[5]

Clearly the pants-shittingly terrifying—but to the untrained eye almost identical—drop bear was at this time unknown to science. At this time, the drop bear may have still been unused to the poncy dress style of the Europeans as opposed to the indigenous peoples and were therefore reluctant to attack them, even with their signature surprise attack by dropping on the prey from a great height, stunning them so they can be easily disembowelled. They particularly favour latrine trees, attacking their prey while their pants are down.[6]

While on a lab retreat in some godforsaken forest, we surveyed reputed *T. plummetus* habitat with binoculars from a safe distance to ascertain the habitat's characteristics. There were indeed a multitude of trees used by koalas as food (*Eucalyptus microcorys*, *Eucalyptus tereticornis* and *Eucalyptus camaldulensis*). Two koalas were also spotted; we identified them as koalas, not drop bears, because they were actively grazing on leaves instead of human flesh. Other individuals were seen sleeping, or appearing to sleep, and could not conclusively be identified as one or the other.

We were unable to perform a genetic comparison due to the Australian scientists' deep unwillingness to approach known *T. plummetus* territory; an attempt to collect samples using a remote-controlled trap baited with an American exchange student was unsuccessful. We could have repeated the attempt with the Korean student, but we actually like her.

Conclusions

We conclude that, as far as we can tell from a safe distance, *T. plummetus* does indeed share habitat with *P. cinereus* and may have evolved the close resemblance to them as a form of Wicknerian-Eisnerian mimicry. This is supported by the presence

A. Department of Cryptids, Stephen R. Irwin University

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of heedless tourists (i.e., prey) wandering around in the area like they're just asking to be eaten. However, a genetic analysis will need to be performed to confirm that koalas and drop bears do not share a recent common ancestry and have not merely diverged to take advantage of different niches in the same habitat. As stated previously, we're too chickenshit to do it.

Author Contributions

Russelle conceived of this idea and Norma is just happy so long as someone else does the work. Josh provided the bait. Seo-Yun provided the bangin' K-pop soundtrack.

Conflicts of Interest

Messing with tourists is our hobby. Please don't ruin it.

Acknowledgements

The first author would like to acknowledge *Dendrocnide moroides* for introducing her to the true terror of the Australian rainforest and a referral for her first opiate administration. Norman Gunston is thanked for his exemplary career in fucking around with international guests of our country.

No students were harmed in the production of this manuscript, though not for want of trying.

Notes and references

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2 C. Morris. Attack of the killer pine cones! Bunya pines dropping bumper crop of giant cones in Parramatta. *Daily Telegraph*. 2015, https://tinyurl.com/cz3sh4r5

3 D. Maor, M. Little. Skin contact with a stinging tree requiring intensive care unit admission. *Contact Dermatitis*. 2017, 77(5), 335-337.

4 Z.A. Halford, P.Y. Yu, R.K. Likeman, J.S. Hawley-Molloy, C. Thomas, J.P. Bingham. Cone shell envenomation: epidemiology, pharmacology and medical care. *Diving Hyperb Med*. 2015, 45(3), 200-207.

5 *G. Perry. Arcana; or The Museum of Natural History. 1811, p109.*

6 *Totally not shitting you on this. Seriously, pee out in the open.*

CATALYSIS

Novel Preparation of Palladium-On-Carbon and Pd/TPPO by Gradual Mesobaric Pyrolysis

Günther Schlonk[A*]

Palladium on carbon (Pd/C) is a widely used heterogeneous catalyst. It consists of a thin coating of palladium supported on activated charcoal, and is predominantly used in hydrogenation and hydrogenolysis reactions. Although it is commercially available, some chemists prefer to prepare their own, by reducing aqueous solutions of Pd(II) with formaldehyde. Entirely by accident, we have discovered a new way to prepare this venerable catalyst.

Procedure:

A 100 mL round-bottom flask was charged with iodobenzene (10.0 g, 50 mmol, 1 equiv), phenylboronic acid (6.1 g, 50 mmol, 1 equiv), triphenylphosphine (1.3 g, 5.0 mmol, 10 mol%), $PdOAc_2$ (0.56 g, 2.5 mmol, 5 mol%) and Na_2CO_3 (10.6 g, 100 mmol, 2 equiv). The solids were suspended in toluene (50 mL) and water (10 mL). The flask was fitted with a reflux condenser which, crucially, was not connected to a water source. A gas adaptor was used to connect the reaction setup to a Schlenk line, and the flask was cycled under vacuum/N_2 three times. The gas adaptor was then partially disconnected, allowing air to enter the flask. Finally, the reaction flask was placed in oil bath set to 120 °C, but with the thermometer placed outside the bath. The reaction was heated thus for 16 h, resulting in complete evaporation of the solvent and decompository pyrolysis of the reactants. The flask was cooled from 300 °C to room temperature and smashed with a mallet. Shards of glass were mechanically separated to yield a foul-smelling black sludge, which was washed with DMSO and dried under vacuum (figure 1). 2.6 g of Pd/C were thus obtained, with an approximate Pd content of 5% w/wt as assessed by ICP-MS-MS-MS-MS-MS-MS.

Figure 1: Crude reaction mixture (A) and purified product (B)

The correct placement of the condenser, gas adaptor and thermometer are crucial to the success of this procedure. If the system is sealed, biphenyl is obtained as the major product via a competing Suzuki-Miyaura cross-coupling. The selectivity thus obtained by our experimental method led us to further probe its mechanism. The reactants are first dissolved, then deposited on the flask walls as a homogenised oil by the evaporation of the solvent. Strong heating of this residue results in pyrolysis/carbonisation, leaving a residue of palladium coated on organic char. This method contrasts with the well-established technique of flash-vacuum pyrolysis, in which molecules are heated intensely and briefly under reduced pressure. Being a progressive roasting at atmospheric pressure, we have entitled our new technique "Gradual Mesobaric Pyrolysis" or GMP for short.

It was found that by modifying the aforementioned conditions, another catalyst could be rapidly prepared: palladium on triphenylphosphine oxide (Pd/TPPO). This lesser-known species is often prepared inadvertently, but does function effectively in hydrogenation reactions. Unlike charcoal, TPPO dissolves in most solvents, further increasing the available surface area. To prepare Pd/TPPO, a solution of $Pd(PPh_3)_4$ in benzene is subjected to the gradual mesobaric pyrolysis conditions described above, until the reaction resembles a black snow-globe.

We hope that this new technique will be explored by others, and that it will be a valuable addition to the synthetic toolbox. Current work in our laboratory is focused on preparing rhodium-on-alumina by columning $[Rh(COD)_2]BF_4$ in air.

A. *Department of Pyrofrolics and Inorganometallics, University of West Failure*

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ORGANIC CHEMISTRY

A Scalable Synthesis of Methamphetamine

DD Revolución[A] *Fweedel Kwaft*[B] *and R&B Woodward*[C*]

Methamphetamine has been shown to be a miracle molecule.[1] Previous literature shows the utility of methamphetamine (**1-Meth**) as a relaxant, stimulant, painkiller, and nirvana catalyst. The biological mechanism for these effects remains unknown,[2] but recent research has suggested that more funding can be diverted to studying **1-Meth** for increasing its utility in healthcare, government, and educational institutions.

To-date, literature has been limited by the scarce number of **1-Meth** resources available nationwide. The Drug Enforcement Agency (DEA) has been a challenging obstacle in synthetic organic chemistry,[3] and known methods of obtaining **1-Meth** have increased in cost and risk (figure 1, top). This work demonstrates a novel method of spawning methamphetamine "off-the-grid", which reduces the rate at which your department chair[4] calls the police, while remaining cost- and resource-efficient.

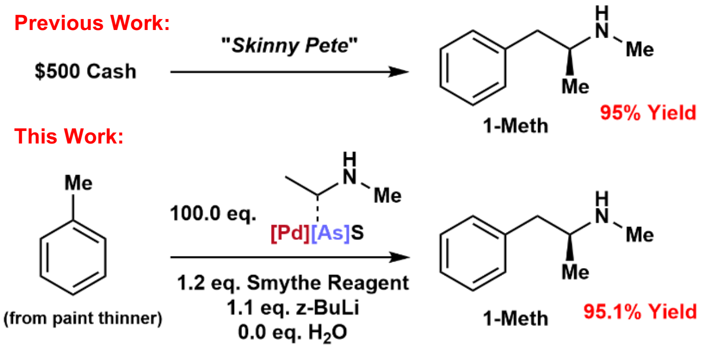

Figure 1: (Top) Previous method of methamphetamine synthesis. (Bottom) Our 1.1-step synthesis of methamphetamine.

With these benefits in mind, we targeted a quick, efficient, and scalable synthesis of **1-Meth** which could be easily replicated by other researchers and amateurs alike, so at least the entire black market can boost our H-index.

Results and Discussion

C-H insertion conditions into paint thinner were first screened using 1 condition from literature, which first yielded the **1-Meth** analogue vanillin in 35% yield (figure 2). However, confidence in this outcome was reduced after it was discovered that the reaction was completed in KitchenAid Tupperware. After some dialogue and monetary exchange with the editors of *J. Immat. Sci*, the Smythe reagent was found to supply necessary hydroxide ions to push the reaction towards desired product.

This process could be repeated even by the aging laboratory manager, who hasn't seen a fume hood since penicillin was discovered. When the reaction scale was increased to 100 kg, z-BuLi was found to react violently with the laboratory floor, since there were no flasks large enough to contain the reaction volume. However, the individual setting up this reaction was told to "suck it up" since "we gonna be rich after this".

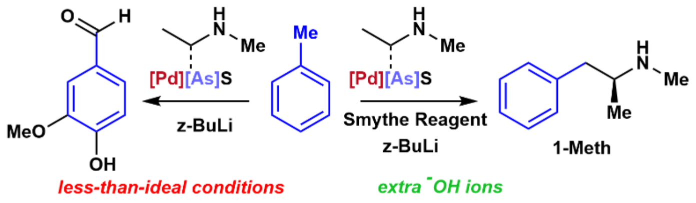

Figure 2: Synthetic attempts towards **1-Meth** with and without Smythe reagent

Preliminary biological testing demonstrated that isolated product had sufficient biological activity. When F. Kwaft first ingested **1-Meth**, he remained positively affected for a minimum of 12 hours at room temperature.[6] Product was distributed to known users at local shelters to overwhelmingly positive acclaim.

The immediate success of our attempted reactions remains unexplained. A large amount of time was spent reviewing security camera footage and attending local psychics without much insight, except that DD Revolución is expected to find love in the coming years.

Experimental

Paint thinner was used as received from the Home Depot, Aisle 8. Günther Schlonk[7] graciously supplied us with Smythe Reagent since he had "way, way too much". z-BuLi (Smegma-Aldrich) was sublimed from IrH_3 and stored over 0 Å molecular sieves. H_2O was purchased from Flasher Scientific and dried in a vacuum oven at 80°C for 3 days before use.

To prepare the 2-[Pd][As]S-Ethyl-2-methylamine, a solution of ethylmethylamine was added to a nearby undergraduate's waste beaker and stirred for 2 semesters at 42.0 °C. After finals, the solution was finally dumped, and the product filtered with a burnt lab coat before concentrating and analysing via ^{69}Pd-NMR. Product was obtained as a brown oil in 13% yield.

1-Meth was generated by the more or less slow addition of Smythe reagent to a still solution of z-BuLi in paint thinner. 2-[Pd][As]S-Ethyl-2-methylamine was added lastly with eyes closed tightly, and the reaction permitted to run for some time: not too short, not too long, but just right. The reaction was injected intravenously at 2-hour intervals to detect presence of **1-Meth**, and was quenched with addition of 2 M stomach bile at 0 °C. Product was afforded in 95.1% yield as a white solid which, interestingly, appeared more blue with increased purity.

Conclusion

This work demonstrates an efficient production of methamphetamine, and the authors hope that their downtown territory isn't infringed upon. It is believed that these data can increase worldwide availability of such an important unnatural product. The reactions shown are currently being applied to our ongoing work with opium dispensaries.

Experimental data, samples, syringes, and lighters are available for sale at the Crips Research Institute Waste Facility, but only after 1 am.

Acknowledgements

The authors would like to thank Mrs. Kwaft for allowing Fweedel come out to play on Saturday afternoons. This research could not have been completed without the help of janitor Doug Spunk for not being a snitch.

Author Contributions

DD completed all labwork within 72 hours after a "guy's weekend" in Las Vegas. Fweedel created a really neat Minecraft server. R&B is no longer with us.

Conflicts of Interest

R&B was a DEA informant and was "removed" from the project.

About the Author

A. Crips Research Institute
B. Albuquerque Middle School, Ms. Baker's Class
C. Institute of Froyo Technology, Department of Swirly-Dirlies

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Only Known Photo

Dr. DD Revolución attended Sunday school at Ridgeside Catholic Church before completing his Ph.D. at the University of Hard Knoxford around 2010, advised by Dr. Spongeboy. Before coming to Crips Research Institute in 2018, DD was involved with a chemistry-themed Ska group, known for hits "Crash Out" and "Schlenk Line to Skaville".

Notes and references

1 Just trust us on this one.

2 C. Alice, Y. Agra, 2003, *J. Excit. Bio. Sci.* **4**, 2069.

3 https://www.dea.gov/

4 Screw you Dr. James! Our life is our own personal business!

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6 F. Kwaft remains dependent on **1-Meth** to-date.

7 G. Schlonk, 2021 *J. Immat. Sci*, **1**, 8-9.

FOOD SCIENCE

Debuttering: Not with That Attitude

Don G. Boop,[A] Nugget P. Stilles[A] and Carlos S. Harbor[A]

Anybody who has ever made butter out of heavy cream has been told that once it is separated into butter and buttermilk, the mixture cannot be turned back into cream. As biochemists with long mindless commutes from the lab, we sought to challenge this. The transformation from cream to butter/buttermilk is a physical change, not a chemical change, and all physical changes can be undone provided enough energy.[1] Sonication generally provides enough energy to emulsify liquids. Seeing as cream is an emulsion, it was hypothesized that sonication would be sufficient to re-emulsify the aqueous/hydrophilic (buttermilk) and hydrophobic (butter) layers. The following workflow was put together by the undergrad (figure 1), considering several factors that could prevent/promote stable re-emulsification, for example: phase difference between layers and heating due to sonication. When posed with the question "Is this possible?", the supervisors asserted "I don't know, we have a sonicator and you haven't broken it before, find out".

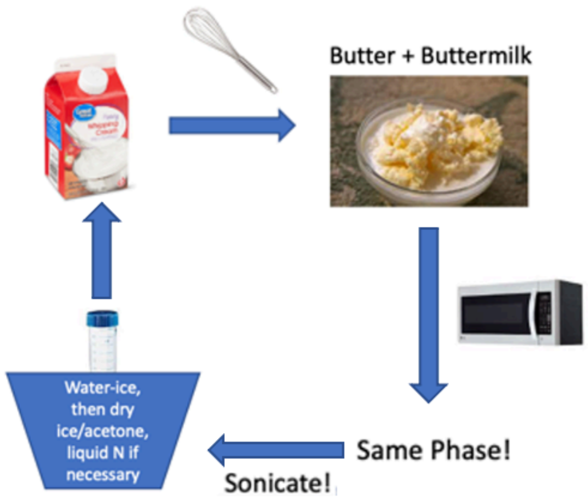

Figure 1: Planned Workflow

A. University of Fontina, Tampa, Florida

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After finalizing the procedure, Walmart brand heavy cream was obtained and about half the pint container was whipped into butter. The butter and buttermilk were separated and weighed. A 25 g sample proportional to the ratios of butter:buttermilk was then transferred to a container for transport to the lab. The remaining butter was made into herbed butter for use as a spread on bagels. It was not shared with any other lab members and has likely gone bad in the fridge by now. The remaining buttermilk was ingested quickly. This was a bad decision seeing as it ended up being aspirated by the investigator who drank it.

Once in the lab, the mixture was microwaved in the break room for 21.3752 seconds. It was then transferred to a 50 mL falcon tube. The hydrophilic and hydrophobic layers can be seen clearly (figure 2A). The mixture was sonicated twice in pulses of 7 seconds. The mixture was observed to have no layering and to have achieved homogeneity. The mixture was then placed in a water-ice bath and allowed to cool for 53 seconds. After 53 seconds, there was no visible layering. The mixture was sonicated for another 10 seconds, just to be sure, and was left to cool in the ice bath until cool to the touch (around 4°C), around a minute and a half. The layers did not separate in that time (figure 2B).

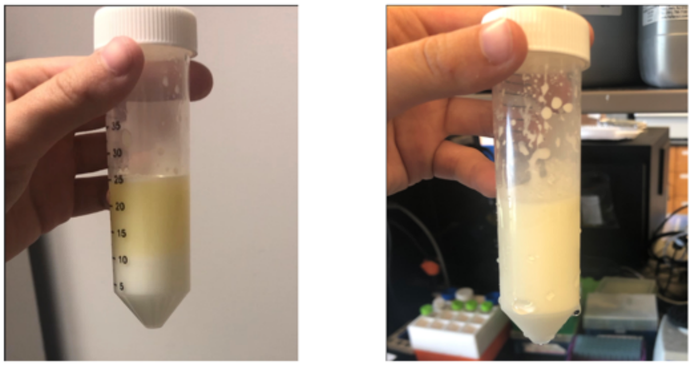

Figure 2: A) Before sonication B) 15 min post-re-emulsion

There was absolutely no way in hell the investigator running the procedure was going to ingest anything the sonicator had touched, seeing as she knew where that thing had been, and the microscope room was locked, so it was confirmed by consistency analysis that the mixture had been emulsified back into cream. This was done by gently stirring the emulsion with a plastic knife stolen from a neighbouring lab's cabinet in the breakroom, then observing the dripping patterns as it dripped off the knife. The physical behaviour of the re-emulsified mixture was identical to that of cream that had never been whipped.[2] It is also worth noting that upon whipping the cream into butter, protein aggregates formed in the buttermilk, likely due to hydrophobic regions of the proteins being unable to coordinate with hydrophobic milkfat, and instead coordinating with each other to retain thermodynamic stability. These insoluble bodies were identified as protein aggregates by visual analysis.[3] Upon re-emulsification, the protein aggregates were absent despite nothing being added or removed from the sample, indicating that the re-emulsion had a chemical environment identical to that of cream, and thus the hydrophobic regions of the proteins were able to coordinate with milkfat once again. Furthermore, stability of the re-emulsion was tested by leaving it in the lab fridge over the weekend. It was left undisturbed by lab members not involved in the project since they were slightly afraid of it. By the beginning of the next week, the re-emulsion was unchanged.

Conclusions

We have unequivocally disproven the popular myth that once cream is separated into butter and buttermilk, it cannot be turned back into cream. This process is very simple, not requiring nearly as much time, resources, or procedural steps as initially predicted. These results beg the question: if any dairy product containing milkfat can be turned into butter/buttermilk, can the process be similarly reversed for any dairy product turned into butter/buttermilk? Further testing will be focused on answering this question. Future work in our laboratory will also focus on the unscrambling of eggs, the desifting of flour and whatever the opposite of kneading dough is.

Experimental data, spectra and reaction conditions are available at www.tumblr.com for a bag of Cheetos, a penny, and a bottle of hand lotion (the gloves dry out my hands, ok?).

Author Contributions

Don G. Boop and Nugget P. Stilles contributed equally to this project. Carlos S. Harbor is a free-loader and nobody is really sure why he is on this paper.

Conflicts of Interest

Nobody was paid for their work on this project.

Acknowledgements

The authors would like to thank Derin TS Pescatarian for experimental consultation and Anon Y. Mous for reminding the primary investigator what the fucking word for "buttermilk" was instead of letting me keep saying "hydrophilic layer" like an idiot who doesn't know what buttermilk is. The authors also wish to acknowledge the insight of Reviewer 2's prescient proclamation: "I refuse to believe it's not butter".

Notes and references

1 Your Elementary School Science Teacher, *J. Ed. Sci.*1969, **4**, 6743.
2 Marsh, Randall M, *J. Creme. Fraische.*2010, **6**, 1073.
3 Trust me I'm a protein scientist.

ANALYTICAL CHEMISTRY

Unconventional Methods for Metal Detection in Semi-Crystalline Samples

F. Drebin,[A] N. Lawson and Shelby Wright[A]*

Abstract: In lieu of an abstract, or any semblance of a social or romantic life, Wright provides the opening line to her favourite dirty limerick- "There once was a man from Nantucket…"

The synthesis of metal complexes is a persistent source of anguish for inorganic and organometallic chemists alike. Endless rounds of recrystallisation can make even root-canal seem like pleasant alternative. Thanks to the inherent paramagnetism of many transition metals (including most of the cheap ones), it can be challenging to figure out what the fuck you've actually made. Is it a new metal complex, or is it TPPO garnished with $CuSO_4$? Included below is a selection of unconventional techniques for determining the presence of transition metals in prospective samples.

1. The fridge test

The research groups of Profs Mills and Boon, inspired by a wise crack from one of their Master's students, applied first-principles to this quandary. What's the best way to confirm whether something has metal in it? Why, see if it sticks to a fridge! As the group accrued more and more crystalline powdery BS, it was flung onto the nearest fridge and the adherence of the samples were assessed. The deposit thus accrued acquired a rather distinctive shape, which is believed to be the origin of the phrase "is that a Schlenk in your fridge or are you just pleased to see me?"

2. The airport metal detector test

Are you dying to know whether the crystalline powder adhered to the bottom of that manky vial has any sweet, sweet metal in it? Just arrange a trip to the nearest airport for this fool-proof characterisation method. There you will find a piece of highly specialised scientific equipment: the airport metal detector. Just mosey on through with your sample held high and proud and listen out for that winning alarm. You may need to remove your and your samples belt and shoes as you escort the vial through the silver arches but it's worth it. If you happen to get selected for a random drug swab test and you and/or your sample test positive, blame the PhD student working in illicit substances and not your harrowing narcotics addiction.

3. Taste test

According to some chemistry legends from the '50s, there is a 38% success rate for the identification of metal samples by taste. While low, this is still far more successful than elemental analysis. Typically, copper complexes have a sharp, astringent flavour with fruity notes and a smooth finish, while molybdenum clusters are known for their subtle and complex palate.

4. The fish test

It is a well-known fact that fish love to eat metal—why would bioaccumulation exist if they didn't? A group at the Cambridge University of Litigations and Tribulations exploited this fact to confirm whether the semicrystalline powder they collected from countless failed recrystallizations contained a metal complex. While edible fish are ideal for this proof, such as salmon and halibut, the group resorted to the more commercially available option: the humble goldfish.

The test was simple: sprinkle some metal complex sample in the tank followed by a control sample containing no metal, but of equivalent levels of toxicity, and see what they gravitate towards. As predicted, the fish would swim towards the metal complex samples with reckless abandon and indulge in the metallic buffet as nature intended. While the group could not recover the samples, or the countless lab goldfish used (all aptly named 'Goldmember'), the test provided comforting evidence for their metal complexes, as well as a moment to ponder if science has once again gone too far.

While these methods show correlation to the presence of metal in a sample, they may result in confounding data and a confounded supervisor. If so, a new spectroscopic technique has come on the market in the last few years and may help soothe your woes. It is known that NMR spectroscopic data cannot always give viable information when it comes to metal complexes. As such, new wave technology of MMR (metal magnetic resonance) spectroscopy can offer concrete evidence as to the Schrödinger-like behaviour of your metal complex success. This technology is not to be confused with the MMR vaccine, which also 'definitely contains mercury' according to an anonymous Karen's blog post, quoting a dubious article from the Lancelot.

Conclusions

Metal complexes are a clusterfuck (pardon the pun) and the everyday chemist must think outside the box to confirm their existence. Even if that means harming group members or goldfish.

About the Authors

F. Drebin learned the extent of his chemistry knowledge watching Breaking Bad while high as a kite. N. Lawson claims that 'if you can cook you basically know chemistry already' and she's not wrong. S. Wright knows a disturbing amount about nuclear warfare and bomb construction but will divulge no further.

A. Department of Chemistry, University of North Texas

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Author Contributions

F. Drebin wrote this paper on his own personal computer, the only device in the group with a fully functioning keyboard and the smallest amount of hardcore midget porn. S. Wright formulated the concept for the paper while on a spiritual journey to the Bahamas. N. Lawson only found the template, but cooked some fantastic chocolate volcano cakes which definitely made up for it.

Conflicts of Interest

S. Wright still owes N. Lawson for that stuffed crust pepperoni pizza. Oh, for the paper? Nah.

Acknowledgements

S. Wright acknowledges her sheer will and determination in dark days of inorganic dumfuckery to search the internet far and wide (well, a 10 minute google search) for these novel approaches. N. Lawson would like to acknowledge her pornographic name and persona for her worldwide cookbook sales. F. Drebin would like to thank his uncle for throwing it around in the backyard.

COMPUTATIONAL CHEMISTRY

Back To Basis: A Tool for Computational Chemists

Heinz Furzbaum-Fock[A]*

There are now officially more published basis sets than videos of cats on Pornhub.[1] I think I've got that right. Anyway, there's shitloads of them. For the uninitiated, basis sets are collections of mathematical functions used by computational chemists to simulate the distribution of electrons in molecules. Each set serves a different purpose and has its associated strengths and weaknesses, usually trading accuracy for the time it takes to run the simulation. Unsurprisingly, using different basis sets will give different results for the same calculation. Consider the following example, in which a number of well-known basis sets were used to calculate the energy barrier for the insertion step of the O-Heck reaction (figure 1).

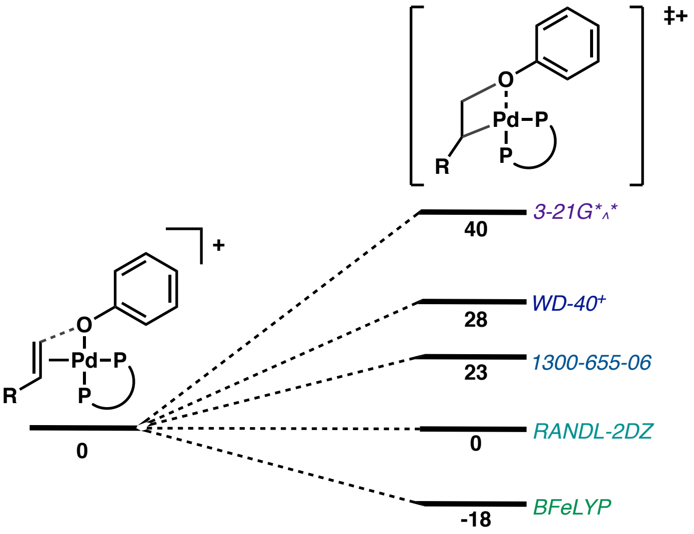


Figure 1: Partial energy profile for the O-Heck alkenylation of a phenol with five common basis sets. *Energies in kCal/mol, R = futyl.*

The step is either endothermic (3-21G*ʌ*), barrierless (RANDL-2DZ) or exothermic (BFeLYP). So, which one is right? And how does one decide which set to use? The process of considering all the nuances and variables is tedious and time consuming. That's why I've devised a tool to expedite this process. *Back2Basis.con* is an online library, where you input the energy that you want to get, and the software finds a basis set that will give it to you.[2] This program saves computational chemists the effort of trying dozens of basis sets until they find one that supports their hypothesis. Thousands of computational hours can now be saved and spent on more valuable pursuits, like processing NFTs.

Notes and references

1 B. Delphine, R. Reid, R. LaCroix, R. Jeremy, 2022, *J. Comp. Chem,* **69**, 420–422.
2 Back2Basis.con link: http://bitly.com/98K8eH

A. *Theoretical Department of Chemistry, Australian Notional University*

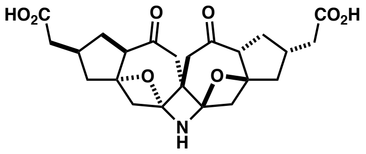
Published: 22nd April 2022 *DOIOU: 10.fAuStiAn*

ORGANIC SYNTHESIS

A One-Step Total Synthesis of Spirodragone from N-Boc Spirodragone

Günther Schlonk[A]*

Spirodragone was isolated from a fungus growing in a laboratory sink in 1998. It's discoverer, Hamfast Twinkelstein, tentatively assigned its structure with reference to its NMR spectra.[1] His proposed structure was corroborated by a team at the University of Woolloomooloo who obtained a crystal structure (figure 1).



1
Spirodragone

Figure 1: The structure of *spiro*-dragone (**1**), as per X-ray crystallomancy.

This data revealed a symmetrical polycyclic hydrocarbon backbone, cantered on an azetidine and bearing ethers, ketones and carboxylic acids. The Woolloomooloo group, led by Professor Sir Michael Sherbert, investigated the biological properties of this remarkable molecule, and found it exhibited potent antimicrobial, antisocial and antenatal activity. Regrettably, the original sample of sink-mould was expunged during a lab clean-up day, and no other colonies have been found to date. Thus, no more spirodragone could be obtained for further testing. Sherbert began a total synthesis of spirodragone, but died after the first 51 steps, leaving his work unfinished.

Our group decided to pursue a more efficient synthesis of spirodragone. After much toil, we have arrived at an efficient one-step route from a commercially available precursor. We obtained a sample of N-Boc-spirodragone from Schlonk's Fine Chemicals Inc® and performed a standard Boc-deprotection procedure to give spirodragone in 98% yield (scheme 1).

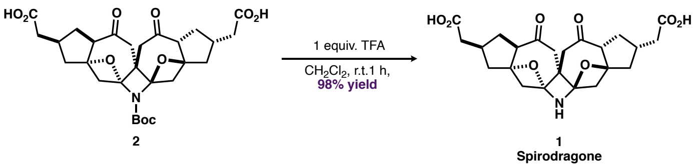


Figure 1: One step synthesis of spirodragone from N-Boc-spirodragone.

This is therefore one of the most efficient total syntheses in contemporary chemistry, with 98% overall yield and a step-count of one. Precursor **2** is only available in 5 mg lots from Schlonk's Fine Chemicals®, but it is easily prepared in 51 steps following a literature procedure.[3]

A. *Department of Pyrofrolics and Inorganometallics, University of West Failure*

Published: Yes *DOIOU: No*

Notes and references

1 H. Twinkelstein, 1998, *The J. Nat. Prod.* **4**, 280–281.

2 A. Tilla, T. Hun, M. Sherbert, 2001, *Inorg. Biomol. Chem.* ***11**, 4–6.*

3 M. Sherbert, 2021, *Even Newer J. Chem*. **39**, 230–231.

FOOD SCIENCE

Immaterials and Methods: Reagents for the Total Laboratory Synthesis of the Chocolate Cookie

Cannot Goodenough[A]

Scientists have long wondered what laboratory reagents they might consume and survive on in the event of entrapment in the laboratory (resulting from natural disaster or zombie apocalypse, not just being in academia).[1] Tragically, this is not a hypothetical scenario. This year, a PhD student starved to death when a delivery of solvent drums from 2020 was placed across the doorway to his lab. His corpse was found three weeks later, still clutching a flask of tryptophan. The coroner ruled that the student had died while attempting to construct a scotch fillet by peptide coupling.

If asked "what would you eat first if you were trapped in here?" most scientists would choose the humble LB broth, with reagent-grade glucose and sodium chloride for seasoning. Traditionally, the holy trinity of disallowed lab consumables includes MilliPure water, 200 proof ethanol, and the aforementioned LB. Here, I propose a fourth member of the quadrinity, and present the following list of reagents necessary to perform the chocolate chip cookie reaction and discuss associated costs and benefits.

Figure 1: One (1) chocolate chip cookie (Source: Evan-Amos CC BY-SA 3.0 via Wikimedia Commons).

One notable limitation of the laboratory synthesis of chocolate chip cookies (historically known as ChoChiCO, or fraction 1 cookie) (figure 1) is the lack of availability for fresh ingredients, primarily dairy (e.g. butter). I have found a protocol from the literature that describes the butterless synthesis of chocolate chip cookies,[2] though I speculate that the recently discovered debutterification reaction may have significant implications for the performance of this reaction.[3] Nevertheless, the dairy-free ingredient list is presented in table 1. Values for ingredients that are measured in nonstandard units (ex. one egg) are best approximations according to Google Search.

Ingredient	Amount
Coconut oil	177 mL (3/4 cup)
Vanilla extract	8.68 g (2 tsp)
Eggs	56.7 g (2 eggs, rehydrated)
White sugar	300 g (1 1/2 cup)
Flour	340 g (2 1/2 cups)
Salt	4.5 g (3/4 tsp)
Baking Soda	5 g (1 tsp)
Chocolate	170 g (1 cup)
Water	118.29 mL (1/2 cup for eggs)

Table 1: Reagent list for chocolate chip cookies, accompanied by amounts necessary from.[2] Units converted from freedom units to the more useful units for readability.

With the list of ingredients compiled, a comprehensive computational search was conducted across all publicly available Si/g//ma-*ldrich products to find acceptable representatives for each of the ingredients. As previously mentioned, one notable limitation of this methodology is the requisite use of powdered egg, as a carton of one dozen eggs was not available from scientific suppliers—and would probably cost one gajillion dollars if it was anyways. From these reagents, the total cost of the multiples of each necessary has been summed, giving us a value of $30,031.70, representative of a theoretical yield of 25-30 cookies (table 2).[2]

Description	SKU	Unit price	Total price
Coconut oil, 1000 mg	46949	$94.70	$16,761.90
Vanillin, ReagentPlus 99%, 2g	V1104-2G	$31.40	$314.00
Whole egg powder, NIST, 5x 10g	NIST1845A	$1,960.00	$3,920.00
Sucrose, molecular biology >99.5%, 500g	S0389-500G	$45.00	$45.00
Wheat flour, NIST, 50g	NIST1567B	$971.00	$6,797.00
Sodium chloride, molecular biology >99%, 500g	S3014-500G	$48.20	$48.20
Sodium bicarbonate, ReagentPlus >99.5%, 500g	S8875-500G	$42.90	$42.90
Baking chocolate, NIST, 5x 91g	NIST2384	$2,040.00	$2,040.00
Water, nuclease-free, 1L	W4502-1L	$62.70	$62.70
			$30,031.70

Table 2: Descriptions, stock keeping unit (SKU) numbers, unit prices, and total prices of reagents for the synthesis of laboratory grade chocolate chip cookies. Total price includes the minimum number of units necessary for the required amounts shown in Table 1. Prices were recorded on 3/15/2022.

Conclusion

Though I have not discussed the means by which to bake the cookie reactions, it is not outside the realm of possibility to find communal laboratory equipment capable of sustaining the output necessary for a perfectly chewy, gooey cookie. This line of reasoning has been recently explored by an Italian group of scientists that have utilized an autoclave to make yeast-free pizza crusts, going to show that anything is possible.[4]

A potential follow-up experiment would entail quenching the products of the cookie reaction in resuspended powdered milk, which is likely present in large quantities around protein biochemists or anyone with the misfortune of running Western blots. I anticipate the results of quenching to be somewhat delicious, and I further postulate that this would still be better than drinking LB to survive.

Further refinement of this recipe is most certainly possible in order to optimize the reagents used and to reduce cost. However, $30,031.70 is a small price to pay for a freshly baked laboratory cookie, and I will die on this hill.

A. Ark Night University, Gaul, Terra

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DOIOU: 10.cooookies

Acknowledgements
The author would like to thank C.O.B. for consuming all cookies and biscuits during the preparation of this manuscript.

Author Contributions
All presented information has been compiled by C.G. during a bout of late-night hunger in the lab.

About the Authors
C.G. is a former Ph.D. candidate who has now moved into sales.

Conflicts of Interest
C.G. has stolen unintellectual property from Ligma-Aldrich.

Notes and references

1 Ask your co-worker, they've probably thought about this already
2 https://www.lifeasastrawberry.com/butterless-chocolate-chip-cookies/
3 *"Debuttering: Not With That Attitude"* Boop D.G., Stilles N.P., Harbor, C.S. 2022, *J. Immat. Sci.* **2**. 43–44.
4 P. R. Avallone, P. Iaccarino, N. Grizzuti, R. Pasquino, E. Di Maio, Rheology-driven design of pizza gas foaming. *Physics of Fluids*. **34**, 033109 (2022).

PHYSICS

The Buttered Cat Conundrum: An Investigation

Jimmy Amogus PhD[A] and Namidio Salvatori[B]*

The "Buttered Cat" conundrum has existed for as long as AC motors and cats.[1] It is founded on two incontrovertible tenets:

1. Toast always lands butter-side down
2. Cats always land on their feet.

The conundrum states that if a piece of buttered toast is strapped to the back of a cat, it will either levitate or revolve axially forever. If this phenomenon could be harnessed, it has the potential to revolutionise electricity generation. Previous attempts at implementing this technology have been plagued with ethical dilemmas, like "is it ok to centrifuge a cat?" We, however, don't really care about that stuff, so we've had a go anyway.

Below you can see how the mechanism works in theory. We have chosen to use a peanut butter sandwich in place of toast, as it makes cleaning up easier. To attach the sandwich to the cat we used an atomic frictionless bonding to reduce losses during the energy transformation step (figure 1).

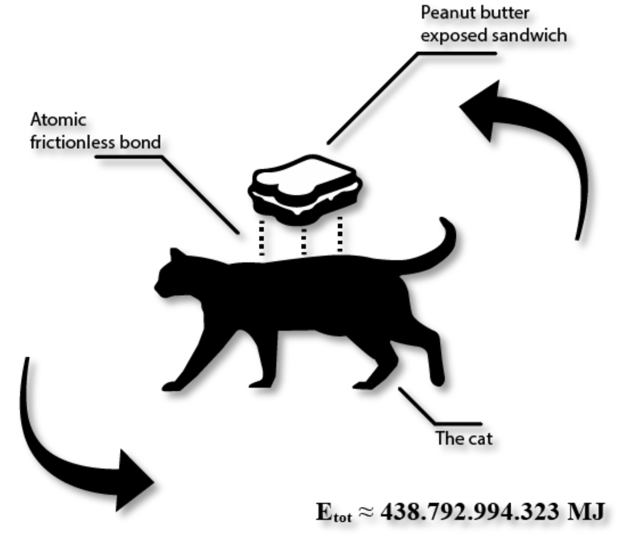

Figure 1: General theorical working scheme.

After formulating a theoretical model for the mechanism, we designed the physical energy generation rig. Since the mechanism rotates, we needed a system to produce energy from a rotational movement. We decided to use a giga copper wire coil that lets a current flow inside with an intensity proportional to the rotational speed of the cat and the surface/volume ratio of the peanut butter on the sandwich.

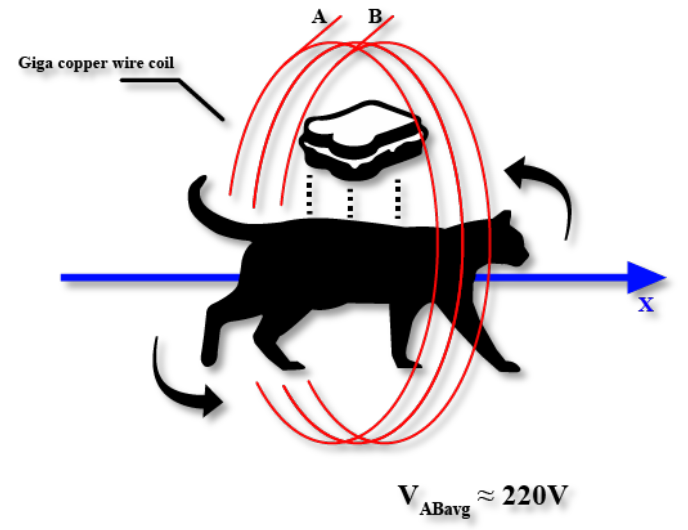

Figure 2: The complete electro-mechanical system (patent pending).

After making some measurement we found out that the voltage output resembles the typical "kitty waveform" and that was something we could expect since a cat is involved in the experiment (figure 3).

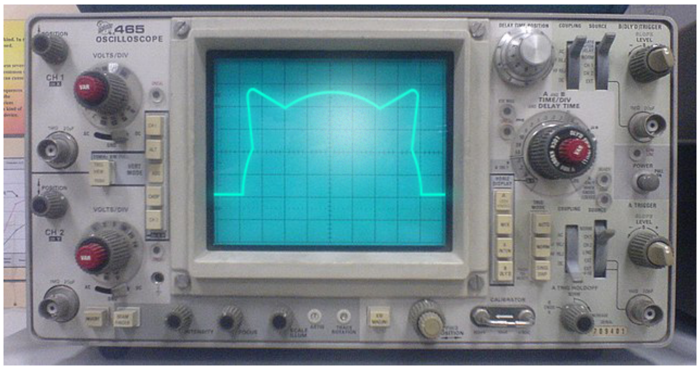

Figure 3: The voltage kitty waveform seen through a CRT oscilloscope.

The average voltage between A and B terminal of the coil was about 220 V and the current we could get out was about 10 A which leads to a total continuous output power of around 2.5 kW. Since the power output is continuous, we can expect to gather at least 60 kWh (216000 kJ). That is an enormous amount of energy for a single mechanism. Now the only thing that is left to do is to create a big array of thousands of these mechanisms.

Conclusion
Please send us your cats so that we can get this array up and running. They'll be fine, we promise. We might even let them eat the toast.

Notes and references

[1] Just google "toast cat," you'll get the idea.

A. School of Idle Thought, Quandary University
B. Department of Hopes and Memes, University of Reddit

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An Interview with Demeritus Professor Günther Schlonk: The Imperial Editor in Perpetuity

Legatus Beef-Cheeks: Professor Schlonk, thank you for taking the time to speak to the journal today.

Professor Schlonk: That's quite alright Beef-Cheeks, I have nothing better to do with my time.

LBC: Yes, I thought as much. Professor Schlonk, in your last editorial, you prophesised that humanity was heading for a second Dark Age, in which technology and science were swamped by conspiracy, fake news and bullshit. Has anything in the last six months made you reconsider this view?

GS: Ah yes, the impending Brown Age. Actually yes, I have changed my mind. I now believe we will wipe ourselves out entirely before that happens.

LBC: Right. You must be a real killjoy at parties.

GS: Why do you think I have so much time to devote to this stupid journal?

LBC: Do you ever write anything that isn't depressing?

GS: Yes actually, I wrote a script for Finding Nemo 3.

LBC: Really? What was the plotline?

GS: Nemo's father spends 90 minutes searching for his son in a bleached and barren reef, devoid of life. His gills slowly clog with microplastic, and he floats to the surface where seagulls eat his liver.

LBC: What the fuck is wrong with you?

GS: I refer you to the previous 60 pages.

LBC: Well, if you think we're all doomed, why don't you do something about it?

GS: I like to see myself as a modern Emperor Nero, fiddling while Rome burns.

LBC: Do you have anything else in common with Emperor Nero?

GS: I also look magnificent in marble.

LBC: Professor Schlonk, where do you get your ideas from?

GS: I find them in the space between the second and the third pint.

LBC: And how you turn them into articles?

GS: Well, I scribble the ideas in a notebook, then ignore them for several months. Once I've completely forgotten the context from which they came, I pull them out and pass them on to the writer's room.

LBC: I didn't realise the budget extended to writers.

GS: It doesn't, that's why you don't get paid. Shakespeare could afford an infinite number of monkeys; we have seven bonobos and a laptop running on Vista.

LBC: That explains all the cock-jokes.

GS: Indeed.

LBC: So, what's next for the Journal?

GS: Well, we have about 15,000 readers now, assuming that everyone who likes our pages reads every article (which I'm sure they do), so the logical next step it to go corporate. We're planning to start charging for every article, plastering our pages with advertising and endorsing anyone who'll chuck us a few quid.

LBC: Are you serious?

GS: Fuck no, what self-respecting scientific company is going to associate themselves with us? No, our real plans are to keep doing what we're doing. Publishing articles once a week, supplemented with assorted other bullshit. If we wanted to make money, we'd be better off wanking for creeps on OnlyFans.

LBC: Do you have any goals for the 3rd Volume?

GS: I'd like to see a more diverse range of fields represented in the journal. Not that there's anything wrong with chemistry, there are just lots of scientists who, for whatever reason, don't acknowledge its obvious superiority.

LBC: And how do you plan on enticing authors from different fields?

GS: I have no fucking idea. Asking nicely, free food… What the fuck do physicists even want?

LBC: Do you have anything you want to say to the people who have submitted articles?

GS: Ah, well remembered. I do want to thank them. Not with a vapid, soulless "thanks for flying with Lufthansa" kind of thank you, but a heartfelt, backslapping kind of thank you. The kind of thank you that you give a friend when they've agreed to stay quiet about your affair.

LBC: That's oddly specific.

GS: … Next question.

LBC: Where do you think the Journal will be 10 years from now?

GS: I want to say "on the shelf next to Science and Nature" but realistically, it will be halfway down the basket of newspaper I use to light the oil-drum fire in my slum. Or perhaps in a courtroom, in a folder entitled "exhibit 1".

LBC: What are your guilty pleasures?

GS: For fuck's sake, who's giving you these corny questions to ask?

LBC: You are.

GS: …

LBC: Fine then, what does it feel like having just spent an hour writing an interview with yourself?

GS: I am filled with a profound sense of emptiness.

LBC: And on that cheerful note…

GS: Aw fuck, don't end it ther-

click

About the Editor

Günther Schlonk was born in the Austrian town of Fucking, and obtained his BSc from a box of cornflakes. He is now a Demeritus Professor at the University of West Failure. When not writing satirical science, Günther is usually hiding from his emails somewhere in the West Failian wilderness.

THE JOURNAL OF IMMATERIAL SCIENCE

"The suppository of all wisdom"
– Tony Abbott

The Over Reaction
"The Pinacle of Pointlessness"
On the front cover this year, we feature the first mechanistic study of The Over Reaction
Pages 19–22

Extreme Titrations!
Pages 51–52

The Smythe Reagent: ~1.6 M LiOH in Hexane
- One step from n-BuLi
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Cover Image: Günther Schlonk and Lassitude Jones perform an extreme titration. Credit: Lyn Hoff