

Chemistry Update

Newsletter 340, 28 January 2022

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Calendar of Events

Green Chemistry: The Missing Elements

Speaker: Prof John Warner, Zymergen and co-founder of Green Chemistry
Date: Tuesday 1 February
Time: 3pm—4pm
Location: Virtual

Physical seminar

Speaker: Prof Piers Forster, University of Leeds
Date: Wednesday 2 February
Time: 1pm—2pm
Location: C/A/101

Virtual UCAS Visit Day

Date: 3 February
Time: 1.30pm—3.30pm

Organic seminar

Speaker: Prof Anita Maguire, University College Cork
Date: Wednesday 9 February
Time: 1pm—2pm
Location: Virtual

UCAS Visit Days

Date: 15, 17 & 24 February
Time: 12.30pm—3.30pm

Physical seminar

Speaker: Dr Fay Probert, University of Oxford
Date: Wednesday 16 February
Time: 1pm—2pm
Location: C/A/101

Applications of Bio-based Furan Building-block Chemicals

Speaker: Various
Date: Wednesday 23 February
Time: 10am—5pm
Location: C/F/106

Further details and register at:
furanday2022.eventbrite.co.uk

Date of Next Issue:
25 February 2022

New Year Honour for Professor Lucy Carpenter

Professor Lucy Carpenter from the Department of Chemistry received an MBE for services to atmospheric chemistry in the Queen's New Year Honours.



In 2000, Lucy Carpenter was the first atmospheric chemist appointed in the Department of Chemistry. In the years since, she has become Professor of Atmospheric Chemistry and a Fellow of the Royal Society. She has been a winner of the RSC Tilden Prize, Royal Society Rosalind Franklin Prize and a Philip Leverhulme Award.

Professor Carpenter plays a leadership role in the [Wolfson Atmospheric Chemistry Laboratories](#) (WACL), established in 2013 - the first centre of its kind in the UK, co-locating over 50 researchers across multiple academic groups, enabling experimental and theoretical studies relating to the science of local and global air pollution, and climate change.

Her own research is world-renowned for work on halogens. She helped to establish that oceanic iodine and bromine mattered in the lower

atmosphere, as well as discovering the predominant source of iodine into the atmosphere: chemistry occurring on the ocean surface. She has pioneered an understanding of how this process interfaces with the deposition of ozone to the ocean and delivers atmospherically important trace gases to the marine troposphere.

Professor Carpenter was a co-founder of the [Cape Verde atmospheric observatory](#), which has proven exceptionally powerful in monitoring the signal of changing “background” atmospheric composition over the ocean. Furthermore, she has made key contributions to strategic intergovernmental work on both reactive halogen chemistry and ozone depletion.

Lucy is also a committed STEM ambassador, encouraging young people, particularly women, into science careers through outreach to secondary schools.

Reflecting on her MBE, Lucy said: “I’m delighted and honoured to receive an MBE for services to atmospheric chemistry. I want to thank my amazing team and colleagues at York for being so great to work with and my family for always having their support.”

Head of Department Professor Caroline Dessent said: “It is fantastic to see Lucy’s longstanding service to the Atmospheric Chemistry community has been rewarded with an MBE. She is an outstanding scientist, but has also given extremely generously of her time to support her research community. Excellent science cannot happen without such contributions, which often go unrecognised, so it’s extremely pleasing to see them recognised here.”

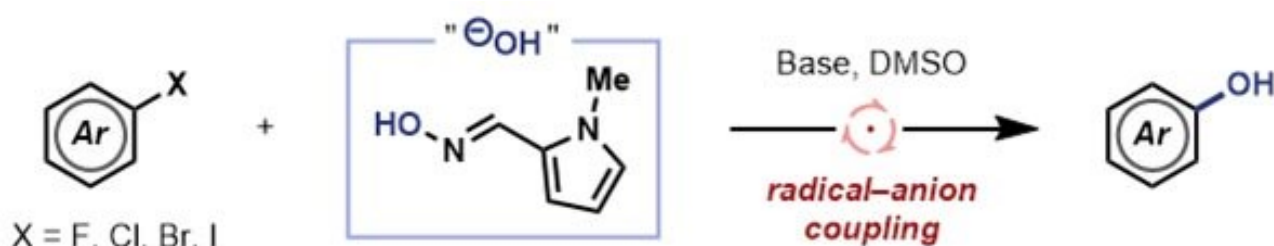
50-year-old synthetic challenge solved

Landmark research from the Department of Chemistry has developed an innovative synthetic method, able to convert any aromatic halide into a phenol, solving a long-standing problem in organic synthesis.

Phenols are compounds with high value in the pharmaceutical, agrochemical and polymer industries. In general, their synthesis relies on the conversion of an aromatic halide (C-X) bond into a phenol (C-OH) using a hydroxide anion reagent. However, this approach only works for fluorides and chlorides that are highly activated, and fails for bromides, iodides and non-activated systems.

With the goal of solving this problem, Dr Michael James decided to make use of a radical substitution approach. However, this has previously been considered impossible because hydroxide anions will not participate in this type of process.

Dr James and his research team of Masters students therefore developed a new reagent capable of facilitating this process and in collaboration with Professor Victor Chechik also developed a detailed mechanistic understanding of the way it works.



The oxime reagent (see blue box) is capable of transferring its hydroxyl group to an aryl radical (created on loss of the halide), enabling the smooth conversion of aromatic halides into phenols. The team were delighted to discover that this reagent was compatible with all aromatic halides, including the previously problematic bromides and iodides, and also worked effectively for non-activated systems.

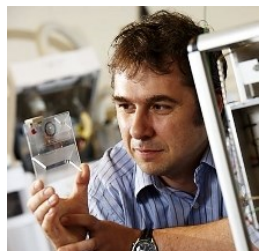
The team hope that this 'transition-metal free' reagent will soon be commercialised and made widely available to others who wish to perform this kind of reaction. Dr James said "The conversion of a halide into a phenol looks such a simple process on paper, but for many years has been challenging except in very specific cases. This new carefully-designed reagent opens the possibility of a general transition-metal-free approach to this type of reaction which could be of high value in both academic and industrial settings."

This research has been published open access in [Chemical Science](#), the flagship journal of the Royal Society of Chemistry.

Dr James is funded by a [Leverhulme Trust early career fellowship](#) and this is his first fully independent research paper.

York researcher named as chair of UK government Science Advisory Council

Professor Alastair Lewis, of the Wolfson Atmospheric Science Laboratories, has been appointed chair of the Department for Transport's (DfT) Science Advisory Council (SAC).



He succeeds Professor Lord Robert Mair, who stepped down as SAC Chair in late 2021. Professor Lord Mair is Emeritus Professor of Civil Engineering at University of Cambridge and has chaired the Council since its formation.

The Council was formed in 2014 to provide independent strategic advice to the DfT on key areas of science, social science, engineering and technology.

Professor Lewis's research has long been closely linked to transport, including work on heavy duty diesel engine exhaust and issues associated with fuels, vehicle emissions and decarbonisation.

He said: "There are many fascinating topics for the Science Advisory Council to consider in the coming years, such as cleaner fuels that can support net zero, the integration of autonomous vehicles into our lives, and the security and resilience of transport systems.

"I'm very positive that the SAC can help the DfT use the latest science in their decision-making in all these areas. I was extremely pleased to be able to take on the role as chair of the SAC - the DfT is a department where science, engineering and technology are critically important, and it's a fantastic opportunity to be able to contribute to that."

The DfT's Chief Scientific Adviser, Sarah Sharples, said: "I'm delighted to welcome Professor Lewis as the new Chair of DfT's SAC. He brings a wealth of experience in research funding, policy and government engagement which will be hugely beneficial to his leadership of the SAC, as well as his expertise in air quality science and related policy issues. I very much look forward to working with him and SAC members to support the delivery of high-quality science and engineering advice to DfT."

New starters

Fiona Lawson, PA/ Administrator

Room: C/A121; Ext: 2501; Email: fiona.lawson@york.ac.uk

Dr Peter Rayner, Associate Lecturer

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Niall Donaldson, Assistant Laboratory Technician

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Ania Tratkowska-Pastwa, Administrator

Room: C/A109 & C/A119a; Ext: 3022/2512; Email: ania.tratkowska-pastwa@york.ac.uk

Sofia Skott, Assistant Laboratory Technician (Chemistry/Education)

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Launch of Powder X-ray Diffraction Service

We now have a new powder X-ray diffractometer, a benchtop Panalytical AERIS. This instrument enhances significantly our capabilities both in the range of experiments we can perform and software available to analyse the resultant data.



Experimental methods include:

- standard reflectance pXRD of powders
- reflectance pXRD of thin-films
- reflectance pXRD of objects
- transmission pXRD of powders in capillaries or as thin layers
- study of air-sensitive powder samples
- analysis at elevated temperatures

Analysis capabilities include:

- phase identification
- phase quantification
- determination of unit-cell parameters
- structure determination

As well as training individual users, we are going to provide a service where the sample is run and analysed for researchers. The range of methods and particularly analysis will gradually increase to those listed above as while we gain knowledge and experience. If you wish to find out more, check out our [web pages](#) or contact adrian.whitwood@york.ac.uk.

Online Department suggestion box



The online Equality and Diversity suggestion box has been extended to be a suggestion box for the whole Department. You can submit your thoughts/suggestions/ideas for general Departmental matters as well as matters relating to Equality and Diversity. You can find the Google form at this [link](#).