

Celebrating chemistry 2016

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Dave Sammut
takes a light-
hearted look at
some of this year's
chemistry
highlights.

Periodicity

The biggest chemistry news so far this year has been the proposed naming of the four newest elements. The names nihonium, moscovium, tennessine and oganesson have entered our lexicon, for elements 113 (Nh), 115 (Mc), 117 (Ts) and 118 (Og). These were proposed by their attributed discoverers, and by the time of publication should have been ratified (or rejected) by IUPAC.

Nihonium, named for Japan, was proposed by the RIKEN Nishina Center for Accelerator-based Science in Wako, near Tokyo.

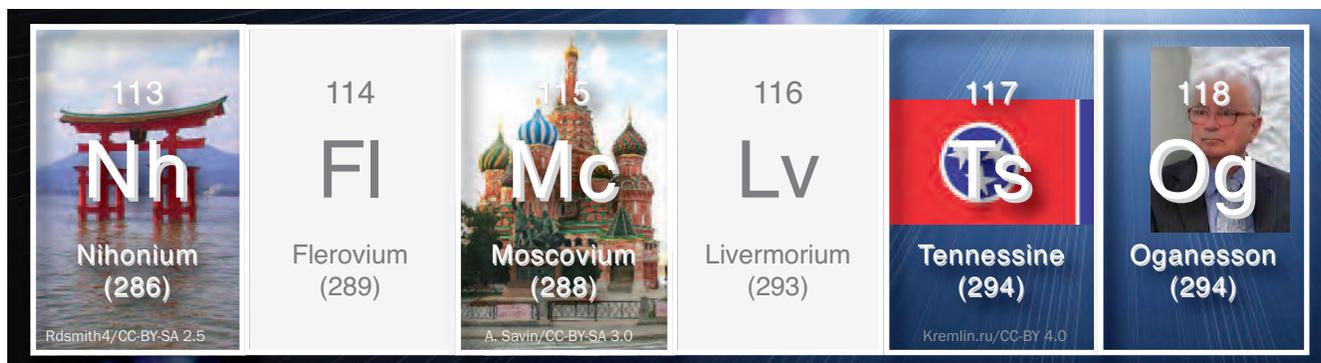
Moscovium and tennessine, for Moscow and Tennessee respectively, were jointly proposed by the collaboration of the Joint Institute for Nuclear Research in Dubna, Russia, and the Lawrence Livermore National Laboratory in California, USA. The same collaboration proposed the naming of oganesson in honour of Yuri Oganessian 'for his pioneering

contributions to transactinoid elements research'.

Coffee mug manufacturers worldwide have expressed disappointment that elements don't better lend themselves to spelling words. 'We need more element vowels,' said Joe Caffeine, spokesperson for the Coffee Mug Association, 'The caffeine molecule can only take us so far.'

In an effort to stay relevant, mathematicians announced the discovery of a new prime number, the biggest so far: 'We took the biggest number that we could think of, and added one.' But at just 22 million digits, chemists laughed off the 'discovery' with the witty retort 'Avagadro, ya mug'.

Meanwhile, chemists are celebrating having reached the end of our laboratory days. The periodic table is complete, everyone. We can all go home now, maybe go out and get a little sun (wearing sunblock... which we invented).



In space, no one can smell your steam

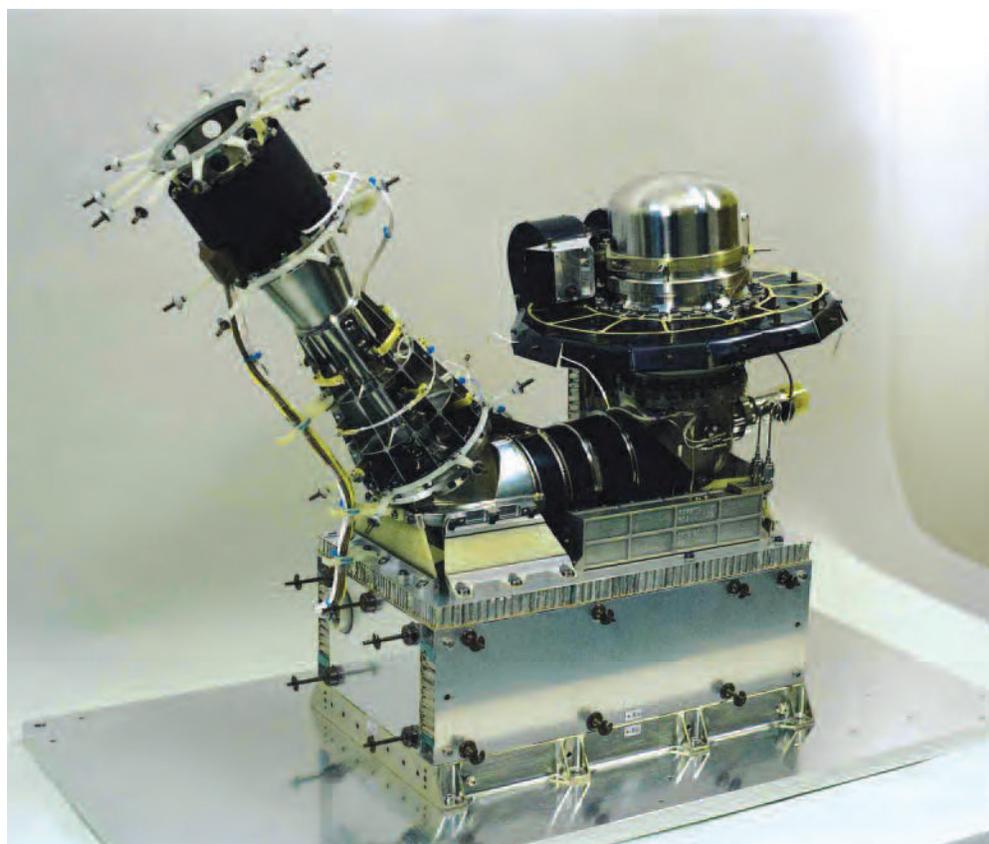
Since the Rosetta probe came close enough to comet 67P/Churyumov-Gerasimenko, ongoing analysis using double-focusing mass spectrometry and reflection time-of-flight mass spectrometry has detected the expected water, carbon monoxide and carbon dioxide, but also key life ingredients such as glycine and its precursors, and phosphorus, and key life-ending compounds such as hydrogen cyanide.

With krypton and xenon also detected in 2016, some might say the possibility of fugitive interstellar superbeings refugees has not been absolutely ruled out. I can just imagine a Federal Minister for Alien Affairs (yet to be appointed) responding: 'I don't care if they can fly; no unauthorised superbeings will ever be allowed on this country's soil. They can just stay airborne.'

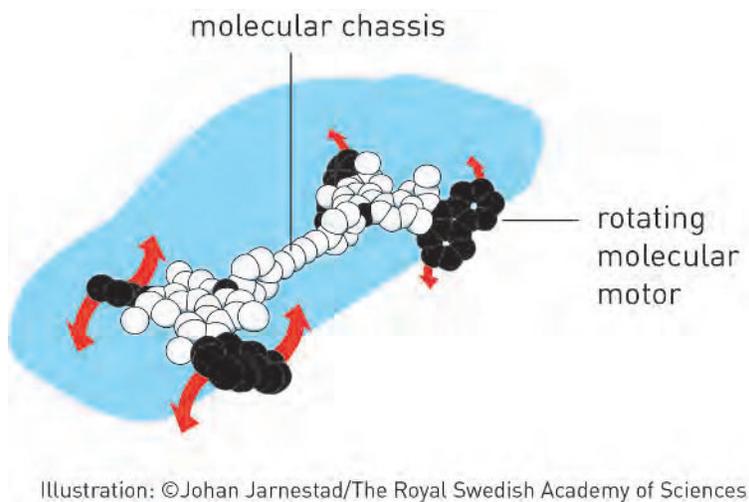
Collectively, comet 67P has been described as smelling of 'rotten eggs, cat pee and bitter almonds'. Visiting astronauts are advised not to take off their helmets.

UK perfumers The Aroma Company, in collaboration with Open University scientist Dr Colin Snodgrass, have reproduced the comet's aroma in 2016, coming soon to a counter near you. Professional chemists have been observed carefully wafting the Aroma Company's scent-imprinted cards within the safe confines of their fume cupboards.

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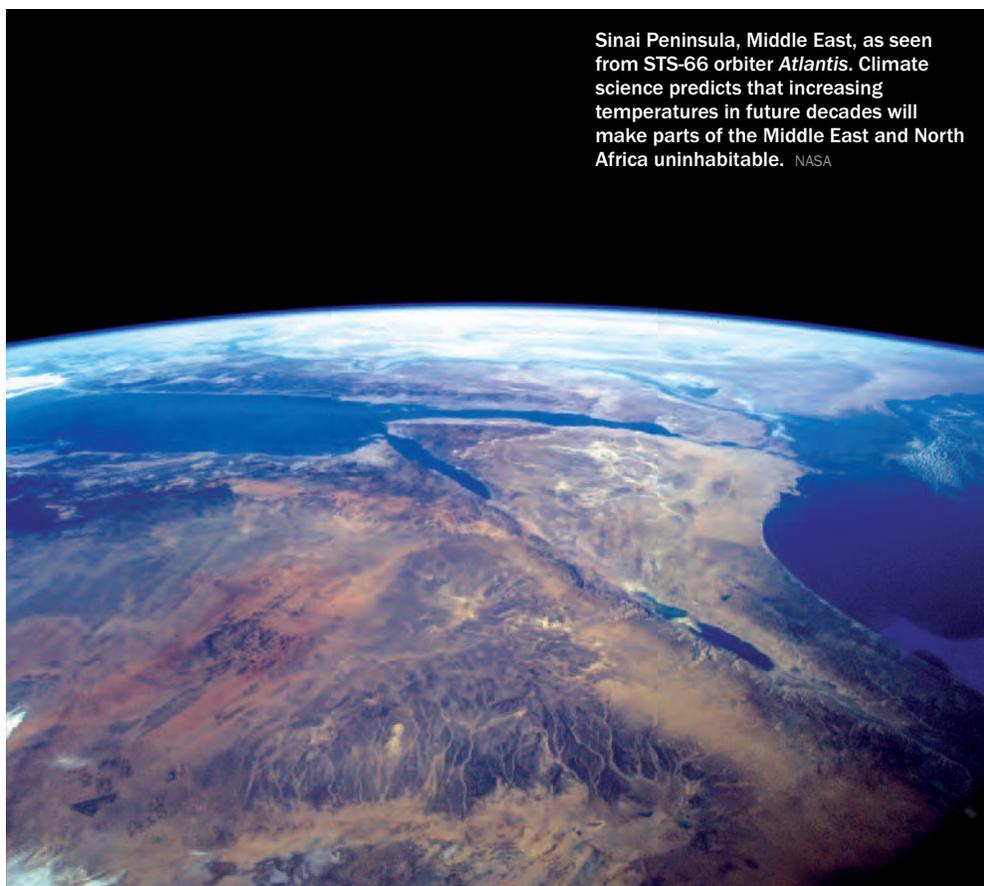
For the European Space Agency's Rosetta mission, NASA provided part of the electronics package for the double-focusing mass spectrometer (pictured), which is part of the Swiss-built Rosetta Orbiter Spectrometer for Ion and Neutral Analysis (ROSINA) instrument. ROSINA is the first instrument with the resolution to separate two molecules that have approximately the same mass: molecular nitrogen and carbon monoxide. Clear identification of nitrogen will help scientists understand conditions at the time the solar system was born. University of Bern/Lockheed Martin



Nobel endeavours

On the basis of the parental advice 'good things come in small packages', the 2016 Nobel Prize in Chemistry has been jointly awarded to Jean-Pierre Sauvage, Sir J. Fraser Stoddart and Bernard L. Feringa 'for the design and synthesis of molecular machines' (see p. 7). Given that the most sophisticated molecular machine developed so far has been a ring and axle, pundits have observed that it seems overkill to be handing out prizes for literally reinventing the wheel.

In March, it was reported that global average temperatures had briefly spiked 2°C above the pre-industrial average.



Feeling hot, hot, hot

This year has been a big one for climate science. In March, it was reported that global average temperatures had briefly spiked 2°C above the pre-industrial average. The University of Massachusetts Amherst reported that sea-level rises could nearly double over earlier estimates in the next 100 years. And the Max Planck Institute for Chemistry reported that in future decades, the Middle East and North Africa could become so hot that human habitability is compromised. The more sarcastic residents of Dubai might well respond: 'Have you *been* to the Middle East lately?'

In related news, reports of the first successful gene therapy to lengthen telomeres and thereby delay ageing has caused some conservative politicians to sit up and take notice. With the possibility that they might live long enough to be affected by climate change, they are suddenly much less keen to debunk the scientific consensus.



The water of the Rio Olympic diving pool turned green after 80 litres of hydrogen peroxide was mistakenly added to the pool during cleaning. The hydrogen peroxide neutralised the chlorine and allowed algae to bloom. Fernando Frazão/Agência Brasil/CC-BY-2.0

Faster, stronger, greener

Chemistry is of course fundamental to every aspect of daily life, but this fact was brought to the world stage at the 2016 Rio Olympics diving pool. Billed as the 'Greenest Olympics ever', the organisers took the marketing hype to extreme levels.

The diving pool was slammed by German diver Stephan Feck as smelling like a 'fart'. Australia's swimmers were more sympathetic, combining the bleaching of the excess chlorine added in response to the crises with the residual algae to put on a truly patriotic display of green and gold.

RACI National Award winners

RACI congratulates all the RACI National Award winners who are celebrating winning prizes for 2016. Full details will be published in the February edition.

I would like to thank the RACI for allowing me to write for *Chemistry in Australia*, and most particularly Sally Woollett (Editor) and Catherine Greenwood (Production Editor) for all of their hard work, guidance and patience throughout the year.

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