THE YEAR IN CHEMISTRY

2018'S BIGGEST CHEMISTRY STORIES

NEW DEFINITIONS FOR THE KILOGRAM AND MOLE

Metrologists redefined the kilogram and the mole. The new definitions reference fundamental constants instead of physical objects, making measurements more accurate, and take effect on May 20, 2019.

NEW TYPES OF ISOMERISM AND BONDING

The first new type of stereoisomerism for 50 years was identified: 'akamptisomerism'. Other researchers proposed a new type of bonding, metavalent bonding, which occurs between metalloid elements.

MACHINE LEARNING MAKES FURTHER PROGRESS

A 'Chemputer' made by researchers can carry out the synthesis of several organic compounds on demand. Elsewhere, chemists trained a neural network to predict structures for inorganic crystals.

EU BAN FOR THREE NEONICOTINOID PESTICIDES

The EU announced a total outdoor ban on three neonicotinoid pesticides (clothianidin, imidacloprid, and thiamethoxam) due to mounting evidence of risks to bees. The ban will come into effect at the end of 2018.

WATER AND ORGANIC MOLECULES ON MARS

2018 saw the first detection of liquid water on Mars. The water, at the southern ice cap, is kept liquid by dissolved salts and pressure from the ice above. Evidence of organic compounds was also found in rocks.

NOVICHOK AGENT USED TO POISON RUSSIAN EX-SPY

The nerve agent used in the attempted murder of a former Russian spy was identified as a Novichok compound, developed in the former USSR. Russia faced questions about its involvement.

GENE-EDITED BABIES SPARK CONTROVERSY

In November, a Chinese researcher claimed to have used CRISPR-Cas9 gene editing to create babies resistant to HIV. There are concerns around the transparency and ethics of the as yet unpublished research.

'DIRECTED EVOLUTION' WINS NOBEL PRIZE

The 2018 Nobel Prize in Chemistry was awarded with half to Frances Arnold for directed evolution of enzymes, and half to George Smith and Sir Gregory Winter for phage display of peptides and antibodies.

TECHNIQUE REVEALS SMALL MOLECULE STRUCTURES

Cryo-electron microscopy determines the structures of small molecules in minutes. It allows structures of samples of powders or amorphous solids to be determined, which is not possible using X-ray crystallography.

AIR POLLUTION: PROGRESS AND SETBACKS

The ozone layer continues to recover – but CFC emissions in East Asia could impact on its recovery. Elsewhere, chemists developed a metal-organic framework which removes pollutants from the atmosphere.

E-CIGARETTE EFFECTS ON USERS SCRUTINISED

Vaping's popularity rocketed in 2018; research continues to analyse its effects on users. One study found high levels of reactive carbonyl compounds in saliva during vaping, and signs of DNA damage.

EUROPE-WIDE CO_2 SHORTAGE HITS BEER SUPPLIES

CO_2 is a by-product of ammonia fertiliser production. Closure of factories over the summer, when fertiliser demand is low, caused the shortage. CO_2 is used to carbonate beer and in food packaging.

For links to articles and studies, visit: **bit.ly/TYIC2018**. Follow **@Chemunicate** or **#ChemMonthly** on Twitter to keep up with the latest chemistry news!