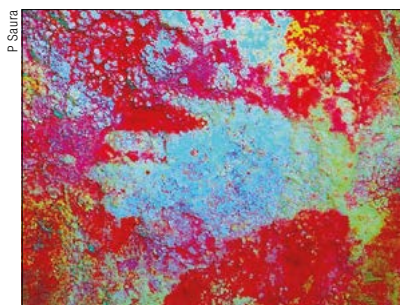


Sciencewatch

COMPILED BY JOHN SWAIN, NORTHEASTERN UNIVERSITY

Neanderthals created Europe's first art

Contrary to common belief, Neanderthals may have been the first cave artists. Dirk Hoffmann of the Max Planck Institute for Evolutionary Anthropology in Dresden and colleagues used uranium–thorium dating of carbonate crusts to show that cave paintings from three sites in Spain must be older than 64,000 years, predating the arrival of modern humans by 20,000 years or more. The paintings are mainly red and black with depictions of animals, linear signs, geometric shapes and stencils, and prints



A colour-enhanced section of the La Pasiega cave wall in Spain showing what is thought to be a hand stencil dating to older than 64,000 years.

of hands. Together, they suggest a more advanced appreciation of symbols than had previously been thought, and prove that the cognitive abilities of our evolutionary cousins were similar to our own.

● **Further reading**
D Hoffmann *et al.* 2018 *Science* **359** 912.

Introducing the memtransistor

Two-terminal memristors have been getting attention for some time now, both for computer memories and for neuromorphic computing. But their usefulness has been limited, largely owing to the small number of inputs they can take. Now, Vinod Sangwan and colleagues at Northwestern University have announced that they have made multi-terminal memtransistors (hybrids of a memristor and transistor) in molybdenum disulphide (MoS_2). Unlike conventional devices, which require single-crystal MoS_2 flakes, this process can use polycrystalline and all-surface MoS_2 films and be readily scaled up to very-large-area devices, claims the team.

● **Further reading**
V Sangwan *et al.* 2018 *Nature* **554** 500.

Pulsating auroras

The auroras, whose striking images wind up on calendars and screensavers across the world, occur a few thousand kilometres above Earth. Pulsating auroras are another, less-well-known phenomenon. These blinking patches of light at altitudes of tens of thousands of kilometres occur at high latitudes when energetic magnetospheric electrons precipitate out and excite air molecules. Many researchers had hoped that the phenomenon was describable by an interaction between magnetospheric electrons and electromagnetic waves called whistler-mode chorus waves. Now, Satoshi Kasahara of the University of Tokyo and colleagues have used the ERG (Exploration of energization and Radiation in Geospace) spacecraft, launched in December 2016 equipped with

Wood as strong as steel

Natural wood has been used for millennia as a structural material, but its mechanical performance is limited. Jianwei Song from the University of Maryland and colleagues have exhibited a simple way to turn natural wood into a new structural material with more than 10 times the strength, toughness and ballistic resistance, as well as improved stability. First, the team partially remove lignin and hemicellulose from the wood cells by boiling wood in a solution of NaOH and Na_2SO_3 , and then use a hot press to collapse the cell walls. The technique works well for many woods and the final processed wood has a strength higher than most metals.

● **Further reading**
J Song *et al.* 2018 *Nature* **554** 224.



The team reports a simple strategy to transform bulk natural wood into a high-performance structural material.

instruments to measure electrons and electromagnetic radiation, together with ground-based observations of the aurora, to confirm the proposed explanation.

● **Further reading**
S Kasahara *et al.* 2018 *Nature* **554** 337.

High-power THz chip

Alan Turing was the first person to demonstrate how stationary periodic patterns could form in biology, but his ideas have been fruitful in other fields. One is pattern formation in continuous-wave-laser-pumped Kerr-active microresonators, which Shu-Wei Huang of UCLA and colleagues have now stabilised via a novel scheme using local-mode hybridisations to set a new record of 45% in power conversion efficiency. Finally, the pattern is turned into terahertz radiation with a plasmonic photomixer for an overall optical-to-THz conversion efficiency of 1.1%. The whole setup can fit on a chip, so would have huge implications for medical imaging, wireless communications and other applications.

● **Further reading**
S-Wei Huang *et al.* 2018 *Phys. Rev. X* **7** 041002.

Unstable allotropes made safe

The elemental allotropes white phosphorus and yellow arsenic would be potentially more useful reagents were it not for their extreme instability: the former bursts into flame in air, while the latter turns grey on exposure to light. Many approaches of varying difficulty have been tried to store these materials in a protected way so that they can be used when needed, for synthesis or other applications such as semiconductors. Now, Manfred Scheer of the University of Regensburg and colleagues have found that the substances can be stored safely and inexpensively in the pores inside activated charcoal and released into solutions when needed for a reaction.

● **Further reading**
A Seitz *et al.* 2018 *Nat. Commun.* **9** 361.

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Best 20u/25	20, 25–15	Best 15 + ^{123}I , ^{111}In , $^{68}\text{Ge}/^{68}\text{Ga}$
Best 30u (Upgradeable)	30	Best 15 + ^{123}I , ^{111}In , $^{68}\text{Ge}/^{68}\text{Ga}$
Best 35	35–15	Greater production of Best 15, 20u/25 isotopes plus ^{201}Tl , $^{81}\text{Rb}/^{81}\text{Kr}$
Best 70	70–35	$^{82}\text{Sr}/^{82}\text{Rb}$, ^{123}I , ^{67}Cu , ^{81}Kr + research

Introducing...Best Particle Therapy Systems

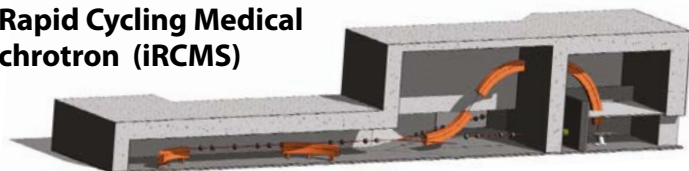


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