Research highlights

IT'S A WRAP: FLEXIBLE MINI-SCANNER CAN CHART FINGERPRINTS

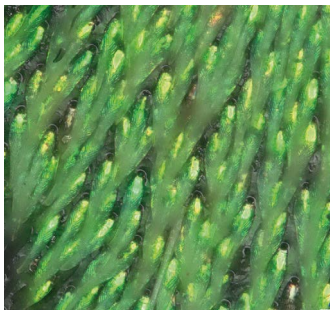
A high-resolution scanner roughly as thick as a human hair can be wrapped around objects about 1 centimetre in diameter, allowing it to image fingerprints and documents alike.

Crystalline materials called metal halide perovskites have excellent optical and electronic properties, which make them useful for solar cells, lasers and light detectors. But it has been difficult to produce flexible, high-resolution scanners using these materials.

Albert van Breemen at the Dutch Organization for Applied Scientific Research in Eindhoven, and his collaborators have now created such a device, which relies on an array of metal-halide-perovskite light sensors. To make them, the team fabricated a plate consisting of thin, flexible transistors that are typically used in high-resolution computer monitors. The plate was then coated with a solution containing a metal halide perovskite.

The researchers suggest that the wrap-around device could be embedded in mobile phones and door handles for fingerprint authentication, and might have applications in medical imaging, surveillance and optical communication.

Nature Electron. https://doi.org/gnbd6w (2021)



THE WEIRD CRYSTAL BEHIND BEETLE'S SHIMMERING SCALES

An African beetle achieves its glittering green forewings thanks to a unique type of light-reflecting crystal in its scales (pictured).

Photonic crystals are microscopic structures that can block the passage of some wavelengths of light while permitting the passage of others. The crystals are difficult to make in the laboratory, but many organisms grow them with ease: the structures are found in butterfly wings and give an emerald sheen to the *Sternotomis callais* beetle of Central Africa.

Using scanning electron microscopy, Shinya Yoshioka at the Tokyo University of Science and his colleagues took images at 17-nanometre intervals through a *S. callais* scale. The team used the images to reconstruct the scale's 3D internal structure and found that it matches well with an ideal mathematical surface called I-WP, which looks a bit like a mixture of spheres and wide tunnels.

At the size of the scale's crystal, the structure should reflect green light, just as the beetle's wings do. It is unclear how the beetle's crystal, which differs markedly from the twisty labyrinthine structure found in butterflies, is formed.

J. R. Soc. Interface https://doi.org/g5nf (2021)

CAT CALLING: PET CAN TRACK ITS OWNER'S POSITION BY VOICE

Pet cats seem to be able to track their human companion's every move — through sound.

Domestic cats (*Felis catus*) use visual cues to create a mental map of their environment and the whereabouts of any other creatures nearby. But our feline familiars also have keen ears, which could assist with their mental cartography when their prey — or person — is out of sight.

To investigate this, Saho Takagi at Kyoto University in Japan and her colleagues attempted to hoodwink dozens of house cats through 'impossible teleportation' experiments. The researchers placed each cat in a room with two widely spaced audio speakers. First, one speaker played a recording of the cat's owner calling its name. Then, the second speaker played the same recording after an interval that would be too short for a human to travel between the two locations. Video cameras recorded the cats' reactions.

The team found that house cats were noticeably surprised by auditory evidence that their people had been 'teleported'. This suggests that the animals can keep mental notes of their humans' presence and map that person's location by voice.

PLoS ONE **16**, e0257611 (2021)

PANDEMIC'S PLASTIC WASTE IS CHOKING THE WORLD'S OCEANS

Disposable masks and gloves might have helped to relieve the COVID-19 pandemic, but they have worsened the world's plastic-waste crisis. Thousands of tonnes of plastic from hospital waste, face masks and other single-use items are flooding the oceans, a study shows.

Yanxu Zhang at Nanjing University in China and his colleagues estimate that, from the start of the pandemic until 23 August 2021, the 193 countries they studied generated a total of more than 8 million tonnes of pandemic-related plastic waste, 87% of which was medical waste from hospitals. The authors calculated that rivers carried nearly 26,000 tonnes of pandemic-associated plastic to the oceans; about 70% of the total came from Asian rivers.

The team also used a mathematical model to simulate the fate of the plastic in the oceans. By the end of 2021, small amounts of pandemic plastic will have sunk to the sea floor; however, 71% is expected to wash up onto beaches. By 2025, the remaining plastic waste will have formed large garbage patches or become trapped in the Arctic Ocean.

The authors call for better management of medical waste, especially in low-income countries.

Proc. Natl Acad. Sci. USA **118**, e2111530118 (2021)

L TO R: Y. KOBAYASHI *ET AL. / J. R. SOC. INTERFACE*; SARAH ARCHIBALD; SUNIL GHOSH/*HINDUSTAN TIMES*/GETTY