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Researchers mimic butterfly wing nanostructures for compact new technology

(*Nanowerk News*) Inspired by the intricate structure of a butterfly wing, Swinburne researchers have developed a technique that could be used to make more brilliant computer screens (*Science Advances*, "Biomimetic gyroid nanostructures exceeding their natural origins").

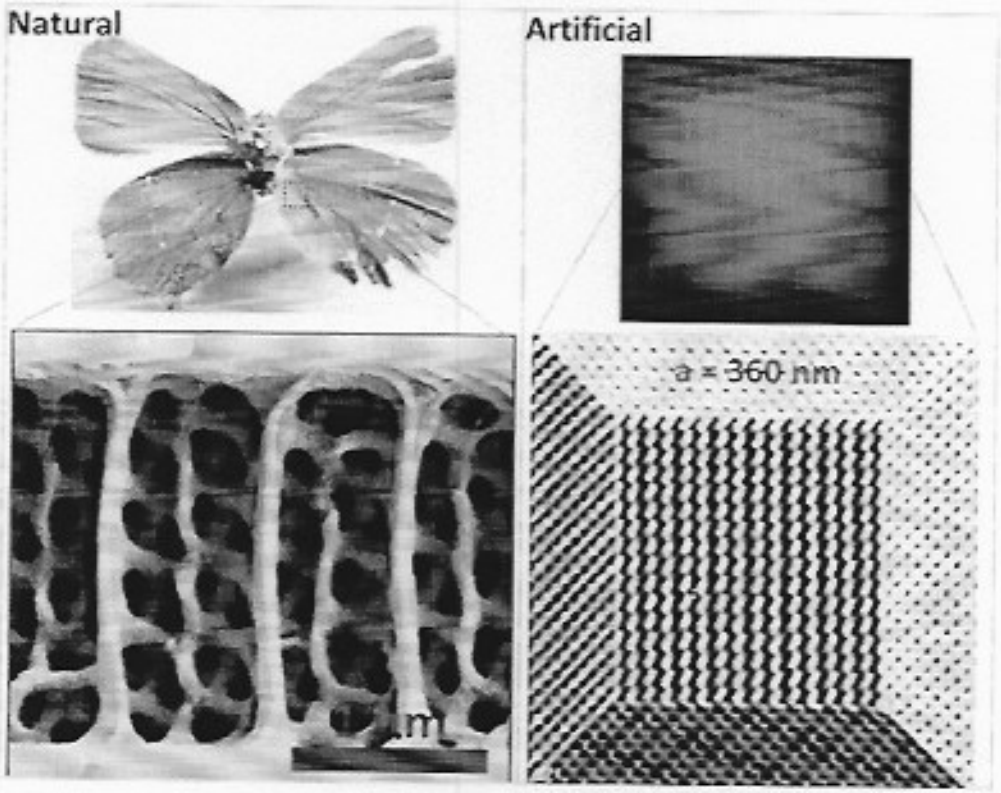


Nanostructures on the wings of the Callophrys Rubi or Green Hairstreak butterfly have inspired the design of an artificial material that could be used in photonics and optics technologies.

The researchers used a special printing technique to create tiny structures similar to those found in the wings of the *Callophrys Rubi* butterfly, also known as the Green Hairstreak.

In some iridescent butterfly wings, such as the Green Hairstreak, the wing is made up of a pattern of intertwining and curved surfaces, known as a gyroid structure. This gyroid structure has amazing properties when it comes to its interactions with light.

The researchers used two-beams of light to print at a super-resolution, creating gyroid structures that are three-dimensional and mechanically strong.



Comparison of natural gyroid structure with artificial structure.

Lead author Dr Zongsong Gan from Swinburne's Centre for Micro-Photonics says that materials made from these artificial gyroids should respond to light at ultrafast speeds making them ideal for high-speed switches.

He says the technique has two significant advantages.

"The first is that it has improved resolution and the second is that the materials fabricated with this technique have better mechanical strength.

"These new gyroid structures could help make more compact light based electronics because, thanks to their smaller size, larger numbers of devices can be integrated onto a single chip.

"However, for three-dimensional devices, smaller and more compact also means there is a higher risk of structure collapse because of weaker mechanical strength.

"Our fabrication technique allows us to make stronger architectures to overcome this problem," Dr Gan says.

Source: *Swinburne University of Technology*