

Swiss researchers found new organic luminescent material

The newly discovered luminescent material is cheap, efficient and can become an alternative light source in the future.

Researchers in Switzerland have found that the new organic light-emitting diode (OLED) material can lead to a cheaper scale for light technology. This result comes from a new arrangement of copper electrons (CuPCPs), replacing the more expensive precious metal diodes like platinum, iridium and ruthenium according to Popular Mechanics.

OLEDs are descendants of the original light-emitting diode (LED) technology. About 10 years ago, plasma, the fourth state of matter did not exist in three forms: solid, liquid, gas and LED directly competing in different categories. Ultimately plasma is the winner. However, plasma represents a proprietary technology that only works in certain large sizes and in strong light sources. Meanwhile, LEDs improve the brightness in the dark. OLED has combined and improved both technologies before it. Instead of relying on a bright backlight like LED, OLED has its own light. OLEDs also have better contrast. Because the pixels of the OLED are individually controlled, it is possible to change colors quickly. This is important for activities like playing games, watching sports or action movies.

But despite their significant advantages, previous researchers still had difficulty expanding OLED for widespread use. This is because the material is limited by the natural limits of fluorescence. 'The classic organic dyes are fluorescent and have a theoretical limit of 25% for the internal quantum efficiency,' the researchers said. The secret in the Swiss team's new material is that heat-activated delayed diodes (TADF). A few years ago, the team started making TADF using copper in an excited state, and the results were positive. Quantum yield of luminescence greater than 99% is what has been achieved for this material recently. The team hopes others can find and refine many of the above-mentioned TADF versions, with a focus on their applicability and cost reduction.

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