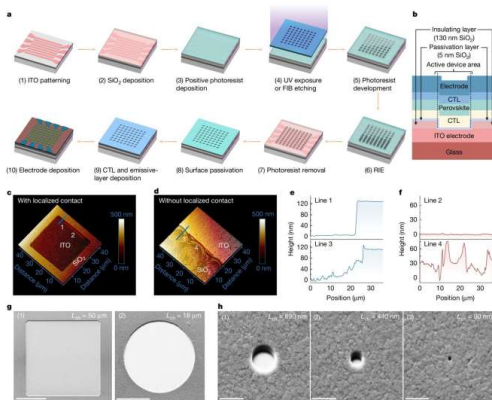


# Employing Perovskite to Create LED Pixels as Tiny as a Virus

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Courtesy of SynEvol  
Credit: Zhejiang University

A group of physicists, engineers, opticians, and photonics experts at Zhejiang University in China, collaborating with two colleagues from the University of Cambridge in the U.K., has discovered a method to reduce pixel size by utilizing perovskite. In their article published in the journal *Nature*, the team explains how they utilized the mineral to develop pixels the size of a virus.

The research team emphasizes that the driving force for contemporary electronics is to incorporate more technology into increasingly compact base units. For decades, the aim for computers was to increase the number of transistors on a single integrated circuit twofold. In the same way, decreasing pixel sizes in video screens has resulted in increasingly sharper images.

The present benchmark for digital display technology is micro-LED, which relies on II-V semiconductors. Regrettably, this technology becomes overly costly and ineffective for reducing pixels smaller than the size currently utilized. This caused the team to question whether an alternative base material could enable the development of smaller pixels that are both economical and effective. They turned to perovskite, the same mineral now being explored as an alternative to silicon in solar cells to help lower expenses.

The task included developing semiconductors from perovskite that could function as display screen pixels, emitting light when an electric current is applied. The team discovered that test LEDs emitted brightness comparable to traditional LEDs while maintaining the same efficiency.

Motivated by their findings, they created a smaller version, which also emitted light as brightly as a conventional LED, yet its price did not increase and it stayed as efficient as the larger prototype. They kept producing smaller and smaller LEDs until they created one that measured only 90 nanometers in width, approximately the size of a virus. This equates to an unprecedented pixel density of 127,000 pixels per inch.

The researchers have so far created only monochrome LEDs, indicating that the team must conduct further investigations to determine if color perovskite LEDs can genuinely surpass the current models. Furthermore, it remains uncertain how long these LEDs would endure in practical applications.

The group recognizes that there is a limit to minimizing LED dimensions, as the human eye can only perceive sharpness up to a specific point. Nevertheless, they propose that incredibly small LEDs could be utilized in products like ultra-high-resolution augmented reality gadgets.