

Optical Metasurfaces for Improved Organic LEDs

Organic Light-Emitting Diodes (OLEDs) are a class of light-emitting devices that use organic compounds to produce light in response to an electric current. OLEDs are known for their vibrant colors, high contrast ratios, and flexibility, making them ideal for applications in displays and lighting. However, only 25% of the injected current creates light, limiting the overall efficiency of the OLED. Recent advancements focus on developing new materials with higher emission efficiencies to overcome the limitations and push OLEDs towards higher efficiency and broader commercial adoption.

The EIC Pathfinder Open project SCOLED focuses on a new solution for improving OLEDs. It exploits resonant phenomena in nanoparticle arrays that can be integrated into OLED geometries. These arrays can couple to the emission and modify drastically its properties. Different effects can be achieved: Light outcoupling can be improved and controlled by the array, improving also the efficiency. In this way, it is possible to achieve omnidirectional emission or highly directional emission, depending on the application. The polarization of this emission is also determined by the array, which enables novel applications. By controlling the coupling between the array and the organic material, it might be also possible to improve the light generation and the overall device efficiency.

Fields of application

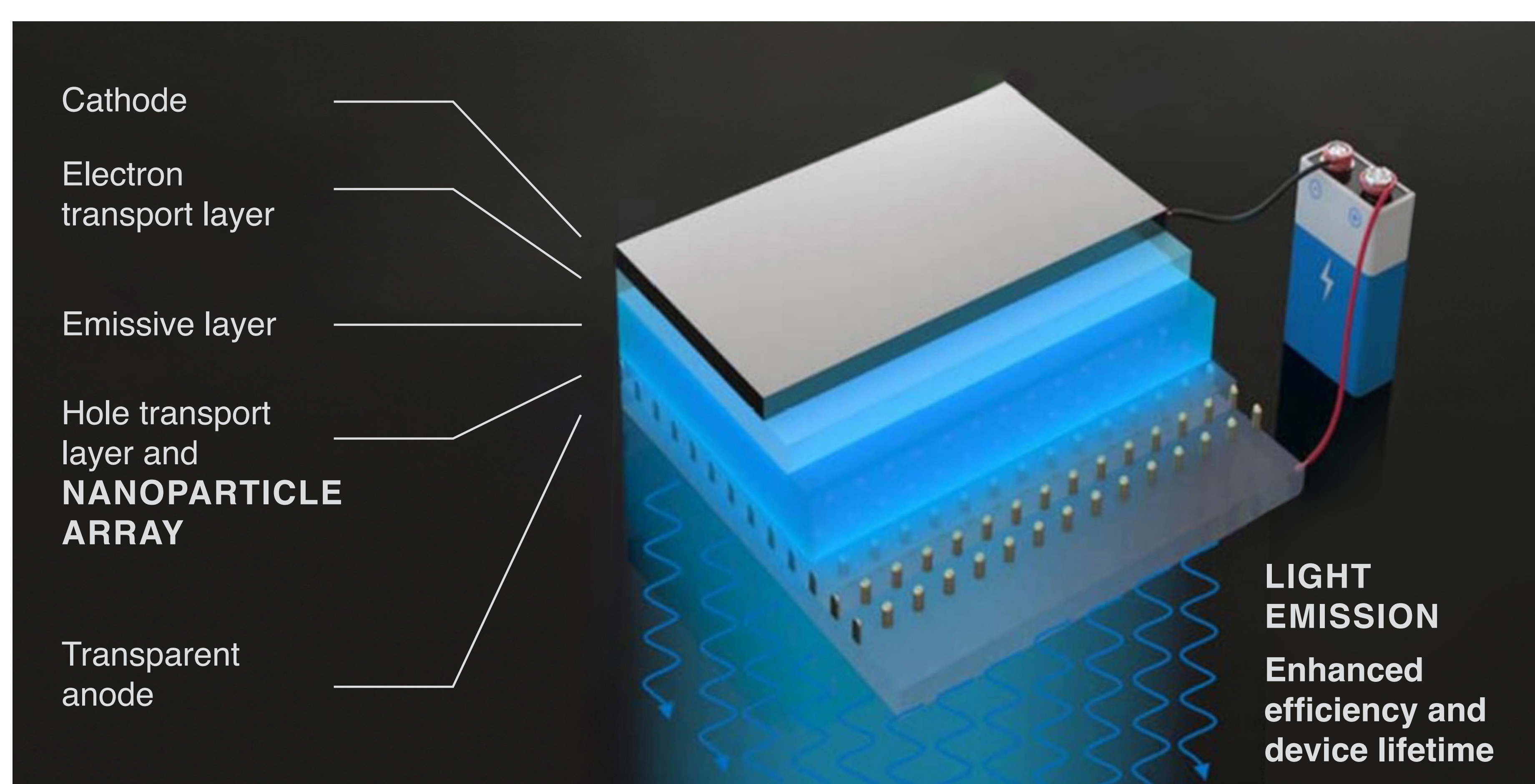
- Indoor and outdoor lighting
- Indoor farming
- Displays
- Projection

Project info

Project name	SCOLED
Coordinator	Aalto University
Funding instrument	EIC Pathfinder Open
EU contribution	EUR 2.73 million
Funding period	2023 – 2026
GA number	101098813

Next steps

- 1) Validation and optimization of the concept
- 2) Fabrication of a proof of concept device
- 3) Looking for investors and collaborators for further steps towards commercialization



Learn more about the project
<https://scoled.eu>