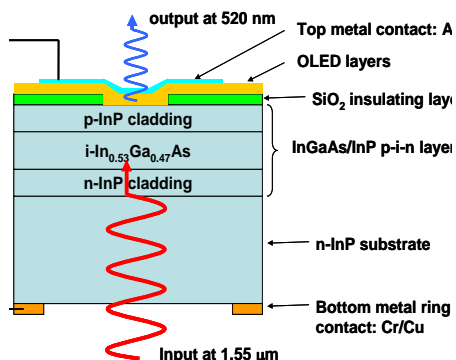


## Near-Infrared to Visible Light Optical Converter

### Description of the invention

A novel near-infrared (NIR) to visible light electro-optical converter has been developed that is based on the integration of organic light emitting devices (OLEDs) with inorganic photodetectors. This integrated optical converter device is capable of detecting an incoming near-infrared electromagnetic wave and converting it to visible light.

This novel integration relies on using a photodetector, comprised of an embedded metal electrode mirror that provides dual functionality as an optical mirror and charge injection electrode. Incoming NIR light is absorbed by the photodetector which is capable of generating photo-induced charge carriers that are injected into the emission layer of the OLED to emit visible light. As each organic molecule comprising the OLED is a topologically perfect structure, the growth of each organic layer of the OLED does not require "lattice matching". The need for lattice matching has been the fundamental limit for the growth of inorganic semiconductor monolithic devices. Avoiding this lattice matching problem enables this unique integration of an OLED with inorganic photodetectors.



### Reference

8810-7298

### Patent status

Issued U.S. 9,082,922,  
PCT patent application filed

### Stage of development

Prototyping activities with potential partners to be explored

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### Advantages

- Represents a simple approach to produce a large-area, high-efficiency, and low-cost infrared imaging devices.
- Avoids lattice matching problems.
- The cost will significantly be reduced while the efficiency can be further improved.
- OLED emission wavelengths can be easily varied across the complete visible spectrum offering more application flexibility.

### Potential applications

- Military (night vision).
- Law-enforcement (surveillance).
- Semiconductor industry (integrated circuit inspection, solar cell inspection).
- Bio-medical industry (bio-imaging).