

Organic photodetectors

CDT and Sumitomo have developed materials and device technologies for visible and Near Infrared optical detection.

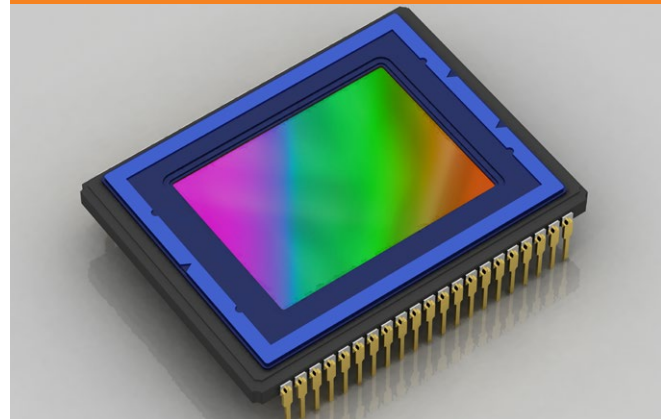
Wide range of potential applications

- Detection and imaging applications enabled by visible and near infrared (NIR) organic photodetectors
- Detector devices can be thin, lightweight, on plastic films (<<1mm)
- Optionally conformable to body

Digital x-ray



Image sensor



Wearable medical patch

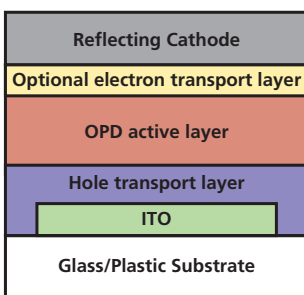


Fingerprint

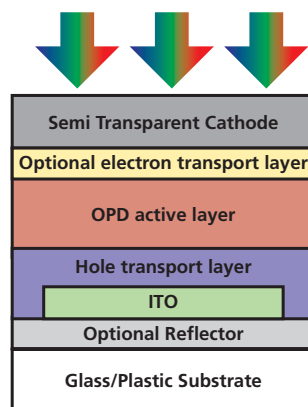


CDT's Organic Photodetectors

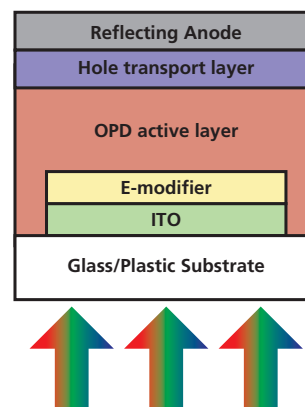
Bottom absorbing standard cell



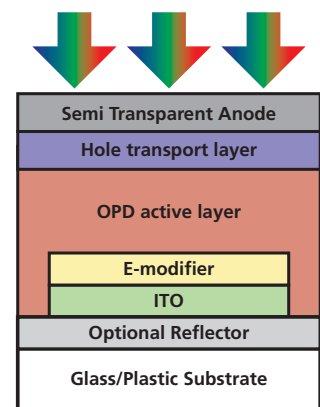
Top absorbing standard cell



Bottom absorbing inverted cell



Top absorbing inverted cell



Optoelectronic Detection Systems

▶ Exceptional Bandwidth Performance

- **SPV001** inverted device performances:
 - Low dark current density $J_D < 10 \text{ pA/mm}^2$ (-10V reverse bias)
 - High responsivity (0.2A/W @400nm – 0.4A/W@850nm)
 - High signal-to-noise ratio ($D^* > 10^{13}$ Jones)
 - EQE > 50%
- **SPV019** devices in development for near infra-red applications:
 - EQE of 40% at 940nm & >15% at 1000nm

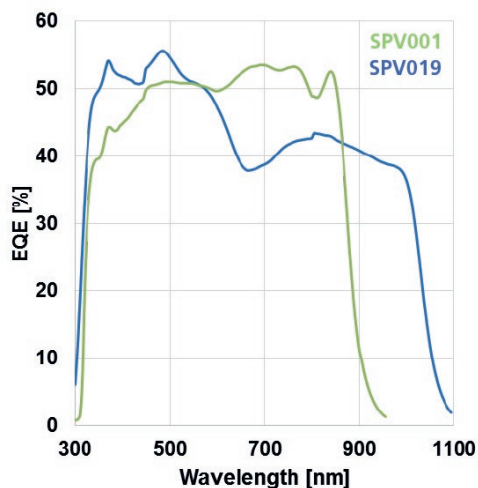
▶ Tailorable for Application/Customer

- Large range of device cost / performance options
- Tuneable absorption spectrum
- Expertise in surface treatments and interlayers to allow various device structures
- Standard (Top Cathode) / Inverted (Top Anode) structure
- Light detection from substrate / top electrode side
- Easy integration with other printed electronics components (OLEDs, OFETs, Passive components)

▶ Simple Fabrication

- Glass/plastic substrates
- Evaporated/solution processed electrodes
- Fabrication in ambient conditions. Stability to oxygen/moisture exposure.
- Low temperature processing < 80 °C
- Processed from environmental friendly solvents (non halogenated)
- Compatible with various printing methods (Spin coating / Ink-jet printing / Slot-die coating and many more)

Inverted cell – EQE at -2V reverse bias



Inverted cell – optimised dark current

