

NIR Light Emitting Diodes and Photodetectors (Yissum)

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Plastic electronic and optoelectronic components for telecommunications

Categories	Nanotechnology Devices, Optical Devices
Development Stage	Prototype device demonstrated in lab. Ongoing research and development
Patent Status	U.S. patent application filed
Market Size	Worldwide electro-optical modulators for the 40Gbps market reached over \$1.6 million in 2004, to reach \$74.4 million by 2007

Highlights

- Optical fibers that carry information for telecommunications and military applications are most transparent in near infra red wavelengths
- Polymer-based electronic components that emit visible light are lower cost and provide greater adaptability, but until now their development has been restricted to devices active in the visible range as plastics could not emit efficiently in the near-infrared band
- The proven advantages of using organic light-emitting molecules and polymers for telecommunication bands at 1.3 μ m and 1.5 μ m has driven the search for extending plastic technology to NIR

Our Innovation

High-quality NIR-active nanocrystals have been developed and incorporated into semiconducting polymers to give plastic composite materials with electro-optical activity in the NIR waveband. Changing the size, shape, and composition of the semiconductor nanocrystals provides unprecedented spectral coverage and tuning throughout the NIR band. A special coating shell enhances the emission intensity and protects the nanocrystals against degradation.

Key Features

- Enables the production of electro-optical devices such as light emitting diodes (LEDs), lasers, photovoltaic cells, photo-transistors, transistors, detectors, and modulators that are tuneable throughout the NIR range
- Enables lower-cost fiber-optic access for consumer telecommunications
- Development Milestones
- Industrial collaboration to customize LEDs for color and device design

The Opportunity

Nanocrystal polymers can be used as a lower-priced solution for telecommunications terminals linking fiber optic communications to individual homes

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