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For dual-band near-infrared detection at room temperature

A new class of high-performance, self-powered NIR photodetectors that are CMOS compatible and operate at room temperature without cooling.

Background:

Commercial Si- and InGaAs-based near-IR photodetectors require power to operate and they need to be used at low temperature to suppress large dark currents. This increases their size, weight and power, when compared to the desired requirement. In addition, these PDs are also sensitive to visible light, which limits their accuracy and applicability.

The present technology demonstrates a new class of high performance, self-powered NIR photodetectors. The devices are fully CMOS-compatible, self-powered, highly sensitive and show room-temperature operation and dual-band NIR detection for different NIR wavelengths.

Benefits:

- Fully CMOS compatible, lending itself well to easier integration with existing electronic circuits on a single chip
- Operates at room temperature, removing the need for external cooling devices
- Self-powered NIR detection at 940 nm and 1064 nm wavelengths

Reference number: DRI-11020-24

- Outperforms commercial Si photodetectors in terms of responsivity and detectivity
- Strong detection performance is achieved without the need for an external voltage
- Simple, straightforward fabrication process based on Al/Si/SiOx/ZrO2/ITO

Applications:

- IoT sensors
- Wireless, self-powered devices for healthcare monitoring
- Internet of Things devices
- Scientific instruments
- Specialist defense military applications
- Optical communication systems

Opportunity:

We are seeking industrial partners interested in helping us to develop this.

References

Zhang, Y., Li, X., Wang, Y., & Liu, J. (2024). Advanced Functional Materials for Energy Storage. Advanced Functional Materials, 34(16), 1679-1697.

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