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Enhancing Light-Matter Interactions In Mos2 By Copper Intercalation

Tech ID: 33397 / UC Case 2021-891-0

ABSTRACT

Researchers at the University of California, Davis have developed layered 2D MoS2 nanostructures that have their light-interactive properties improved by intercalation with transition and post-transition metal atoms, specifically Copper and Tin.

FULL DESCRIPTION

The technology involves photodetectors made of 2-dimensional vertically-aligned MoS2 layers. The van der Waals gap in at least two layers of MoS2 is intercalated with metal atoms such as Copper and Tin to enhance light-matter interactions. These intercalated atoms introduce electronic states near the MoS2's conduction band, boosting the photodetector's efficiency, especially in the near-infrared spectrum.

APPLICATIONS

- ▶ Optical sensors such as photodetectors
- ▶ Night-vision image intensifiers
- ▶ Technologies operating in low-light conditions or high vegetation terrain.

FEATURES/BENEFITS

- ▶ Enhanced light-matter interactions in near-infrared spectrum
- ▶ Improved photodetector efficiency
- ▶ Increased photoresponsivity and absorption capabilities in the infrared range.
- ▶ Addresses weak absorption in IR spectral region of 2D MoS2 devices
- ▶ Solves inefficient light-interactive properties of 2D MoS2 structures.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,037,259	07/16/2024	2021-891

Additional Patents Pending

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OTHER INFORMATION

KEYWORDS

MoS2, nanostructures, near-infrared spectrum, light-interactivity, light-matter interaction, photodetector, photoresponsivity, optical sensors

CATEGORIZED AS

- ▶ **Optics and Photonics**
 - ▶ All Optics and Photonics
- ▶ **Engineering**
 - ▶ Engineering
 - ▶ Other
- ▶ **Materials & Chemicals**
 - ▶ Nanomaterials
 - ▶ Other
- ▶ **Nanotechnology**
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