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Mechanically Robust and Self-Healable Perovskite Solar Cells

Flexible, damage-recovering perovskite layers keep ~94% performance after thousands of bends for wearables and portable power.

Researchers at Purdue University have developed new mechanically robust and self-healable perovskite thin films for solar cells. The new flexible, portable, semi-conducting polymeric materials can also be implemented in wearable energy-harvesting devices and electronics applications. Unlike traditional perovskite materials that are often brittle, the new semiconducting layer is self-healing allowing for retention of optimal mechanical and rheological properties as well as enhanced durability. Purdue researchers integrate a polycrystalline halide perovskite thin film to form a composite with a bi-continuous interpenetrating network to enable synergistic grain growth and solid diffusion at high temperatures. In fabrication, 10% conversion efficiency and high stability are achieved. In testing over 3000 bending cycles, the new solar cells obtained 94% power conversion efficiency.

Technology Validation: The new self-healing semiconducting perovskite thin films have been adapted into solar cell technologies tested at high temperatures over 3000 bending cycles and exhibited 94% power conversion efficiency.

Advantages:

-Robust

-Self-Healing

-Portable

-High Power Conversion Efficiency

-Retention of Mechanical Properties

-Enhanced Rheological Properties

Technology ID

2020-DOU-69145

Category

Chemicals & Advanced Materials/Specialty & Performance Chemicals

Chemicals & Advanced Materials/Polymer Science & Smart Materials

Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

Further information

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Potential Applications:

-Perovskite Solar Cells

-Wearable Energy Harvesting Devices

-Power Electronics

Recent Publication:

"Mechanically Robust and Self-Healable Perovskite Solar Cells"

Cell Reports Physical Science

DOI: 10.1016/j.xcrp.2020.100320

TRL: 5

Intellectual Property:

Provisional-Gov. Funding, 2021-04-14, United States

Provisional-Gov. Funding, 2021-05-08, United States

Utility-Gov. Funding, 2022-04-14, United States

DIV-Gov. Funding, 2023-12-01, United States

Keywords: Chemical Engineering, diffusion, Electrical Power, Energy Conversion, Energy Efficient, Materials, Materials and Manufacturing, Materials Engineering, Materials Science, Mechanical Properties, Power, power electronics, rheology, Solar, Solar Cells, Solar Technology, Thin Film Electronics, Thin Films, Wearable Devices, Wearable Electronics, Wearable Technology