

Solution-based deposition approaches for the oxygen-free synthesis of chalcogenide perovskites

A solution-based method produces stable perovskites at low heat, compatible with PV and LEDs.

Researchers at Purdue University have developed a new method to synthesize chalcogenide perovskites. Chalcogenide perovskites have both excellent optoelectronic properties, including a direct bandgap and high absorption coefficient, and a high intrinsic stability. This makes them an enticing class of materials for semiconductor applications, including photovoltaics. However, chalcogenide perovskite synthesis is challenging, generally requiring high temperatures (often > 800 degrees Celsius), negatively affecting the structure of the contact layer between the perovskite and the semiconductor substrate. Purdue researchers have developed a method that involves solution-phase delivery of at least one of the metals that forms the perovskite and a lower temperature treatment step. This method is the first to successfully synthesize a chalcogenide perovskite film that is compatible with semiconductor applications.

Technology Validation: The chalcogenide perovskite synthesized by the researchers showed the same peaks in the X-ray diffraction (XRD) and Raman spectra as the standard.

Advantages:

- lower temperature synthesis
- compatible with semiconductor applications

Applications:

- PV cells
- LEDs
- water-splitting devices

Technology ID

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Category

Chemicals & Advanced
Materials/Specialty &
Performance Chemicals
Energy & Power Systems/Power
Generation
Computing/Photonic & Optical
Computing Technologies

Further information

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- field effect transistors

TRL: 3

Intellectual Property:

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