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Two-Dimensional Halide Perovskite Lateral Heterostructures

A new synthesis method builds sharp, stable perovskite junctions for more reliable next-gen electronics and photonics.

Lateral heterostructures of two-dimensional (2D) semiconductors have applications in industries such as next-generation electronics, optoelectronics and photonics. One particularly promising class of lateral heterostructures is based on 2D Ruddlesden-Popper halide perovskites, due to their diversity and tunability. However, high ion diffusivity results in rapid interdiffusion of halides across the heterostructure interfaces. Interdiffusion affects the sharpness of the interfaces and subsequently the electrical and optical properties of the device, greatly limiting their stability and preventing the halide perovskite class from realizing its full potential.

Researchers at Purdue University have developed a new way to synthesize halide perovskite heterojunctions that results in the effective inhibition of ion interdiffusion. With this method, they were able to achieve stable and near-atomically sharp interfaces which make halide perovskite heterostructures a strong option for application in a wide range of industries.

Advantages:

-Reduced interdiffusion at interfaces

-Increased stability at interfaces

-Enables application of the promising halide perovskite class of 2D lateral heterostructures

Potential Applications:

-Next-generation electronics

-Optoelectronics

-Photonics

Technology ID
2019-DOU-68710

Category
Chemicals & Advanced Materials/Specialty & Performance Chemicals
Computing/Photonic & Optical Computing Technologies

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View online

TRL: 3

Intellectual Property:

Provisional-Patent, 2019-09-12, United States

Utility-Gov. Funding, 2020-09-04, United States

Keywords: Chemical Engineering, Materials and Manufacturing