Method for Synthesis of Highly Stable Lateral Heterostructures of 2D Halide Perovskites

Track Code: 2019-DOU-68710

Categories:
- Chemical Engineering
- Materials and Manufacturing

Keywords:
- Chemical Engineering
- Materials and Manufacturing

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

People:
- Dou, Letian (Project leader)
- Gao, Yao
- Shi, Enzheng

Intellectual Property:

Application Date: September 4, 2020
Type: Utility-Gov. Funding
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

Application Date: September 12, 2019
Type: Provisional-Patent
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
1801 Newman Road
West Lafayette, IN 47906

Phone: (765) 588-3475
Fax: (765) 463-3486
Email: otcip@prf.org