PURDUE INNOVATES | Office of Technology Commercialization

Managing 2D/3D Heterostructure Energy Landscape via ï °-conjugated Organic Cations for Efficient Perovskite Solar Cells

Conjugated organic cations that stabilize perovskite 2D/3D interfaces to boost efficiency and lifetime of perovskite solar cells (24.6% demonstrated).

Organic-inorganic halide perovskite solar cells (PSCs) have seen a rapid increase in their power conversion efficiency in the last few years. However, the long-term stability of the PSCs under operational conditions remains a significant hurdle on the road to commercialization. Current solutions apply passivation layers onto perovskite surfaces but these decrease the efficiency of the solar cell. Purdue researchers have developed multi-functional semi-conducing conjugated ligands with 2D/3D heterostructures in order to passivate the surface defects and to improve the intrinsic stability and power conversion efficiency of the perovskite solar cells. The Purdue researchers have achieved a power conversion efficiency of 24.6% and improved the longevity of the solar cell.

Technology Validation:

Solar cell with demonstrated power conversion efficiency of 24.6 %.

Advantages:

- Improved power conversion efficiency

- Improved stability

Applications:

- Photovoltaic panels

TRL: 3

Intellectual Property:

Technology ID
2023-DOU-70055

Category
Chemicals & Advanced Materials/Specialty & Performance Chemicals
Energy & Power Systems/Power Generation

Further information
Will Buchanan
wdbuchanan@prf.org

View online

Provisional-Gov. Funding, 2022-11-23, United States

Provisional-Gov. Funding, 2023-06-07, United States

Utility-Gov. Funding, 2023-10-10, United States

Keywords: Chemical Engineering, Methane dehydroaromatization (DHA), Mo-SSZ-13, Nanosheet-CHA, Reaction-regeneration, Stability, Zeolites