

Multi-Functional Conjugated Ligand Engineering for Stable and Efficient Perovskite Solar Cells

Organic ligands improve stability and charge transfer, pushing perovskite cells past 22% efficiency.

Researchers at Purdue University have developed new multi-functional conjugated ligands for stable, efficient perovskite solar cells. Currently, perovskite solar cells are limited by instability, lack of effective charge transfer, and vulnerability under prolonged light exposure which often leads to degradation. Purdue researchers have created pi-conjugated semiconducting organic ligands that enable high performance solar cell activity as an interface modifier between light-harvesting perovskite films and a hole transporting layer (HTL). Improved charge transfer is achieved between the HTL and perovskite film materials and the new conjugated ligands allow for better adhesion of the HTL layer, thereby preventing ion migration and increasing chemical and material stability. When adapted in solar cells, exceptional power conversion capability up to 22.06% was achieved with long-term stability of over 1000 hours under continuous illumination.

Advantages:

- Efficient Power Conversion Capability
- Long-Term Stability
- Improved Charge Transfer

Potential Applications:

- Perovskite Solar Cells
- Materials Research and Development

Technology Validation:

Technology ID

2021-DOU-69323

Category

Chemicals & Advanced
Materials/Specialty &
Performance Chemicals

Further information

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The power conversion capability of perovskite-based solar cells has been tested after adapting these materials with the new pi-conjugated organic ligands developed by Purdue researchers, found to be upward of 22.06% in over 1000 hours of continuous illumination.

Recent Publication:

<https://pubs.rsc.org/en/content/articlelanding/2020/qm/d0qm00233j/unauth#!divRelatedContent&articles>

<https://onlinelibrary.wiley.com/doi/abs/10.1002/anie.202100243>

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