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IAPME Seminar

Regulating Carrier Transport toward Highly Efficient Perovskite-based Tandem Solar Cells

4 July 2025

Prof. Mingzhen LIU
University of Electronic Science and Technology of China (UESTC)

Venue: N23-4018
Time: 10:00 - 11:00
Hosted by: Prof. Guichuan XING

Abstract

In recent years, the integration of emerging perovskite solar cells with traditional c-silicon solar cells to construct tandem devices has become to a promising photovoltaic technology. However, the integration of commercial silicon cells with perovskite solar cells, particularly on textured silicon substrates featured with large pyramids, presents a significant challenge in achieving effective charge transfer, which is critical for highly efficient tandem solar cells. This report focuses on our recent works on developing molecular-level nanotechnology that involves the design of charge transport layers, alongside optimizing the crystallization of conformal perovskite layers on the textured silicon sub-cells, leading to highly efficient perovskite/silicon tandem solar cells with certified power conversion efficiencies over 34%. This series of work aims to further enhance the performance of perovskite/silicon tandem photovoltaic technology and push its industrial application.

Biography

Prof. Mingzhen LIU earned her Ph.D. in Condensed Matter Physics from the University of Oxford and currently serves as Vice Dean of the School of Materials and Energy at the University of Electronic Science and Technology of China (UESTC). Prof. Liu has been working on perovskite solar cells for more than a decade. Her current research primarily focuses on perovskite-based tandem solar cells technology. Her group has achieved a series of breakthrough on perovskite/silicon tandems, perovskite-based triple junction tandems and flexible tandems. Prof. Liu has published more than 40 papers in journals such as Nature, Nat. Commun., Energy Environ. Sci., Adv. Mater. and Angew. Chem. Her articles have been cited over 14,000 times by scholars worldwide (Google Scholar). She is a Fellow of the Royal Society of Chemistry (RSC) and has been named a “Highly Cited Chinese Researcher” in Materials Science and Engineering by Elsevier every year since 2022.

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