

Pyridine-Terminated Conjugated Organic Molecules as an Interfacial Hole Transfer Bridge for NiO_x Based Perovskite Solar Cells

Haoliang Cheng, Yaru Li, Zhong-Sheng Wang*

Department of Chemistry, Shanghai Key Laboratory of Molecular Catalysis and Innovative Materials, Laboratory of Advanced Materials, iChEM (Collaborative Innovation Center of Chemistry for Energy Materials), Fudan University, 2205 Songhu Road, Shanghai 200438, China

* E-mail: zs.wang@fudan.edu.cn

To engineer the NiO_x/perovskite interface and promote the interfacial hole transfer, two pyridine-terminated conjugated small organic molecules (PTZ-1 and PTZ-2) are synthesized to link the NiO_x and perovskite layers for NiO_x based perovskite solar cells (PSCs).^{1,2} One terminal pyridine group interacts with the NiO_x layer, while the other one coordinates with the Pb atoms of perovskite layer, erecting an interfacial hole transfer bridge between NiO_x and perovskite (Figure 1). Surface modification of the NiO_x film with the PTZ molecules is able to enhance the hole extraction, increase the hole mobility and conductivity of NiO_x, reduce the defect density and retard the interfacial charge recombination. As a consequence, power conversion efficiency is improved from 12.53% to 16.25% and 17.00% upon surface modifications of NiO_x with PTZ-1 and PTZ-2, respectively. Furthermore, the modified PSCs exhibit almost no hysteresis and show good stability after storage in air (relative humidity of 30%~40%) for 500 h without encapsulation.

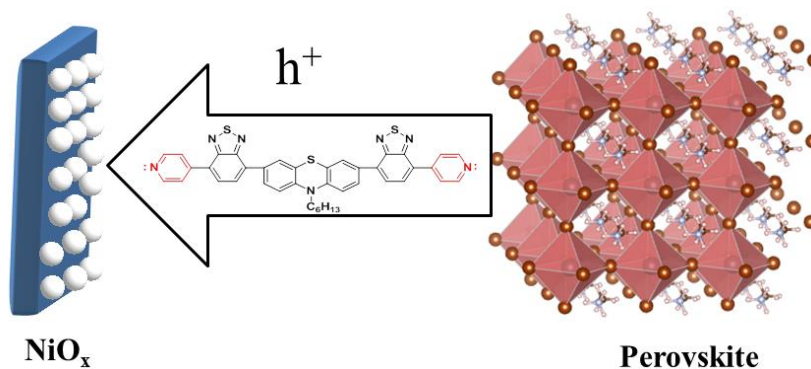


Figure 1. Hole transfer bridge between the NiO_x and perovskite layers.

References

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