Supramolecular Control in Hybrid Perovskite Photovoltaics

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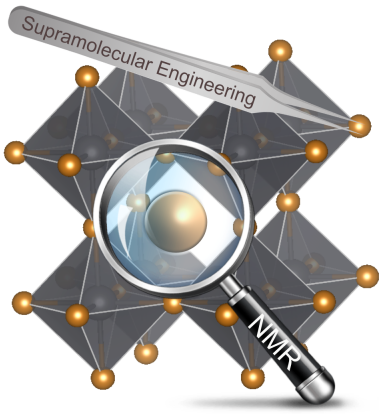
Hybrid organic-inorganic metal halide perovskites have become one of the leading semiconductors for solar-to-electric energy conversion in photovoltaics. However, they feature limited stabilities under operating conditions that hamper practical applications. To address this, we rely on templating hybrid perovskite materials by using supramolecular assemblies with organic components, such as through halogen bonding,[1,2] π-based interactions,[3] and host-guest complexation,[4,5] which has been uniquely assessed by solid-state NMR spectroscopy and NMR crystallography.[2,3] Moreover, we apply these strategies to form low-dimensional perovskite architectures with enhanced functionalities to further control the stabilities and performances of materials and devices.[3,6] As a result, we have achieved perovskite solar cells with superior operational stabilities without compromising photovoltaic performances,[3,4] providing a versatile strategy for advancing hybrid perovskite photovoltaics.



[1] M. L. Ball et al. *Chem. Mat*. **2022**, doi:10.1021/acs.chemmater.1c03117.
[2] M. A. Ruiz-Preciado et al. *J. Am. Chem. Soc*. **2020**, *142,* 1645.
[3] M. A. Hope et al. *J. Am. Chem. Soc*. **2021**, *143,* 1529.
[4] H. Zhang et al. *Nat. Commun.* **2021**, *12*, 3383.
[5] P. Ferdowsi et al. *J. Phys: Mater*. **2021**, *4*, 042011.
[6] J. V. Milić, *J. Mater. Chem. C* **2021**, *9*, 11428.