

The Novel Photophysical Properties of Halide Perovskites

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Organic-inorganic halide perovskites are presently in the limelight because of their outstanding optoelectronic properties (such as long balanced electron-hole diffusion lengths [1]) for applications ranging from photovoltaics, light emission, lasing [2] and even radiation detection. Presently, the power conversion efficiencies of perovskite solar cells have exceeded 20% while the external quantum efficiencies perovskite light emitting diodes have breached the 10% mark. In this talk, I will review the photophysical mechanisms of the workhorse methylammonium lead halide ($\text{CH}_3\text{NH}_3\text{PbI}_3$) system. In addition, I will also present our latest photophysics results on (a) slow hot carrier cooling in perovskite nanocrystals [3]; (b) overcoming the slow bimolecular recombination in 3D perovskites [4]; and (c) giant five photon absorption in core-shell perovskite nanoparticles [5].

References

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