

Structure-Photophysics-Function Relationship of Perovskite Solar Cells

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Abstract

Solar cells based on organometal halides employing perovskite structure have received tremendous attention in both academia and industry, due to their potential commercial application. As one of the most critical parameters, power conversion efficiency of perovskite solar cells has already exceeded 25%, on par with that of silicon solar cells. The perovskite film is sensitive to subtle variations during the fabrication process. Characterizing the crystal structure and testing the device performance only probes its static properties. The conversion from photon to separated electron and hole is a dynamic process, ranging from femtosecond to microsecond. Ultrafast laser spectroscopy can be utilized to study photophysics. A key feature of my research is to build a photophysics bridge to better connect structure and optoelectronic properties. I will present a collection of our progress on structure-photophysics-function relationship of perovskite solar cells.