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Monitoring Charge Separation and Injection Processes of Semiconductor Perovskite Thin Films CHRISTOPHER MCCLEESE, LILI WANG, Case Western Reserve University, YIXIN ZHAO, Shanghai Jiao Tong University, CLEMENS BURDA, Case Western Reserve University — In the past several years, semiconductor perovskites have had a major impact on the field of photovoltaics with device efficiencies reaching up to 20.1%. By studying the photophysical properties of these sensitizers, valuable information about the charge carrier relaxation processes is gained and insight into charge transfer and recombination processes that occur within the sensitizer and its interfaces after photoexcitation is obtained, all of which are useful to further help increase the efficiencies of perovskite based devices. Two of the main variables that have shown to have an effect on device efficiency is the substrate that the perovskite is coated on and the precursors used to prepare the perovskite films. In this talk I will focus on the ultrafast photophysics of perovskites studied by way of time resolved photoluminescence measurements. To better understand how the aforementioned variables effect device efficiencies, the ratio of CH_3NH_3I:CH_3NH_3Cl:PbI_2 in the precursor solution is varied and these solutions are coated on either a planar or mesoporous TiO_2 substrate. The charge carrier injection dynamics of these prepared films are investigated and their implications on device efficiencies is discussed.

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