Abstract Submitted
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Charge carrier transport properties of methyl-ammonium-lead-trihalide perovskites investigated by the time-of-flight method[1] EVAN LAFALCE, CHUANG ZHANG, Z. VALY VARDENY, University of Utah, UNIVERSITY OF UTAH TEAM — We studied the charge transport properties of methyl-ammonium-lead-trihalide perovskites using the photocurrent transient time-of-flight method. Various morphologies that include single-crystals and thin films with different crystalline grain sizes and surface roughness were investigated. The photocurrent transients were recorded as a function of excitation wavelength, intensity, and applied electric field as well as the sample temperature. We found that surface recombination leads to a photocurrent response that is sharply peaked at the band edge. While the carrier mobility depends on the sample preparation and sample temperature, typical values are on the order of $1 cm^2/Vs$, consistent with previous reports using similar methods. This value is high compared to other solution-processed semiconductors such as pi-conjugated polymers and quantum dots; however it is relatively low compared to inorganic semiconductors. Therefore determining the mobility limiting factors in hybrid perovskite devices is important for progress in their optoelectronic device performance.

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