Abstract Submitted
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Resolving the charge transfer complex (CTC) state in organic heterojunction solar cell using capacitive photocurrent technique[1] HEMANT SHAH, University of Louisville, ADITYA MOHITE, Rice University, TANESH BANSAL, BRUCE ALPHENAAR, University of Louisville — The dissociation of photo-excited states in organic heterojunction solar cells is thought to occur through the formation of a charge transfer complex (CTC) at the bi-layer interface. Absorbance and luminescence from the CTC is usually very weak, making direct observation difficult. Here we describe the use of a capacitive photocurrent technique to directly probe the CTC. The capacitive photocurrent signal is sensitive to photo-generated charge only when it is physically separated across the bi-layer interface. Since the CTC leads directly to exciton dissociation, the signal observed using the capacitive photocurrent technique is greatly amplified by the high dissociation fraction of the excited carriers. Measurements of a MDMO-PPV/PCBM heterojunction solar cell shows a strong peak at around 650 nm, that is observed as a much weaker feature in standard photocurrent and absorbance measurements. Excitation at 650 nm causes a reduction in the background photocurrent signal. This bleaching of the photocurrent suggests that occupation of the CTC states blocks the dissociation of higher energy excitonic states.

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