

Abstract Submitted
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Observation of optically forbidden states in PC₆₀BM due to interfacial distortion HEMANT SHAH, BRUCE ALPHENAAR, University of Louisville — PCBM is a fullerene derivative used extensively in organic solar cells. PC₆₀BM shows strong absorbance at wavelengths below 400 nm. A series of sub-gap transitions exist, but are symmetry forbidden in C₆₀, and only weakly observed in the PC₆₀BM absorbance. Recent theoretical calculations predict that the symmetry rules for C₆₀ can be lifted by the proximity of a metallic substrate due to perturbation of the electronic spatial distribution. Here we describe capacitive photocurrent measurements of PC₆₀BM in which the optically forbidden features are strongly observed. In agreement with the theoretical predictions, this is thought to be due to the influence of a high conductivity ITO layer in contact with the PC₆₀BM. The influence of the ITO is tested by introducing a thin insulator (Al₂O₃) of varying thickness between the PC₆₀BM and the ITO. The photocurrent due to the symmetry forbidden states drops strongly compared to the above gap photocurrent with increasing separation. Implications of these results on the polythiophene/fullerene blends will also be discussed. DOE-3048103802-08-073, NSF- DMR-0906961

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