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Scaling behavior and transport in bulk heterojunction materials ERIC DANIELSON, CHRISTOPHER LOMBARDO, ANANTH DODABALAPUR, The University of Texas at Austin — A lateral device geometry has been used to study charge transport in P3HT:C_{71}-PCBM bulk heterojunction devices. Analysis of current-voltage curves have previously been used to study charge transport in these materials. We perform ambipolar field effect transistor measurements on these structures to extract carrier mobilities. We are also able to describe the charge transport and recombination properties of these materials. Assymetric electrodes (Al, Au) separated by 100 nm-20μm enable us to gain considerable insight into transport physics. Photocurrent measruements as a function of channel length, electric field, and illumination intensity (0.1-100 suns) are used to measure the ambipolar mobility-lifetime product and study how this correlates with measured field-effect mobilities at various electric fields. Lateral structures are shown to be a powerful tool to understand transport and the role of carrier mobility on photovoltaic performance.

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