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Bipolar Charge Transport Properties of Poly(imide-thienyl(thienylenevinylene)) EVAN LAFALCE, XIAOMEI JIANG, Univeristy of South Florida, CHENG ZHANG, South Dakota State University — The charge transport properties of π–conjugated polymers are of interest from a fundamental perspective and also because they are a limiting factor for many optoelectronic device applications. In this work, we study the charge carrier mobility and recombination in Poly(imide-thienyl(thienylenevinylene)) (imide-PTV), a novel PTV derivative with imide side group. The electron and hole mobility are determined separately through the Space Charge Limited Current (SCLC) analysis of single carrier diodes. These devices are fabricated using interfacial layers that provide carrier selective contacts. A mobility asymmetry factor of approximately 20 that favors hole transport is observed, with the hole mobility of the order of 10^{-5} [cm^2/V*s]. Similar results are obtained from the analysis of the intensity dependence of photoconductivity. Complimentary analysis of the ambipolar carrier mobility through carrier extraction under linearly increasing voltage (CELIV) and double injection transient techniques are also presented. The effects of carrier recombination and trapping are discussed. We conclude that the hole transport is not the limiting factor for power conversion efficiency of photovoltaic device based on imide-PTV and PCBM.

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