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The interplay of morphology and carrier recombination in dendrimer-based organic photovoltaics. SEAN SHAHEEN, NIKOS KOPIDAKIS, WILLIAM MITCHELL, National Renewable Energy Laboratory, WILLIAM RANCE, Dept. of Physics, Colorado School of Mines, JAO VAN DE LAGEMAAT, GARRY RUMBLES, National Renewable Energy Laboratory — Pi-conjugated dendrimers provide an alternative to polymers in organic photovoltaic devices that allow for systematic study of how the molecular structure affects the morphology of the donor and acceptor components and subsequently how the device operates. The degree of mixing and specific geometry of the donor-acceptor blend play a determining role in the rate of exciton dissociation as well as the efficacy of charge transport out of the active layer. We find that pi-conjugated dendrimers are more miscible with the fullerene-derivative acceptor than their polymeric counterparts, which leads to smaller domains than are commonly found in polymer-fullerene blends. Here we discuss how these differing morphologies affect exciton dissociation, carrier transport, and carrier recombination in the devices.

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