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Modeling morphology dependence of the power generation in bulk heterojunction organic photovoltaics TIMOTHY SCHLITTENHARDT, SELMAN HERSHFIELD, Univ of Florida - Gainesville — Bulk heterojunctions are mixtures of differently doped organic semiconducting materials that provide for a highly interconnected and complex morphology. A three dimensional simulation is conducted of these systems, where the junctions are modeled by diodes with a given j-V characteristic and the transport within a particular material is treated as ohmic. The current and potential profile are calculated throughout the sample with an iterative method that allows us to readily treat systems with 10^4 sites for a full range of applied voltage biases. Visualizations of the current flow and voltage profile are given. It is found that power is not generated uniformly throughout the sample, but is concentrated near the edges. As has been observed experimentally, this leads to an optimal thickness for power generation. A simple analytical model is presented which reproduces and provides understanding of our simulation results.

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