

Abstract Submitted
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Aluminum nanoparticles for plasmonic enhancement of light absorption in organic semiconductors¹ HANS ROBINSON, Virginia Tech, LAUREN NEELY, MicroXact, Inc., CHIH-YU JAO, Virginia Tech, VLADIMIR KOCHERGIN, MicroXact, Inc. — The energy conversion efficiency in organic photovoltaic (OPV) devices is low, primarily due to the short exciton diffusion length (10 nm) in organic semiconductors. Much effort is currently devoted to improving the optical absorptivities in OPVs by incorporating plasmonic nanostructures in or near the active layer, which would allow for significantly thinner absorption layers. We suggest that aluminum nanoparticles are a better choice than gold or silver particles for embedded plasmonic structures in OPV active layers. This is due to the high plasmon frequency of Al, which makes it easy to create good overlap between plasmon resonance and semiconductor absorption band in a random mixture of polymer and nanoparticles. We will present both modeling and experimental data to support this hypothesis.

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Hans Robinson
Virginia Tech

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