



Abstract:

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Recent progress in the hunt for non-fullerene small molecule acceptors for organic photovoltaics

Organic photovoltaic (OPV) materials hold a great deal of promise in the search for future sustainable methods of energy harvesting. To date, the majority of solution-processed OPV cells employ solubilized fullerene derivatives such as PCBM as electron acceptors. These materials are expensive, require significant amounts of energy to produce, have relatively low optical absorption (due to formally dipole forbidden low energy transitions), and are unstable to photo-oxidation, which greatly limits the lifetimes of resulting devices. The development of affordable, stable non-fullerene acceptor alternatives is therefore desirable. We synthesize and evaluate candidate materials from cost-effective building blocks, designed to have relatively narrow bandgaps, high electron affinities and favorable energy level alignment with typical electron donors. We characterize these materials under various solution and film deposited conditions (both neat and in combination with donor molecules) using optical techniques, atomic force microscopy, and assembled as the active layers in solar cell devices. This poster will summarize the present state of our developing non-fullerene acceptor candidate small molecules.