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Design of block and graft copolymers for use as compatibilizers in organic solar cell active layers DYLAN KIPP, VENKAT GANESAN, University of Texas at Austin — Recent experiments have suggested that the use of block and graft copolymer compatibilizers in polymer based donor-acceptor mixtures can improve both the morphology and thermal stability of organic solar cell active layers. Inspired by these successes, we use the framework of self consistent field theory to study the influence of copolymer compatibilizers on the interfacial properties of donor-acceptor blends. First, we calculate the reduction in the interfacial tension (and hence the driving force towards macrophase segregation) brought on by the copolymer compatibilizer as a function of the copolymer architecture. Second, we calculate the effective interaction between two copolymer monolayers at the interfaces between the donor and acceptor domains. The results of this second study allow us to comment on the expected ability of the copolymer compatibilizer to reduce the coalescence of domains. Overall, our results suggest important rules for designing copolymer compatibilizers to influence both kinetically-trapped and equilibrium morphologies of donor-acceptor blends.

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