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Polymer/solvent bicontinuous microemulsions for use as organic solar cell active layers DYLAN KIPP, University of Texas at Austin, OLGA WODO, University at Buffalo SUNY, BASKAR GANAPATHYSUBRAMANIAN, Iowa State University, VENKAT GANESAN, University of Texas at Austin — The paradigm for the optimal morphology of an organic solar cell is characterized by co-continuous, interpenetrating donor and acceptor domains with nanoscale dimensions and high interfacial areas. One well known equilibrium morphology that fits these characteristics is the bicontinuous microemulsion noted in the context of flexible polymeric blends. Currently, design rules are not available for producing bicontinuous microemulsion morphologies from the kinds of conjugated polymer/fullerene mixtures typically used to form the active layer of organic solar cells. Motivated by the above considerations, we use single chain in mean field simulations to study the ternary composition space of semiflexible polymer + flexible-semiflexible block copolymer + solvent and locate the channels of morphologies with characteristics like that of the bicontinuous microemulsion. Our theoretical analysis results in empirical design rules for producing bicontinuous microemulsion morphologies from blends of conjugated polymer + block copolymer + fullerene.

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