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Self-assembly of side chain liquid crystalline block copolymers MANAS SHAH, VICTOR PRYAMITSYN, VENKAT GANESAN, University of Texas at Austin — We present a new model based on self-consistent field theory (SCFT) approach to characterize the self assembly behavior in side-chain liquid crystalline block copolymers. Our model considers a micromechanical representation of flexible coil-coil diblock copolymers, with rod-like units grafted to one of the blocks. We present results which elucidate self-assembly arising from the interplay between block copolymer microphase separation and the orientational ordering of the rod segments. Our numerical results are in very good agreement with reported experimental observations. Many of the traditional flexible diblock copolymer microphases are also predicted to occur for side chain liquid crystalline polymers, with smectic ordering accompanying within the microphases. The equilibrium phase morphologies are observed to depend on the molecular weight of the copolymer, the length of the rod units, the relative volume fractions of each block, and the energetic and orientational interactions between different components. Moreover, for the parameters considered in this article, microphase separation was observed to be a requisite for developing orientational ordering between mesogenic units

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