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Effects of dipolar interactions on thermodynamic stabilities of polymer blends and diblock copolymer melts RAJEEV KUMAR, Computer Science and Mathematics Division and Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, TN, M. MUTHUKUMAR, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA, BOBBY SUMPTER, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, TN — We present a generalized theory for studying effects of dipolar interactions on the phase separation in polymer blends and diblock copolymer melts. A new formalism is developed to construct free energy of these polymeric media with inhomogeneous dielectric function, which bears resemblance to the static part of Lifshitz theory for dielectric slabs with sharp interfaces. Using the formalism, effects of continuous dielectric function can be studied. We have applied the formalism to a study of co-existence curves in polymer blends and interfacial tension for a planar interface between the coexisting phases. The same formalism is used to study microphase separation in lamellar forming diblock copolymer melts. Results on the effects of mismatch between the dipole moments on thermodynamics of polymer blends and diblock copolymer melts will be presented in this talk.

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