

Abstract Submitted  
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**Binary phase diagrams of liquid crystal/polymer systems exhibiting crystal, smectic, and nematic transitions**<sup>1</sup> P. DAYAL, R. MATKAR, University of Akron, V. GINZBURG, Dow Chemicals, T. KYU, University of Akron — Current theories describing the phase diagrams of nematic-nematic mixtures and polymer-nematic liquid crystal mixtures are based on the combination of classical Flory-Huggins (FH) theory of isotropic mixing and the Maier-Saupe (MS) free energy of nematic ordering. This combined FH-MS theory was extended by Kyu and Chiu to polymer-smectic-A systems by incorporating McMillan free energy of the nematic-smectic-A transition. We have developed a generalized model for an LC system undergoing crystallization, extending the Maier-Saupe-McMillan theory in conjunction with the Landau-Brazowiskii model of weak first order phase transition such as solidification. The generalized FH-extended MSM free energy is then minimized with respect to all order parameters and the phase diagram is constructed by balancing the chemical potentials of corresponding phases. This form of the free energy could be valuable in the time evolution studies of phase transitions in polymer/liquid crystal mixtures.

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