

Abstract Submitted
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Phase Equilibrium Model for Nanoparticle-Filled Nematic Liquid Crystals EZEQUIEL SOULE, Dept. of Chemical Engineering, McGill University, Montreal, Canada - Nanomaterials Group, Institute of Materials Science, Mar del Plata, Argentina, JONATHAN MILETTE, LINDA REVEN, Dept. of Chemistry, McGill University, 801 Sherbrooke St. W, Montreal, H3A2K6, Qc, Canada, ALEJANDRO REY, Dept. of Chemical Engineering, McGill University, 3610 University St, Montreal, H3A2B2, Qc, Canada — This work presents an integrated characterization of phase transitions and structure formation in mixtures of nanoparticles (NP) and liquid crystals (LC), by means of a model for phase equilibrium and an experimental study on the system composed by 5CB and gold NPs. The model takes into account mixing, nematic ordering of the LC, crystalline ordering (self-assembly) of NPs, and LC-NP interactions. Generic features of phase diagrams for NP-LC mixtures are discussed. The model can explain some experimental observations, like the formation of NP aggregates and distinctive nematic textures, as a function of experimental parameters like NP concentration and the nature of the NP surface are changed. The parameters that produce these changes in phase behaviours can be directly correlated with experimental variables.

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