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Evaporation induced ordering in polymer-colloid suspensions ERKAN SENSES, Stevens Institute of Technology, MATTHEW BLACK, University of Maryland at College Park, THOMAS CUNNINGHAM, PINAR AKCORA, Stevens Institute of Technology — When evaporated from aqueous solutions, colloidal particles tend to deposit non-uniformly on hydrophilic substrates due to capillary flow from the center of droplet to the pinned contact line. The so called "coffee-ring" deposition has been extensively studied in polymer solutions and colloidal suspensions; however, the behavior of the mixtures of polymer-colloid suspensions under evaporation remains unexplored. The competition between the homogenous fluid phase and the depletion induced phase separation offers rich phase behavior to these three component systems over a wide range of size ratios and concentrations. In this work, we present the formation of long-range, ordered colloid-rich and polymer-rich phases with a well-defined periodicity from homogenous mixture of colloids and polymer via solvent evaporation. The kinetics of the phase separation, studied by video microscopy and Fourier transform analysis of the images obtained at different times, suggests that the early growth of the phases can be quantitatively described by spinodal decomposition kinetics. The effect of particle and polymer concentrations, polymer and particle size ratios, interparticle bridging and substrate on microscopic phase separation will be discussed.

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