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Nanoparticle microstructures templated by liquid crystal phase-transition dynamics SHEIDA T RIAHINASAB, AHMED ELBARADEI, AMIR KESHAVARZ, BENJAMIN J. STOKES, LINDA S. HIRST, University of California, Merced — We report on the use of the isotropic to nematic phase transition of liquid crystals as a new mechanism for sorting and assembling nanoparticles into micro-scale capsules, networks, and foams. Microstructure length scales and morphologies are influenced by the dynamics of the phase transition, and therefore can be controlled by the relevant thermodynamic parameters including transition cooling rates and particle concentration in the host phase. To achieve stable microstructures a mesogenic ligand on the nanoparticle surface provides attractive short-range interactions between adjacent nanoparticles.

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