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Self-Assembly of Soft Colloids with Multi-scale Phase-Separated Structures¹ CHRIS SOSA, ROBERT K. PRUD'HOMME, RODNEY D. PRIESTLEY, Princeton University, Department of Chemical and Biological Engineering — The ability of polymers and block co-polymers to self-assemble into highly-ordered structures in bulk two-dimensional films under specific environmental conditions has allowed in recent years for the fabrication of nano-porous membranes, nano-structured surfaces, and sacrificial templates for the preparation of inorganic nano-materials with well-defined geometries. Extending these fairly specific fabrication techniques to the creation of similar three-dimensional colloidal structures in bulk solutions, however, has proven quite challenging despite the significant need for heterogeneously-structured colloidal materials in medicine and industry. Here we present a strategy for controlling the structural heterogeneity of soft polymer particles along multiple length scales by inducing the rapid phase-separation of polymer mixtures through a continuous nanoprecipitation process.

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