Title: Reentrant Phase Diagram of Network Fluids

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Abstract: We introduce a microscopic model for particles with dissimilar patches which displays an unconventional "pinched'' phase diagram, similar to the one predicted by Tlusty and Safran in the context of dipolar fluids [Science 290, 1328 (2000)]. The model-based on two types of patch interactions, which account, respectively, for chaining and branching of the self-assembled networks-is studied both numerically via Monte Carlo simulations and theoretically via first-order perturbation theory. The dense phase is rich in junctions, while the less-dense phase is rich in chain ends. The model provides a reference system for a deep understanding of the competition between condensation and self-assembly into equilibrium-polymer chains.

KeyWords Plus: Directional Attractive Forces; Dipolar Hard-Spheres; Monte-Carlo; Thermodynamics; Particles; Systems; Patchy

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