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Structure and Phase Behavior of Ion–Dipole Mixtures WONKI ROH, ERIK LUIJTEN, University of Illinois at Urbana-Champaign — It is well established that Coulombic interactions induce a liquid–liquid transition in ionic solutions. By contrast, the occurrence of phase separation driven by anisotropic dipolar interactions is still a matter of debate, with our recent simulation results excluding this phase separation for a large region of the temperature–density plane. These observations naturally lead to the question whether phase separation takes place in mixtures that contain ions as well as dipolar particles. Employing large-scale grand-canonical Monte Carlo simulations, we investigate four prototypical ion–dipole mixtures: *ion-dominated* systems in which the dipole moment is either strong or weak, and *dipole-dominated* systems with strong or weak dipolar strength. We focus on the low-temperature regime and search for phase separation by varying the chemical potentials of the ions as well as the dipolar particles. Depending on temperature and on the magnitude of the dipole moment, remarkable liquid structures are found that may have implications not only for the behavior of ion–dipole mixtures, but also for self-assembly in suspensions containing charged and dipoloar colloids.

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