Title: Bicontinuous and mixed gels in binary mixtures of patchy colloidal particles

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Abstract: We investigate the thermodynamics and percolation regimes of model binary mixtures of patchy colloidal particles. The particles of each species have three sites of two types, one of which promotes bonding of particles of the same species while the other promotes bonding of different species. We find up to four percolated structures at low temperatures and densities: two gels where only one species percolates, a mixed gel where particles of both species percolate but neither species percolates separately, and a bicontinuous gel where particles of both species percolate separately forming two interconnected networks. The competition between the entropy and the energy of bonding drives the stability of the different percolating structures. Appropriate mixtures exhibit one or more connectivity transitions between the mixed and bicontinuous gels, as the temperature and/or the composition changes.

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