Solvation Effects in Soft Matters

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We examine the solvation effects in soft matters, which have not yet been well explored. (i) In fluid mixtures of water and organic solvent, a small amount of selective solute (ions or hydrophobic particles) can drastically alter the phase behavior. With addition of a small amount of strongly hydrophilic (hydrophobic) solute, water-rich (water-poor) domains can appear in a wide region of the temperature and the composition, outside the solvent coexistence region [1]. (ii) We further study the interaction among charged colloids in mixture solvents. We find that a prewetting transition can easily occur on ionizable colloid surfaces. Bridging of wetting layers can drastically intensify the interaction even far from the solvent criticality [2].

[1]R. Okamoto and A. Onuki , Phys. Rev E 82, 051501 (2010).
[2]R. Okamoto and A. Onuki , Phys. Rev E 84, 051401 (2011).