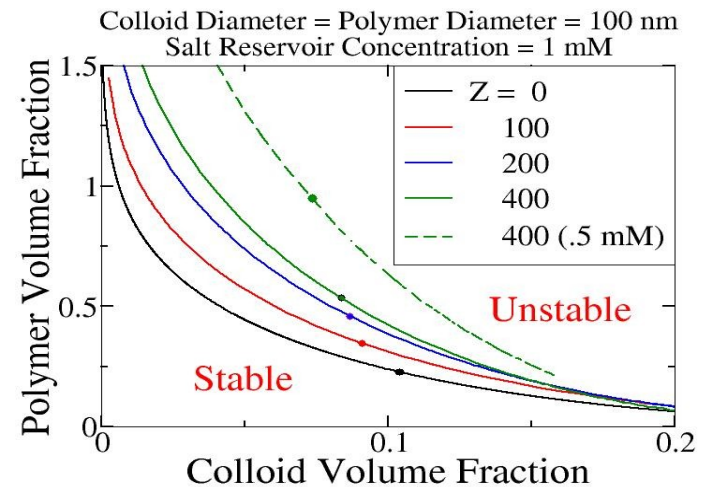
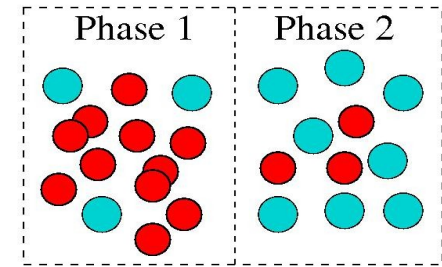


Demixing of Colloid-Polymer Mixtures: Influence of Electrostatic Interactions and Polymer Conformations

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Suspensions of colloidal particles are encountered throughout recovery and processing of petroleum – from drilling fluids to well stimulation suspensions, oil sands slurries, and tailings ponds. Petroleum suspensions are often mixtures of charged colloids and nonadsorbing polymers. Miscibility is of great practical importance, as bulk phase separation can drastically alter thermal and rheological properties. How does the stability of colloid-polymer mixtures depend on competition between depletion-induced attractive interactions and electrostatic repulsive interactions? Our computational modeling predicts that phase stability (miscibility) can be significantly enhanced by amplifying the effective electrostatic interactions between colloids, via either increasing the effective macroion charge Z or decreasing the salt concentration (ionic strength) of the solvent.

Polymer and Salt Reservoir



Electrostatic interactions stabilize mixtures of charged colloids and neutral, ideal polymers.