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Polymeric stabilization of colloidal asphaltenes SARA HASHMI, ABBAS FIROOZABADI, Yale University — Asphaltenes, the heaviest component of crude oil, cause many problems in petroleum extraction and recovery. Operationally defined as insoluble in long chain alkanes but soluble in toluene, asphaltenes have been described by bulk thermodynamic models such as the Flory-Huggins theory. However, bulk models work well only for asphaltenes in good solvents. Characterization of asphaltenes in poor solvents remains elusive: molecular scale asphaltenes readily aggregate to the colloidal scale and become highly unstable in solution. We investigate the ability of polymers to stabilize colloidal asphaltene suspensions in heptane. In the absence of added polymer, sedimentation measurements reveal dynamics reminiscent of collapsing gels. Adding polymers to colloidal asphaltene suspensions can delay the characteristic sedimentation time by orders of magnitude. Light scattering results suggest that the mechanism of stabilization may be related to a decrease in both particle size and polydispersity as a function of added polymer.

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