

Abstract Submitted  
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**Controlling Aggregation in Non-Polar Asphaltene Suspensions Through Electrostatics** SARA HASHMI, ABBAS FIROOZABADI, Yale University — Asphaltenes, the most aromatic and largest molecular weight components of petroleum fluids, can undergo a liquid-liquid phase transition in conditions including highly non-polar environments. Phase separation begins with molecular association and proceeds to and through the colloidal length-scale until complete sedimentation or deposition. Non-ionic polymeric dispersants can stabilize asphaltenes at the colloidal scale in non-polar suspensions. We perform a variety of experiments which suggest that stabilization occurs by adsorption of dispersant onto the asphaltenes, truncating the progress of precipitation. In particular, dynamic light scattering (DLS) and phase-analysis light scattering (PALS) measurements indicate that electrostatic repulsion is responsible for stabilizing asphaltene colloids against further aggregation. Aggregation time increases exponentially with dispersant concentration, as expected for particles interacting through a combination of attractive dispersion forces and repulsive electrostatics. However, contrary to current understandings of electrostatic stabilization in non-polar systems, the charges in colloidal asphaltene suspensions seem to arise from the asphaltene colloids themselves rather than from dispersant micelles.

Sara Hashmi  
Yale University

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