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Observing asphaltene aggregation by NMR spectroscopy and relaxation YI-QIAO SONG, ANDREW POMERANTZ, KOSTA LADAVAC, PABITRA SEN, Schlumberger-Doll Research — Asphaltenes are a class of molecules commonly found in the oilfield and defined by their simultaneous solubility in toluene and insolubility in hexanes. The aggregation dynamics of asphaltenes is currently poorly understood but presents a serious problem to the oil industry because aggregation can clog flow though pipelines and the oil-bearing rocks. Recently, aggregation dynamics of asphaltenes at very low concentration was measured by nuclear magnetic resonance (NMR) of spin-spin relaxation and diffusion, and fluorescence correlation spectroscopy (FCS). Here, asphaltene aggregation at higher concentrations is observed by monitoring the NMR spectroscopy and longitudinal relaxation times (T1) of the solvent protons. These measurements shed new light on the dynamics of aggregation.

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