Supramolecular self-assembling for enhanced oil recovery
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Abstract: Supramolecular self-assemblies are spontaneous organization of molecules formed by noncovalent interactions. The focus of this research was to evaluate the self-assembly capacity of polymer blends with superior viscoelasticity and stability for applications in polymer flooding for Enhanced Oil Recovery (EOR). In this work, an optimum self-assembly system (SAP) derived from the combination of a partially hydrolyzed polyacrylamide (HPAM), xanthan polymer (XP), and an associative polymer (AP) was developed. This optimum formulation demonstrates improved viscoelastic properties, superior salinity tolerance, and increased mechanical and thermal stability compared to the respective baseline polymers. Furthermore, the optimum SAP system shows improved mobility control and therefore enhanced oil displacement efficiency during polymer flooding of heavy oil under high brine salinity concentration (8.4 wt%).

Keywords: Self-assembly system; Polymer flooding; Heavy oil recovery; Viscoelastic properties