

Destabilization of Colloidal Solids in Non-Aqueous Liquids

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Suspended solids in diluted bitumen can be destabilized in two ways: through homo-flocculation (i.e. adhesion between the solid particles) or with the use of emulsified water as ‘collectors.’ In this study, particle-particle and particle-water interactions were examined in diluted bitumen environments. A microcantilever technique was used to quantify adhesive forces on the particle scale. It was observed that, by increasing the aliphatic content of the solvent, the strength of adhesion between solid particles increased significantly from zero. This resulted in homo-flocculation and sedimentation of the suspended colloids. In contrast, strong attachment between solids and water droplets could only be accomplished in solvents of high aromatic contents. The underlying physics of these phenomena are discussed.