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Improvement of Chemical Demulsifier Performance Using Silica Nanoparticles

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Abstract : The reduction of water content in crude oil emulsions reduces pipeline corrosion potential and increases the productivity. Chemical emulsification of crude oil emulsions is one of the methods available to reduce the water content. Presence of demulsifier causes the film layer between the crude oil emulsion and water droplets to become unstable leading to the acceleration of water coalescence. This research has been performed to study the improvement performance of a chemical demulsifier by silica nanoparticles. The silica nano-particles have been synthesized by sol-gel technique and precipitation using poly vinyl alcohol (PVA) and poly ethylene glycol (PEG) as surfactants and then nano-particles are added to the demulsifier. The silica nanoparticles were characterized by Particle Size Analyzer (PSA) and SEM. Upon the addition of nanoparticles, bottle tests have been carried out to separate and measure the water content. The results show that silica nano-particles increase the demulsifier efficiency by about 40%.

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