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Evaluation of the Asphaltene Inhibitors Effect on Asphaltene Aggregation and Precipitation

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Asphaltene aggregation and precipitation is usually responsible for many flow assurance problems such as wettability changes, pore clogging in the reservoir and fouling in wellbore tubing and production surface facilities. The application of chemical additives (surfactant and polymer) is a well-known way to control asphaltene precipitation. Ultraviolet−visible (UV−vis) spectroscopy is the most common analytical technique thathas been applied to study the effectiveness of inhibitors in keeping asphaltene particles dispersed into crude oil.However, this technique requires being performed in diluted solutions, which can interfere significantly in the aggregationphenomena. The aim of this work is to evaluate the effect of two chemical additives, 4-dodecyl benzenesulfonic acid (DBSA) and a novel inhibitor (Poly (vinyltoluene-co-alpha-methylstyrene) (PV)), on the asphaltene aggregation behaviour of Iraqi crude oil using Turbiscan transmission. This is a new methodology developed to study theaggregation kinetics and settling of asphaltenes around its n-heptane precipetation onset. The resultsobtained were compared to those determined with the traditional UV−vis method (λ = 800 nm) and showed qualitatively similartrends. Settling measurements suggest that the stabilization provided by the inhibitors can occur by slowing both formation and growing of asphaltene particles and delaying the phase separation process. Transmission electron microscopy (TEM) has been used to study the effect of inhibitors on the shape and size of asphaltene particles. The findings in this study show that both DBSA and PV were effective in keeping the asphaltene particles dispersed in solution and prevented them from settling. It was demonstrated that theme thodology developed using Turbiscan was more accurate and sensitive.

Biography:

Mahmoud Alhreez completed his bachelor's degree in in Chemical Engineering from the University of Technology/ Baghdad – Iraq and his master degree at the same academic department. He was working in South Refineries Company/ Iraq and he has more than nine years' experiences in atmospheric distillation units as a shift engineer. He has extensive knowledge of oil and gas refining engineering for crude oil. He is currently doing his PhD studying in the University of Leeds/ United Kingdom. He is working on using a novel chemicals and methods for controlling asphaltene problems in reservoirs and refineries. Also he interests in colloid and particle science, flow assurance problem and synthesis emulsions and nanoemulsions for oil and gas applications.