

عنوان مقاله:

Mechanistic Study of Effect of Ultrasonic Radiation on Asphaltenic Crude Oils

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نویسندگان:

Seyed Mohammadreza Mousavi - *Ph.D Candidate, Department of Petroleum Engineering, Shahid Bahonar University of Kerman, Kerman, Iran*

Saeed Jafari - *Associate Professor, Department of Petroleum Engineering, Shahid Bahonar University of Kerman, Kerman, Iran*

Mahin Schaffie - *Professor, Department of Petroleum Engineering, Shahid Bahonar University of Kerman, Kerman, Iran*

Saeid Norouzi Apourvari - *Assistant Professor, Department of Petroleum Engineering, Shahid Bahonar University of Kerman, Kerman, Iran*

خلاصه مقاله:

Ultrasonic irradiation is a new, economic, and environmentally friendly technique for treating asphaltene aggregation in petroleum industry. In this study, the effect of ultrasonic radiation on asphaltene formation is investigated using conventional optical microscopy, viscosity measurement, and Fourier-transform infrared spectroscopy (FTIR). To this end, five crude oil samples, collected from different reservoirs, are used, and the effect of ultrasonic radiation on the structure of the crude oils is investigated at various exposure times. The results show that, at an optimum radiation time, the ultrasonic waves can break the asphaltene clusters and shift the size distribution of the asphaltene aggregate to a smaller size. In addition, the FTIR analysis reveals structural changes in the composition of the crude oil after the ultrasonic irradiation. By increasing the ultrasound exposure time, the viscosity of the asphaltenic oil first decreases to a minimum before rising again. Moreover, the measurement of asphaltene and resin content of the crude oils indicates that at exposure times longer than the one leading to the minimum viscosity, resin molecules are broken upon exposure to ultrasound. This can be the main reason for the existence of an optimum time in the application of ultrasonic radiation, after which the percentage of asphaltene particles and the viscosity of the crude oils .increase

کلمات کلیدی:

Ultrasonic waves, Asphaltene, resin, FTIR, Crude Oil

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