

CHARACTERIZATION AND APPLICATION OF PETROLEUM SULFONATE SYNTHESIZED BY GAS-PHASE SO₃ SULFONATION IN ROTATING PACKED BED

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Abstract

In this study, PS was synthesized by gaseous SO₃ sulfonation of distillate oil in a rotating packed bed. The chemical compositions of the prepared PS and its raw material (distillate oil) were obtained by the combined analysis of the double-bond equivalent and carbon number at the molecular level. In addition, the EOR performance of PS has been studied by measuring surface tension, interfacial tension (IFT), wettability alteration and core-flooding experiments. An ultra-low IFT value 1.327×10^{-3} mN/m between the crude oil and prepared PS solution was obtained at the critical micelle concentration (CMC) of PS solution. Core flooding experiments showed that additional oil recoveries of 28.10% and 30.77% were obtained at PS concentrations of 0.3% and 0.6% respectively after conventional water flooding, indicating the prepared PS has good performance on EOR.

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