

Synthesis and characterization of sodium sulfosuccinates of dodecyl ethoxylates for chemical enhanced oil recovery (EOR) application

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Surfactant flooding as enhanced oil recovery (EOR) technology is considered the most practical technology to increase oil production because rising cost of oil. The principle of surfactant flooding is to extract the capillary-trapped residual oil by reducing the interfacial tension (IFT). Under the reservoir condition, surfactant solution should be formulated to form the microemulsion middle phase with minimum IFT. The practice is to customize the chemical formulation by targeting the hydrophilic-lipophilic balance (HLB) for a specific oil reservoir. In this study, double tail surfactants were prepared as low-HLB components to be mixed with single-tail surfactants. Linear or branched dodecyl ethoxylates with EO numbers, 4 to 7, were synthesized to sodium sulfosuccinates, and the effect of surfactant structure on HLB was examined. With an increase in EO number, the surfactant showed increasing hydrophilicity. Branched-tail surfactants exhibited lower HLB compared to the linear-tail counterparts. The mixed surfactants exhibited tunable properties in HLB and for high-temperature reservoir.