

عنوان مقاله:

Enhanced Oil Recovery by using AMPS in Water-soluble Acrylamide-Based Terpolymers

محل انتشار:

سومین کنفرانس بین المللی رویکردهای نوین در نگهداشت انرژی (سال: 1392)

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خلاصه مقاله:

Acrylamide (AM) terpolymers comprising two of 2-acrylamido-2-methylpropane sulfonic acid (AMPS), 1-Vinyl-2-pyrrolidinone, and Sodium Vinyl Sulfonate (SVS) comonomers were synthesized by free radical polymerization in inverse emulsion media. Hydrogen nuclear magnetic resonance and Fourier transform infrared were used to investigate formation of terpolymers. Polymer particles with diameters of about 500 nm were formed according to the results of dynamic light scattering and scanning electron microscopy. Higher thermal stability of the synthesized polymers was also confirmed by thermogravimetric analysis results. Rheometrical analysis in deionized and saline water at 30 and 90 °C has been carried out by preparing of aqueous solutions of synthesized polymers. Results showed that AMPS-containing terpolymers are more viscose and thermally resistant compared to the other two comonomers. This is mainly on account of the sulfonic ionic groups which increase the distance between polymer chains because of electrostatic repulsion and finally results in higher viscosity. Increasing salinity acts against this phenomenon, because of the screening effect of cations and anionic sulfonated groups which effectively returns the charge balance and finally results in a lower viscosity. Similarly, higher temperatures weaken the hydrogen bands between polymer chains and water and consequently increase the polymeric chain mobility and the possibility of their coiling. Finally, AM/AMPS/SVS terpolymer was used in porous media experiment and resulted in an enhanced oil recovery. Results showed that this terpolymer is more appropriate in oil recovery compared with water injection method.

کلمات کلیدی:

Acrylamide, AMPS, Inverse emulsion, Enhanced oil recovery

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