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PROCESS AND PRODUCT TECHNOLOGY

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acrylamide alkane sulfonic and hydrophobic associating copolymers were synthesized by inverse copolymerization. Effects of hydrophobic content, polymer concentration, salinity and surfactant on rheological behavior of copolymers were investigated and the conformation of polymers in solution was studied by means of environmental scanning electronic microscopy and dynamic light scattering. The experimental results showed that in the dilute regime the hydrophobic parts could interact intramolecularly, while in the regime where the polymer concentration was higher than the critical association concentration, intermolecular hydrophobic association became predominant. Within the limit of the solubility, the critical association concentration of the polymer decreased with the increase of the salinity. The experimental results of the solution conformation indicated the presence of the three dimensional network structure in distilled water and the size of the mesh varied with the polymer concentration. In field solution, above the critical association concentration, an increase in polymer concentration enhanced the intermolecular association and also enlarged the hydrodynamic radius. It would result in the improvement of the thickening power of polymers.

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Abstract

Synthesis and Solution Properties of Hydrophobic Associating Polymers

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Abstract Acrylamide/2-acrylamido-alkane sulfonic acid/hydrophobic associating copolymers were synthesized by inverse copolymerization. Effects of hydrophobic content, polymer concentration, salinity and surfactant on theological behavior of copolymers were investigated and the conformation of polymers in solution was studied by means of environmental scanning electronic microscopy and dynamic light scattering. The experimental results showed that in the dilute regime the hydrophobic parts could interact intramolecularly, while in the regime where the polymer concentration was higher than the critical association concentration, intermolecular hydrophobic association became predominant. Within the limit of the solubility, the critical association concentration of the polymer decreased with the increase of the salinity. The experimental results of the solution conformation indicated the presence of the three dimensional network structure in distilled water and the size of the mesh varied with the polymer concentration. In field solution, above the critical association concentration, an increase in polymer concentration enhanced the intermolecular association and also enlarged the hydrodynamic radius. It would result in the improvement of the thickening power of polymers.

Key words hydrophobic associating copolymer; acrylamide; alkane sulfonic acid; surfactant

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