

Influence of hydrophobe content on the solution rheology of hydrophobically modified terpolymer of SO₂, N,N-diallyl-N-carboethoxymethylammonium chloride

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ABSTRACT

Rheol. properties of hydrophobically modified copolymer of SO₂, N,N-diallyl-N-carboethoxymethylammonium chloride and the hydrophobic monomer N,N-diallyl-N-octadecylammonium chloride were studied. The influence of hydrophobe content (HP) and polymer concn. was studied. Polymers with HP content in the range 1.5-5% were examd. and the concn. was varied in the range 2-5 wt%. Both dynamic and steady-shear expts. were performed in ARES rheometer. Copolymers were obsd. to exhibit typical viscoelastic behavior even with low HP content. Both the dynamic viscosity, \mathbf{h}' and storage modulus, \mathbf{G}' , increase with the increase of both the polymer concn. and the HP content of the system. The viscosity of the high HP content polymer showed a strong shear dependency, while \mathbf{G}' was a weak function of frequency and gel-like behavior was obsd. The zero-shear viscosity, \mathbf{h}_0 , showed a strong concn. dependency (\mathbf{h}_0 .apprx. $\mathbf{f a}$; $1.1 < \mathbf{a} < 5.9$). The concn. dependency of \mathbf{h}_0 suggests that intermol. assocn. is dominant in the high HP content polymer. Control of the HP content and polymer concn. of this class of polymers can lead to a wide range of interesting rheol. properties.