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

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European Polymer Journal (2005), 41(10), 2472-2482.

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, η' and storage modulus, 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 G' was a weak function of frequency and gel-like behavior was obsd. The zero-shear viscosity, η_0, showed a strong concn. dependency (η_0 .apprx. ϕ^{α}; $1.1 < \alpha < 5.9$). The concn. dependency of η_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.