

Influence of hydrophobe content and salt concentration on dilute solution behaviour of hydrophobically modified ionic polymers from diallylammonium salts/sulfur dioxide cyclocopolymerization: Light scattering and fluorescence spectroscopy.

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Abstract

Novel hydrophobically modified polyelectrolytes were synthesized using the cyclocopolymerization of sulfur dioxide, N,N-diallyl-N-carboethoxymethylammonium chloride and the hydrophobic monomer N,N-diallyl-N-octadecylammonium chloride. Aggregation of these polymers in aqueous solutions was characterized in the dilute regime by static light scattering and fluorescence spectroscopy as a function of hydrophobe content and NaCl concentration. Copolymers were observed to associate at very low concentrations (0.005 wt%). The copolymer is capable of association at this very low polymer concentration because of the extended length of the hydrophobic monomer (C18) that can reach far enough from the backbone to avoid electrostatic repulsion. Aggregation of the polymers increased with increasing hydrophobe content. Upon addition of salt, the apparent molecular weight of polymer aggregates decreased as a result of neutralization of the charges. At high salt concentrations, the size of the polymer aggregates was observed to increase again as a result of increased polarity of the solvent that resulted in more hydrophobic association.