

THE EFFECT OF ADDED SURFACTANT ON TEMPERATURE-INDUCED EMULSION GELATION

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It has been previously demonstrated that poly (N-isopropyl acrylamide-co-polyethylene glycol methacrylate) copolymers are able to confer temperature-induced gelation to emulsions and latexes. This phenomenon could have significant implications for a number of areas, including enhancing emulsion stability and controlled release. However, for this to be true, it is necessary to understand the effect that added surfactant has upon temperature-induced gelation. This is because anionic surfactants are often present in emulsion and latex formulations. In this seminar the effect of added surfactant on the attenuation of the temperature responsive behaviour for emulsions is discussed. For this purpose, phase diagrams and rheological measurements are presented for emulsions as the surfactant concentration is varied. The data are compared with measurements carried out for the same systems in which no surfactant was added. Added anionic surfactant has a considerable attenuating effect due to enhanced electrostatic repulsion between dispersed droplets which reduces the tendency for network formation via droplet-droplet contacts.

The molecular bases for temperature-induced emulsion gelation is considered in terms of a mathematical model based on rubber elasticity. The model presented provides a good description of the temperature-induced gelation and provides insight into the roles of copolymer structure and added surfactant.