

Cleaning of Polymer Colloids

J Hearn. Dept. Chemistry & Physics Nottingham Trent University.

Polymer latex particles, even when prepared under surfactant-free conditions, contain impurities arising from initiator decomposition products, residual monomer and possibly aqueous phase polymer. A wide range of techniques suitable for cleaning colloids have been applied to the problem with varying degrees of success. The cleaning process should be capable of removing impurities from the bulk polymer phase and the aqueous suspending medium as well as those associated with the particle /water interface, without affecting the true nature of the colloid eg. particle size, nature and concentration of the surface groups and polymer morphology. Where apparently identical preparative procedures used by different workers have produced latices with differing surface characteristics then differences of detail in the cleaning procedure employed are a probable cause.

This paper reviews the current position on the advantages, disadvantages and theoretical backgrounds to the use of dialysis, hollow-fibre dialysis, diafiltration, microfiltration, ultrafiltration, serum exchange, centrifugation/decantation, ion-exchange, activated charcoal cloth, steam stripping and gel filtration. The success of the cleaning process is obviously important where the latex particles are to be used as model colloids eg. in fundamental, often academic, studies of interactions between particles and between particles and substrates. Filtration techniques also have further industrial applications in removing latex from waste water streams for pollution control, in concentrating latex and its recovery as a valuable product, in addition to latex purification.