Miniemulsion and Emulsion Polymerisations Stabilised by Solid Particles

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Abstract

The phenomenon of solid particles stabilising an interface has been known for a century and has been coined as Pickering stabilisation. The adhesion of particles at liquid-liquid or liquid-gas interfaces can be used as an assembly tool to fabricate supracolloidal structures, in which the interface acts as a template. We have developed a Pickering miniemulsion polymerization method which allows us to fabricate armoured polymer latexes.

We used nano-sized Laponite clay discs, with dimensions of approximately 25 nm by 1 nm as a stabilizer in Pickering miniemulsion polymerization. This system allows control of latex particle size.

Other nano-sized stabilisers can be used instead of Laponite clay discs. We recently used colloidal silica nanosols. We report now that we can use these stabilizers in a conventional emulsion polymerization procedure to fabricate armoured polymer latexes, omitting the need for pre-emulsification. We propose a combination of hetero-coagulative nucleation and Pickering stabilisation to explain our findings.