Thixotropic Behaviour of Laponite-Stabilised Emulsions

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The flow behaviour of oil-in-water emulsions stabilised by laponite particles has been investigated. Laponite dispersions at moderate salt concentrations and high pH are thixotropic. The particles cluster in micron-sized domains that associate together into large fractal superstructures. Shearing disrupts the structure, causing a fall in viscosity. The structure slowly recovers, however, once the dispersion is at rest. The influence of incorporating oil droplets (tens of micrometres in size) into the particle network was investigated using rheology and confocal fluorescence microscopy. The results show that there is a complex interplay between the effect of the drops on the structure build-up and breakdown under shear.

(a) Photo of laponite-stabilised oil-in-water emulsion. (b) Confocal fluorescence microscope image of emulsion. The laponite particles were stained with a fluorescent dye. (c) Transient stress response of emulsion under steady shear.