

The Role of Water in the Stability of Various Non-Aqueous $\text{CaCO}_3(s)$ Colloid-Surfactant Systems

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Four non aqueous $\text{CaCO}_3(s)$ colloids varying in metal ratio and total base number are placed in a water saturated environment and studied via Infra Red Spectroscopy over 4 weeks. Colloid 1 is stabilised by surfactant A and colloids 2, 3 and 4 by surfactant B. A continual uptake of water is observed for all samples. The infra red spectrum for colloid 1 displays that this uptake is accompanied by a shift to lower frequencies of the sulphur-oxygen bond peak and for colloid 4 we witness a similar shift in the $\text{CaCO}_3(s)$ peak. These findings demonstrate the complexing of water with the sulphonic acid and the $\text{CaO}_3(s)$.

In a similar experiment, the colloids and surfactants mentioned above, along with some of there mixtures were split into wet and dry fractions and a comparison of the stability made over a 4 week period using a visual test and Dynamic Light Scattering. The experimental systems used are, unmixed colloids and surfactants, colloid colloid mixtures (Colloid 1 with 2, 3 and 4), a surfactant A with surfactant B mixture and colloid-surfactant mixtures (Surfactant A with colloids 2, 3 and 4 and surfactant B with colloid 1).

Some minimal aggregation of all samples is visually witnessed whilst Dynamic light scattering results demonstrate the instability of wet unmixed surfactant B, wet colloid 4 and wet colloid 3 with added surfactant A. The dry analogues of these samples are stable demonstrating that water plays a role in the non stable behaviour of these samples.