

# Microgels and Core-Shell Particles for Controlled Release

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In this lecture examples of two types of structures will be described which may be utilised for controlled and triggered release of active molecules.

The first type is microgel particles, where the uptake and release is controlled by the diffusion of these species onto and out of the microgel interior. This in turn depends on the cross-link density of the microgel particles (which controls their maximum extent of swelling) and the affinity between function groups within the microgel and the active molecules. Examples will be given of the uptake and release of: (i) cationic surfactants into and from anionic and amphoteric microgel particles, using pH as a trigger [1,2]; (ii) anionic surfactants into and from cationic microgel particles using light as a trigger [3].

The second type is core-shell particles, where triggered release may be affected by the rupture of the shell. This will be exemplified here by systems having a silicone oil type core and a silica-like shell. Methods of preparation of such systems will be discussed as well as their characterisation. A method for estimating the strength of the shells with regard to applied pressure will be described. It will be shown that there is a direct correlation between the strength of the shell and its thickness [4].

## **References:**

- [1] V. Neraisuri, J.L.Keddie, B.Vincent and I.A. Bushnak, *Langmuir*, 2007 **60** 646-650.
- [2] M. Bradley, B.Vincent, G. Burnett, *Colloid Polymer Sci*, 2009 **287** 345-350.
- [3] M. Bradley, B.Vincent, N. Warren, J. Eastoe and A. Vesperinas, *Langmuir*, 2006 **22** 101-105.
- [4] M. O'Sullivan, Z. Zhang and B. Vincent, *Langmuir*, 2009, in press