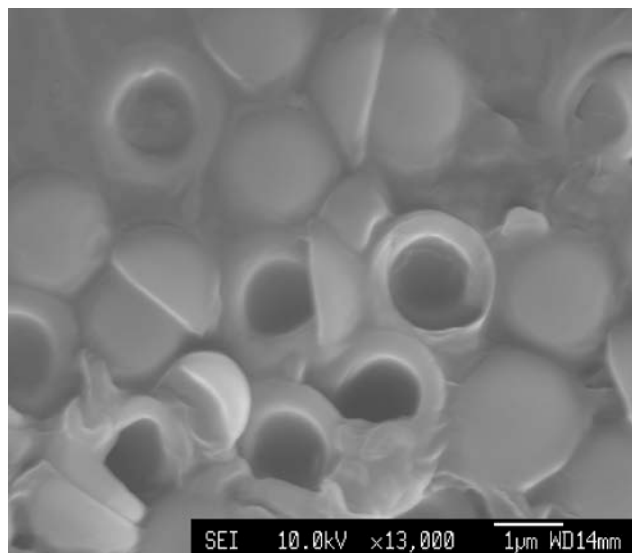


Liquid Core – Silica Shell Microcapsules

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We have prepared microcapsules, up to a several μm in diameter with a liquid core, which may be oil or water, and a solid, silica-like shell, by an interfacial polymerisation route. To this end we start with either an oil-in-water or a water-in-oil emulsion, as appropriate, having the required droplet size, and carrying out a condensation polymerisation reaction at the interface between tetraethoxysilane (more soluble in the aqueous phase) and a suitable alkylethoxysilane (more soluble in the oil phase). The shell thickness may be controlled, either by controlling the concentrations of the two monomers used, or by controlling the reaction time. In the case of the water-in-oil emulsions this method leads to microcapsules with a water core, but dispersed in the oil used to prepare the original emulsion. However the continuous phase may be changed to water, by, for example, centrifuging the microcapsules dispersed in the upper oil phase down into a lower aqueous phase beneath.

The mechanical properties (e.g. the breaking force) of the microcapsules have been measured using the micromanipulator method of Prof Zhang, at Birmingham University. Indeed, one use of microcapsules of this nature is in controlled release applications, where release is triggered by their mechanical rupture.

References:

- 1) Silica-Shell / Oil-Core Microcapsules with Controlled Shell Thickness and their Breakage Stress. M.O’Sullivan, Z.Zhang and B.Vincent, *Langmuir*, 2009 **25** 7962-7966.
- 2) Aqueous Dispersions of Silica Shell / Water Core Microcapsules. M.O’Sullivan and B.Vincent, *J. Colloid Interface Sci.*, 2010 **343** 31-35.