

Amgen Seminar Series in Chemical Engineering  
in  
Cherry Auditorium, Kirk Hall, 1 PM

**Presents on December 2, 2010**

**SUPRAMOLECULAR PATHS FOR THE SYNTHESIS OF COMPOSITE HOLLOW PARTICLES**

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Hollow and porous micro/nanostructures are of great interest in many current and emerging areas of technology; their interior space can be used for storage, or a reaction chamber that can encapsulate various substances, and the shell structure contains paths affording control release systems. As a result these materials have had great impact in many technological areas such as the encapsulation and controlled release of substances (e.g., drugs, genes, dyes, inks, cosmetics, pesticides, food stuffs), protection of biologically active species, removal of pollutants, catalysis, and sensing.

Hollow silica nanospheres were synthesized using a two-step sacrificial templating technique. The template used consisted of equilibrium catanionic vesicles formed from mixtures of Cetyltrimethylammonium Bromide (CTAB) and Sodium Perfluorooctanate (FC7). Tetramethoxysilane (TMOS) under acid conditions was used as the precursor for the formation of the hollow silica spheres. The acidic pH conditions do not offer an operating window that prevents homogeneous nucleation and gel formation of the silicate species in the bulk. We find that by introducing a second processing step, under conditions close to the Stöber synthesis, we can minimize the gel in the bulk. This second step, leads to the rapid condensation of the free silicate species resulting in two distinctly different particle sizes: (a) hollow silica shells with an average diameter in the range of 80-100nm; and (b) solid silica beads with an average diameter in the range of 500-600nm.

This series at the University of Rhode Island is made possible through the generosity of Amgen, West Greenwich, R.I.