# PARTICLE SIZE CONTROL IN NANOPOROUS SILICA AND ALUMINA THROUGH THE USE OF CO-SURFACTANTS.

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It has already been shown that nanoparticle shape and form often determines their function and utility, with extreme changes in physico-chemical properties.[1] Ordered Mesoporous materials with amorphous walls, are a family of nanoporous solids with several extremely attractive features for hosting molecules of various shapes, sizes and functionalities.[2] High surface area materials are most important in catalytic applications where a high contact area between reactants and catalyst is necessary in order to maintain high yields at low cost. Mesoporous materials offer extremely high surface areas, typically above 1000 $m^2/g$.
Mesoporous silica morphologies that have been obtained include fibers, toroids, spiral shapes, discoids, gyroids, hollow and solid spheres.[3] Control of morphology in mesoporous materials is thought to be governed by kinetic effects, where the self-assembly of surfactant molecules and nucleation processes occur simultaneously as a result of the hydrolysis of the silica source, usually tetraethyl orthosilicate (TEOS), into small silicate oligomers. In turn the particle growth process is dominated by the condensation of these oligomers. [4]
Control of morphological features in mesoporous alumina is complex and is highly dependent on the alumina source and its hydrolysis history (temperature, pH etc.). For most applications control of morphological features in mesoporous alumina is obtained through physical means, for example through extrusion of the synthesis gel.
In the present study we attempt to control the growth of silicate and alumina mesoporous materials directly in the synthesis gel by addition of dispersants in the form of "*non-interacting*" co-surfactants. The structural, porous and morphological properties of mesoporous materials prepared and their characterization is discussed.

**REFERENCES:**

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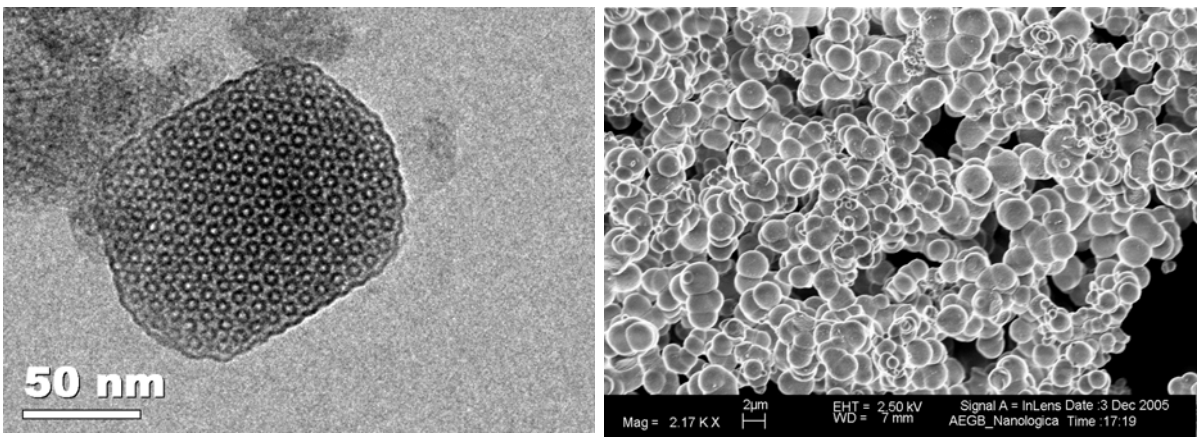
**Figures:**




*Typical TEM image of cubic structured mesocaged silica (left) and SEM of mesoporous alumina (right) nanoparticles prepared through addition of co-surfactants.*