

Abstract Submitted  
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**Tunable Nanoparticulate Scaffolds from Self assembly in Surfactant Mesophase** K.P. SHARMA, K. GURUSWAMY, NCL, Pune, India, O. MONDAIN-MONVAL, CRPP, Pessac, France, V.K. ASWAL, BARC, Mumbai, India — We examine the organization of silica nanoparticles in non-ionic surfactant, C<sub>12</sub>E<sub>9</sub>/water, H<sub>1</sub> phase. We show, using SAXS, TEM, Freeze Fracture and Microscopy, that particles with sizes smaller than the mesophase characteristic size,  $a$ , template the mesophase; particles with size  $\sim a$ , partition into a dispersed phase and into strand-like aggregates. Particles of size  $> a$  phase separate to form particulate strands organized into a scaffold. The particulate network forms by expulsion of particles from growing H<sub>1</sub> phase domains; particles are concentrated in the isotropic phase and jam at domain boundaries. Changing the cooling rate into the H<sub>1</sub> phase changes the nucleation of domains – hence providing a route to tune the network mesh size. When the surfactant is heated to the micellar phase, the particles redisperse readily. SANS confirms that C<sub>12</sub>E<sub>9</sub> forms a bilayer on the silica particles, preventing their irreversible aggregation. PEI coated particles (with size  $> a$ ) also phase separate to form networks. The network of such coated particles can be crosslinked to obtain a free standing nanoparticulate scaffold.

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