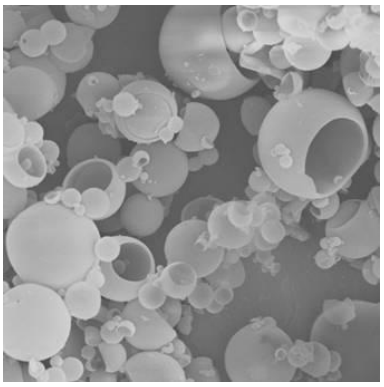
Colloidal ordering in liquid crystals

P. Poulin

Centre de Recherche Paul Pascal-CNRS, 33600 Pessac, France

poulin@crpp-bordeaux.cnrs.fr

We present results over the past six years on the behavior of colloidal particles in liquid crystals. The liquid crystal can mediate anisotropic interactions and direct the spatial ordering of the suspended particles. The observed phenomena can be theoretically understood by considering the presence of topological defects and elastic distortions of the liquid crystal around the particles. We show that these phenomena can play an important role in demixing systems and be used to produced monodisperse and aligned emulsions. We also discuss in this paper the effect of an electric field on liquid crystal inclusions. The distortions around the particles can be modified and, in contrast with classical electro-rheological fluids, colloidal inclusions can be stabilized in directions along which they repel each other. These distinctive features may offer an opportunity for creating novel field responsive fluids. Finally, we will present results on the use of liquid crystals as templates to grow nanostructured mineral particles. We show preliminary experiments dealing with the synthesis of mesoporous capsules in liquid crystal droplets.



Mesoporous mineral capsules grown in liquid crystal droplets