**Magneto-responsive surfactants: from self-assembling to single atom mesoporous materials**

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Magneto-responsive surfactants1 gathered increasing attention and were already used to design several molecularly organized systems such as magnetic micelles or microemulsion or to magnetize DNA. Due to their unique magnetic-responsiveness, the self-assembling mechanism in out-of-equilibrium systems can be accurately investigated as well as the composition and the distribution of surfactants between the self-assembled systems and the aqueous bulk. This was demonstrated on paramagnetic vesicles formed from ion pairs of iron-containing magnetic surfactants4. Moreover, magneto-responsive surfactants can be used for material design.5 In this context, it will be firstly presented the structuring and the magnetization of hexagonally ordered mesoporous silica2. Then it will be shown that magneto-responsive surfactants combined with solid lipid nanoparticles (SLNs) can be used as colloidal tools for meso-macroporous supported catalyst3. Catalytic performance in a Fenton-like reaction will be than evaluated for methylene blue degradation using single iron catalyst or iron oxide nanoparticle supported on silica.

***Keywords: Magnetic surfactant, Vesicle, Spin crossover, Mesoporous silica, Catalysis***

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