

## Metallomicelle directed catalytically active nanoparticles/nanostructures

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Tailoring the colloidal or soft matter assembly is a feasible route to fabricate nanostructures with predefined architecture which is highly desirable to nanoscience but not easily achievable. We demonstrate that metallosurfactants are excellent scaffolds for surface engineered catalytically active NPs, providing a handle to modify the particle surface selectively by altering the capping mode i.e. electrostatic or steric. Binding with the preferred capping agent or ligand (amines or carboxylates) alters the nanoparticle dispersibility (aqueous or non-aqueous), accordingly. Moreover, metal ions assist the metal amphiphile to produce various metallomicellar structures by virtue of self-aggregation governed by electrostatic interactions and lewis acidity, ultimately leading to a variety of nanostructures. With different metal ions and metallomicelles, morphologies from spherical to capsule like and size from  $\approx 8$  to 50 nm is observed. Combination of light scattering and electron microscopy clearly reveals the morphological relationship between metallosurfactant self assemblies and metallic nanostructures fabricated. The synthesized NPs show good performance towards nitroaromatic conversion reactions due to smaller size and inherent catalytic activity [1,2]. Benefitting from metallosurfactant interactions occurring *insitu*, this self assembly approach can be generalized to get tunable surface modified nanostructures from inorganic precursors for various potential applications.

1. Ravneet Kaur, Cristina Giordano, Michael Gradzielski, S.K. Mehta, Synthesis of Long-Time Stable, Water Dispersible Copper Nanoparticles as Catalysts for Nitrobenzene Reduction, *Chem.-Asian J.* **9** (2014) 189-198.
2. Ravneet Kaur, S.K. Mehta, "Self aggregating metal surfactant complexes: Precursors for nanostructures" *Coord. Chem. Rev.* **262** (2014) 37-54.