

## What are the potential applications of the 'reverse micelle' technique in coatings technology?

The nanoparticles in the reverse micelles are almost monodisperse and are thermodynamically stabilized by the surfactant. Hence reverse micellar technique provides an opportunity to the coating technologists to synthesize nanophase additives in-house as intermediates to be used in the coating formulation to impart certain properties or functions. There is a possibility that the correctly formulated reverse micellar colloid itself, after completion of the particle formation process, can be used as an additive in the solvent based paints.

For water based systems, the solvent based reverse micelles can be converted into the water compatible dispersions with the alternative solvents. This can be achieved by removing the original solvent with vacuum and re-dispersing the particles in another medium or water with the aid of ultrasonic energy. The particle size may not change significantly as the particles are already stabilized.

The materials and methodology adopted for this purpose has to be such that:

- Inherent stability of reverse micelles is used advantageously
- Easy dispersibility of the reverse micellar colloids is gainfully used in the coatings system
- The deleterious effects of the other materials of the precipitation reaction are avoided viz. water, solvent, surfactant and the by- products. Typically the water and solvent may not pose any serious problem. However, the issue of surfactants and byproducts of the precipitation reactions needs to be addressed by careful choice of the reactants.

Following examples can be considered to generate innovative strategies for nanoparticle synthesis for coatings:

- Silver nanoparticles for hygienic coatings
- Phosphate salts of various metals as nano anticorrosive pigments

- Metal oxides to improve hardness of wood finishes.
  - Metal oxides as UV absorbers
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