

## **FORMATION AND CHARACTERIZATION OF SILVER NANOPARTICLES IN DMF WITH SHAPE CONTROL**

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Spherical and anisotropic silver nanoparticles were synthesized by reduction of silver salt by N,N-dimethylformamide (DMF), which also acts as the solvent, in the presence of different stabilizers. It was observed that while the absence of stabilizer led to the formation of nanostructured thin films, the presence of either oxide precursors (3-aminopropyltrimethoxysilane, APS, and titanium tetrabutoxide, TOB) or a polymer (poly(vinylpyrrolidone)) produced the formation stable dispersions of silver nanoparticles. In the case of APS and TOB, a thin and porous shell of silica and titania, respectively, was formed on the nanoparticle surface. The porosity of the shell allows the manipulation of the chemical nature of the core to obtain new composite materials. PVP was not only capable to stabilize silver nanoparticles but it could also induce the formation of spherical or anisotropic silver nanoparticles depending on the silver salt concentration, PVP concentration and reaction temperature.

It was observed that the optical properties of the silver nanoparticles are highly influenced by the shape of the particles. While spherical particles only display a surface plasmon band, the anisotropic silver nanoparticles show different plasmon bands due to the different surface plasmon resonances. While the optical properties of spherical nanoparticles can be explained through the simple Mie theory, the modelling of anisotropic particles requires use of the DDA approximation.