

# **Influence of different synthesis approach on doping behavior of silver nanoparticles onto the iron oxide-silica coreshell surfaces**

## **Abstract**

Silver (Ag) nanoparticles with the crystallite size ranging from 13-24 nm were successfully doped onto the surface of iron oxide-silica coreshell particles. In the process, iron oxide particles having a size distribution within 8-19 nm were prepared by using a reverse co-precipitation method followed by the formation of iron oxide-core with silica shell (with 50-150 nm diameter of silica spheres) by using a modified Stöber method. The reduction of Ag ions was done at room temperature in a solution containing polyvinylpyrrolidone and ethanol by using mechanical and ultrasonic mixing. Four different synthesis approaches were used in doping of Ag nanoparticles. The phase, morphology, optical and magnetic properties of the synthesized powders were characterized by using X-ray diffraction, scanning electron microscope (SEM), transmission electron microscope, UV-visible spectrometer (UV-Vis) and vibrating sample magnetometer. Spherical morphology of the Ag nanoparticles was found to deposit on the iron oxide-silica surfaces. The particle size distribution is depending on the synthesis approach used. The UV-Vis absorption peak at 404-410 nm of wavelength confirmed the existence of the Ag nanoparticles