

Synthesis and Properties of Fluorescent and Magnetic Cobalt based on Silica Core/Shell Nanoparticles using Rhodamine 6G

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A simple and reproducible method was developed to synthesize a novel class of Co/SiO₂/dye/SiO₂ composite core/shell particles. Using a single cobalt core, rhodamine 6G of organic dye molecules was entrapped in silica shell, resulting in core/shell particles of ~ 200 nm diameters. Analysis using a variety of techniques like transmission electron microscopy (TEM), energy dispersive analysis of X-rays (EDAX), X-ray photoelectron spectroscopy (XPS), and fluorescence intensity (FI) indeed proves that dye molecules are trapped inside the core/shell particles. Photoluminescence investigation shows that highly luminescent and photostable core/shell particles are formed. Such core/shell particles can be easily suspended in water. The obtained magnetic particles can be transfer-printed onto arrays of glass substrate using microcontact painting (μ CP) for a variety of applications such as bioassays or biosensor etc.