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Chitosan Functionalized Fe3O4@Au Core-Shell Nanomaterials for Targeted Drug Delivery

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Abstract : Chitosan functionalized Fe3O4-Au core shell nanoparticles have been prepared using a two step wet chemical approach using NaBH4 as reducing agent for formation of Au inethylene glycol. X-ray diffraction studies shows individual phases of Fe3O4 and Au in the as prepared samples with crystallite size of 5.9 and 11.4 nm respectively. The functionalization of the core-shell nanostructure with Chitosan has been confirmed using Fourier transform infrared spectroscopy along with signatures of octahedral and tetrahedral sites of Fe3O4 below 600cm-1. Mössbauer spectroscopy shows decrease in particle-particle interaction in presence of Au shell (72% sextet) than pure oleic coated Fe3O4 nanoparticles (88% sextet) at room temperature. At 80K, oleic acid coated Fe3O4 shows only sextets whereas the Chitosan functionalized Fe3O4 and Chitosan functionalized Fe3O4@Au core shell show presence of 5 and 11% doublet, respectively.

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