

Structure and heating efficiency of the porous silica coated magnetite nanoparticles

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In the present studies the microstructure and heating efficiency of the porous silica coated magnetite nanoparticles were investigated. The Fe_3O_4 samples were obtained by the co-precipitation process that involves a synthesis of the iron-oxide particles from the aqueous solutions of the Fe (II) and Fe (III) salts. The magnetite nanoparticles coated with the porous silica were produced by the modified Stöber process. The microstructure of both the silica-coated and non-coated powders was studied using the high resolution transmission electron microscopy. Furthermore, the XRD studies as well as the Mössbauer and Raman spectroscopies were used to analyze the phase constitution of the investigated samples. The XRD measurements were supported by the Rietveld refinement to determine the unit cell parameters and the average grain sizes of produced samples. The magnetic hyperthermia studies allowed to compare the specific loss power (SLP) for non-coated and silica-coated magnetite nanoparticles.