

Abstract Submitted
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Structural and Magnetic Properties of Multifunctional Gold, Silica, and C225 antibody triply coated Superparamagnetic Iron Oxide nanoparticles¹ GAN LIANG, Sam Houston State University, MARITES MELANCON, CHUN LI, University of Texas MD Anderson Cancer Center — In this study, extensive structural and magnetic characterizations have been carried out on the silica, gold, and C225 antibody triply coated iron oxide nanoparticles for image-guided laser ablation of head and neck tumors. X-ray absorption and x-ray diffraction results show the phase of the uncoated and coated nanoparticles to be in the γ -Fe₂O₃ structure. The nanoparticles are studied by transmission electron microscopy and it is found that these nanoparticles have an average diameter of 82 nm and contain 142 antibodies per nanoshell. The magnetization measured at 500 Oe indicates that coating of the iron oxide nanoparticles by silica/gold/C225 decreases blocking temperature from 160 K to about 55 K, which can be explained by the spin-disorder induced change in the effective volume of the γ -Fe₂O₃ core. The blocking temperature decreases from 95 K to 55 K with an increase of magnetic field from 100 Oe to 500 Oe. It is found that the coercivity of the triply coated nanoparticles decreases from 195 to 25 Oe with an increase of temperature from 5 K to 300 K.

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