Identification and characterization of silica-gold passivated iron nanoparticles

JIUNN-YUAN LIN, Institute of Physics, National Chiao Tung University, Hsinchu 300, Taiwan, ROC, W. C. CHEN, K. H. WEI, Department of Materials science, National Chiao TUNG University, Hsinchu 300, Taiwan, ROC, J. Y. TSAI, Institute of Physics, National Chiao TUNG University, Hsinchu 300, Taiwan, ROC, J. Y. HUANG, Department of Photonics, National Chiao TUNG University, Hsinchu 300, Taiwan, ROC, J. Y. JUANG, Y. S. GOU, Department of Electro physics, National Chiao Tung University, Hsinchu 300, Taiwan, ROC, J. M. LEE, J. M. CHEN, National Synchrotron Radiation Research Center, Hsinchu 300, Taiwan ROC — Metal nanoparticles are of current interest owing to the technological applications such as high density storage density and biological labeling, in addition to their novel physical properties. In this paper, Identification and characterization of silica-gold passivated iron nanoparticles are reported. The diameter of the iron nanoparticles is about 3 nm, and the thickness of the gold layer is 0.5 nm. X-ray absorption spectroscopy indicates pure iron cores, in contrast to the previous reported iron oxide formation in cores. Magnetic measurements suggest a superpara- to ferromagnetic transition at low temperatures for the present nanoparticles. This work was supported by National Science Council, Taiwan ROC, under contract NSC93-2112-M-009-015.

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