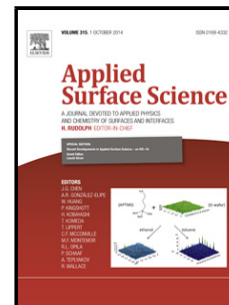


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Author: Marin Tadic Slavko Kralj Marko Jagodic Darko Hanzel Darko Makovec



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Magnetic properties of novel superparamagnetic iron oxide nanoclusters and their peculiarity under annealing treatment

Marin Tadic^{a,*}, Slavko Kralj^{b,c}, Marko Jagodic^d, Darko Hanzel^e, Darko Makovec^b

^aCondensed Matter Physics Laboratory, Vinca Institute of Nuclear Sciences, University of Belgrade, POB 522, 11001 Belgrade, Serbia

^bDepartment for Materials Synthesis, Jožef Stefan Institute, Ljubljana SI-1000, Slovenia

^cNanos Scientifcae d.o.o. (Nanos Sci.), Teslova 30, Ljubljana, Slovenia

^dInstitute of Mathematics, Physics and Mechanics, 1000 Ljubljana, Slovenia

^eJozef Stefan Institute, Jamova 39, Ljubljana, Slovenia

Abstract

The aim of this work is to present the magnetic properties of novel superparamagnetic iNANOvativeTM silicaTM nanoclusters. A TEM analysis showed that these nanoclusters, approximately 80 nm in size, contained an assembly of maghemite nanoparticles in the core and an amorphous silica shell. The maghemite nanoparticles in the core were approximately 10 nm in size, whereas the uniform silica shell was approximately 15 nm thick. The number of magnetic nanoparticles that were densely packed in the core of the single nanocluster was estimated to be approximately 67, resulting in a high magnetic moment for the single nanocluster of $m_{nc} \sim 1.2 \cdot 10^6 \mu_B$. This magnetic property of the nanocluster is advantageous for its easy manipulation using an external magnetic field, for example, in biomedical applications, such as drug delivery, or for magnetic separation in biotechnology. The magnetic properties of the iNANOvativeTM silicaTM

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