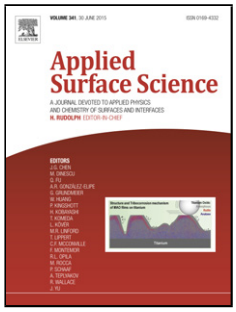

Title: New properties of Fe_3O_4@SnO_2 core shell nanoparticles following interface charge/spin transfer

Authors: C. Leostean, O. Pana, M. Stefan, A. Popa, D. Toloman, M. Senila, S. Gutoiu, S. Macavei

PII: S0169-4332(17)32267-5
DOI: http://dx.doi.org/doi:10.1016/j.apsusc.2017.07.267
Reference: APSUSC 36801

To appear in: *APSUSC*

Received date: 14-4-2017
Revised date: 26-7-2017
Accepted date: 28-7-2017

Please cite this article as: C.Leostean, O.Pana, M.Stefan, A.Popa, D.Toloman, M.Senila, S.Gutoiu, S.Macavei, New properties of Fe3O4@SnO2 core shell nanoparticles following interface charge/spin transfer, Applied Surface Sciencehttp://dx.doi.org/10.1016/j.apsusc.2017.07.267

New properties of Fe_3O_4@SnO_2 core shell nanoparticles following interface charge/spin transfer

C. Leostean[a], O. Pana[a,]*, M. Stefan[a], A. Popa[a], D. Toloman[a], M. Senila[b], S. Gutoiu[a], S. Macavei[a]

[a]*National Institute for R &D of Isotopic and Molecular Technologies, 67 – 103 Donat St., 400293, Cluj-Napoca, Romania*

[b]*INCDO-INOE 2000, Research Institute for Analytical Instrumentation, 65 Donat St., 400293 Cluj-Napoca, Romania*

*Corresponding author: e-mail: ovidiu.pana@itim-cj.ro,
Tel: + (40) 264 584037; Fax: + (40) 264 420042

Highlights

- Fe_3O_4@SnO_2 nanocomposite were prepared by seed mediated growth;
- The core-shell architecture formation was evidenced by XPS and Fourier analysis of HRTEM images;
- The influence of Fe_3O_4@SnO_2 amount on morphological, compositional, structural and optical properties was also discussed;
- Ordered magnetic moments are formed through a charge/spin transfer process;
- The interface processes in Fe_3O_4@SnO_2 nanocomposites are evidenced.

Abstract

The synthesis and properties of Fe_3O_4@SnO_2 core-shell nanoparticles are reported in the present paper. To form Fe_3O_4@SnO_2 nanocomposites (FeSn-Ox), the magnetite (Fe_3O_4) nanoparticles were covered with SnO_2 semiconductor through the use of the seeding method followed by a thermal treatment. XRD studies reveal that the synthesized composite nanoparticles contain mainly Fe_3O_4 and SnO_2 in different proportions depending on the preparation conditions. The composition of nanoparticles and their core-shell architecture were evidenced by XPS and confirmed by Fourier analysis of