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**New properties of Fe<sub>3</sub>O<sub>4</sub>@SnO<sub>2</sub> core shell nanoparticles  
following interface charge/spin transfer**

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**Highlights**

- Fe<sub>3</sub>O<sub>4</sub>@SnO<sub>2</sub> 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<sub>3</sub>O<sub>4</sub>@SnO<sub>2</sub> 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<sub>3</sub>O<sub>4</sub>@SnO<sub>2</sub> nanocomposites are evidenced.

**Abstract**

The synthesis and properties of Fe<sub>3</sub>O<sub>4</sub>@SnO<sub>2</sub> core-shell nanoparticles are reported in the present paper. To form Fe<sub>3</sub>O<sub>4</sub>@SnO<sub>2</sub> nanocomposites (FeSn-O<sub>x</sub>), the magnetite (Fe<sub>3</sub>O<sub>4</sub>) nanoparticles were covered with SnO<sub>2</sub> semiconductor through the use of the seeding method followed by a thermal treatment. XRD studies reveal that the synthesized composite nanoparticles contain mainly Fe<sub>3</sub>O<sub>4</sub> and SnO<sub>2</sub> 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

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