## Abstract Submitted for the MAR08 Meeting of The American Physical Society

Fe-Doped Sno<sub>2</sub> Powders Obtained By Sol-Gel Method, Mechanochemical Alloying, and Thermal Treatment JAIME OSORIO, ANA CALLE, JAILES BELTRAN, LUIS SANCHEZ, Universidad de Antioquia, LIL-IANA TIRADO, Universidad del Quindio, KIYOSHI NOMURA, University of Tokyo, CESAR BARRERO, Universidad de Antioquia, ESTADO SOLIDO TEAM, OPTOELECTRONICA TEAM, APPLIED CHEMISTRY SCHOOL OF ENGI-NEERING TEAM — The present work is aimed to investigate experimental conditions to obtain pure  $\operatorname{Sn}_{1-x}\operatorname{Fe}_x\operatorname{O}_{2-\delta}(x=0, 0.05, \text{ and } 0.1)$  powders by three methods: (1) sol-gel method, (2) mechanochemical alloying and (3) thermal treatment. In (1), different precursors were employed: mixtures of  $\operatorname{Sn}^{4+}$  and  $\operatorname{Fe}^{3+}$  or  $\operatorname{Sn}^{2+}$  and  $\operatorname{Fe}^{2+}$ . In (2), SnO<sub>2</sub> and  $\alpha$ -Fe or  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> were used as reactants. In (3), the Fe-doped  $SnO_2$  were obtained by mechanochemical milling and thermal treatment. All samples were characterized by X-Ray diffraction (XRD) using Rietveld refinement, Fouriertransformed infrared (FTIR) spectroscopy and room temperature <sup>57</sup>Fe Mössbauer spectrometry (MS). The XRD patterns of samples prepared by (1) showed only peaks of  $SnO_2$ . The MS showed ferromagnetic and paramagnetic signals. The samples obtained by (2) showed XRD peaks due to  $SnO_2$  (rutile). The MS revealed the presence of  $Fe^{2+}$  and  $Fe^{3+}$  states as well as  $\alpha$ -Fe or  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> due to the reactants. In the case of (3) was observed total incorporation of  $Fe^{3+}$  in the SnO<sub>2</sub> structure without presence of impurities.

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