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Preparation and Magnetic Properties of Transition-metal-doped SnO_2 JUN ZHANG , XINGZHONG LI, DAVID SELLMYER, Department of Physics and Astronomy and Center for Materials Research and Analysis, University of Nebraska, Lincoln, NE 68588, KIRAN MENDU, JING SHI, YONGFENG LU, Department of Electrical Engineering and Center for Materials Research and Analysis, University of Nebraska, Lincoln, NE 68588 — There is strong interest in the ferromagnetism (FM) at room temperature in doped oxides, e.g., Co or Fe doped SnO_2[1, 2]. We report the preparation and magnetic properties of transition-metal-doped SnO_2 ($Sn_{1-x}TM_xO_2$, TM=V and Mn, x=0–0.05). Bulk and thin-film samples were prepared by solid-state reaction and pulsed-laser deposition, respectively, and characterized by X-ray diffraction, electron microscopy and SQUID magnetometry. The magnetic properties strongly depend on the sample-processing temperature. Room-temperature FM has been observed in the bulk samples sintered at a low temperature of 500 °C, but not in those sintered or annealed at higher temperatures (650 °C and 900 °C for TM=V and Mn, respectively). Additional Sb-doping has no strong effect on the FM, while vacuum annealing enhances the FM. Effects of sample-processing conditions and additional Sb-doping on the magnetic properties will be discussed. This research is supported by ONR, NSF-MRSEC, W. M. Keck Foundation and CMRA. [1]. S. B. Ogale, et al., Phys. Rev. Lett. 91, 077205 (2003). [2]. J. M. D. Coey, et al., Appl. Phys. Lett. 84, 1332 (2004).

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