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Spin polarization of oxygen atoms in ferromagnetic Co-doped rutile TiO 2

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Abstract

Of central interest in the research of dilute magnetic semiconductors is the coupling mechanism leading to a ferromagnetic ground state. Using x-ray resonant magnetic scattering, we have analyzed the element specific magnetic hysteresis curves of Co, Ti, and oxygen in Co-doped Ti O2 synthesized by ion implantation. Magnetic dichroism was observed at the Co L2,3 edges, as well as at the O K edge, indicative of a spin polarization of oxygen atoms in the Ti O2 host matrix. The hysteretic shapes and the coercive field values measured at the Co L3 and O K edges are identical (1.9 kOe at 30 K). © 2006 American Institute of Physics.

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