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# 회보

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of  $\text{Ti}_{1-x}\text{Fe}_x\text{O}_{2-d}$  Thin Films PARK Young Ran, KIM Kwang

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Magnetic and electronic properties of Fe-doped anatase  $\text{TiO}_{2-d}$  thin films grown by a sol-gel method have been investigated by vibrating-sample magnetometry (VSM), conversion electron Mössbauer spectroscopy (CEMS), and Hall effect measurements. VSM measurements revealed that the anatase  $\text{Ti}_{1-x}\text{Fe}_x\text{O}_{2-d}$  films exhibit ferromagnetic behavior at room temperature for a certain range of  $x$ . CEMS spectra revealed that  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  ions coexist, substituting the octahedral  $\text{Ti}^{4+}$  sites. By appropriate Fe doping, the  $\text{Ti}_{1-x}\text{Fe}_x\text{O}_{2-d}$  films exhibited p-type character but the observed room-temperature ferromagnetism turned out to be independent of the hole concentration. The ferromagnetism in the present  $\text{Ti}_{1-x}\text{Fe}_x\text{O}_{2-d}$  films can be interpreted in terms of a direct ferromagnetic coupling between two neighboring  $\text{Fe}^{3+}$  ions via an electron trapped in oxygen vacancy.

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