

## **EPR study of Mn-implanted single crystal TiO<sub>2</sub>**

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### **Abstract**

Single crystals of manganese-implanted TiO<sub>2</sub> rutile have been investigated by electron paramagnetic resonance (EPR) technique at room temperature. ESR spectra have been interpreted to correspond to the transitions among the spin multiplet ( $S=3/2$ ) of the paramagnetic Mn<sup>4+</sup> ion. Characteristic six-line hyper-fine splitting of the ESR spectra resulting from the spin  $I=5/2$  of the Mn<sup>55</sup> nucleus has been observed. Analysis of EPR spectra shows that manganese in TiO<sub>2</sub> rutile host substitutes for Ti<sup>4+</sup> ions. Two equivalent Mn<sup>4+</sup> centers have been observed in the EPR spectra in correspondence with two equivalent octahedral positions of Ti ions in the rutile structure. Parameters of the crystal field of orthorhombic symmetry on the Mn<sup>4+</sup> centers have been obtained as result of computer modelling. © 2009 IOP Publishing Ltd.

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