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Magnetic properties of Ru-Ti doped Strontium hexaferrite nanocrystalline particles ABDEL ALSMADI, Kuwait University, S. MAHMOOD, University of Jordan, I. BSOUL, Al al-Bayt University — We carried out a systematic study on the effect of the substitution of Ti^{2+} and Ru^{4+} ions for Fe^{3+} ions on the magnetic properties of the strontium ferrite $\text{SrFe}_{12-2x}\text{Ru}_x\text{Ti}_x\text{O}_{19}$ nanoparticles with ($0 \leq x \leq 1$), using vibrating sample magnetometry, electrical resistivity, and Mössbauer spectroscopy. A clear irreversibility between the zero-field-cooled and field-cooled curves was observed below room temperature and the zero-field-cooled magnetization curves displayed a broad peak at a temperature T_M . These results were discussed within the framework of random particle assembly model and associated with the magnetic domain wall motion. The resistivity data show some kind of a transition from insulator to perfect insulator around T_M . With Ru-Ti substitution at 5 K, the saturation magnetization showed small variations were it slightly increased up to $x = 0.2$ and then starts to decrease for x between 0.2 and 0.5, while the coercivity decreased monotonically, recording a reduction of about 93% at $x = 0.4$. These results were discussed in light of the single ion anisotropy model and the cationic distributions based on the results of the Mössbauer spectroscopy data.

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