

Study of Structural and Electrical Properties of Arsenic Ferrites
International Journal of Materials Research, Vol. 3, pp. 313-321, March-2008.
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Abstract

The effect of inclusion of trivalent arsenic ions with increasing arsenic concentration on the structural, electrical and thermal properties of the system $\text{As}_x\text{Fe}_{3-x}\text{O}_4$ ($x = 0.2, 0.4, 0.6, 0.8$ and 1.0), synthesized at ambient temperature have been studied. Thermal measurements from room temperature to 1173 K and DC resistivity measurements with activation energy calculations were used for this purpose. Thermal measurements were carried out on these value added products. This investigation provides evidence for all compounds of the system. In particular: 1) They are stable up to 473 K and further only a small loss in weight was observed for the temperature range of 473 K – 1113 K , 2) In $\text{As}_{0.2}\text{Fe}_{2.8}\text{O}_4$, a strong exothermic peak was observed at around 561 K , which has been shifted to 541 K for AsFe_2O_4 , this shows the phase transition and sample crystallization. X-ray diffraction was used for characterization and DC resistivity measurement from room temperature to 623 K shows semi conducting behavior. The present work reveals that the incorporation of As^{3+} ions in the lattice of magnetite results in orthorhombic symmetry for arsenic composition $x=0.2$ to $x=1.0$.