

STRUCTURE AND MAGNETIC PROPERTIES OF $Gd_{1-x}Sr_xFeO_{3-\delta}$ COMPOUNDS

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Abstract — The perovskite type $Gd_{1-x}Sr_xFeO_{3-\delta}$ ($x = 0.0, 0.25, 0.5, 0.75$ and 1.0) system has been studied by X-rays, Mohr's salt analysis, and Mössbauer spectroscopy. From the results of X-ray diffraction measurement the structure of the $Gd_{1-x}Sr_xFeO_{3-\delta}$ system is orthorhombic with x values of 0.0, 0.25 and 0.5, and cubic with the x values of 0.75 and 1.0. Mössbauer spectra of $Gd_{1-x}Sr_xFeO_{3-\delta}$ have been taken at various temperatures ranging from 13 to 800 K. Analysis of Mössbauer spectra for this system demonstrated the existence of the mixed valence states of iron and the coordination state of Fe^{3+} and Fe^{4+} ions. The Néel temperature decreases linearly with Sr concentration, suggesting that the superexchange interaction for Gd-O-Fe link is stronger than that for Sr-O-Fe link.