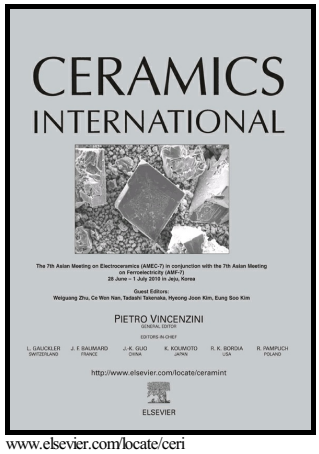

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The electrical, magnetic and ^{57}Fe Mössbauer studies of Al doped $PrFeO_3$ polycrystalline materials

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Abstract

The structural, electrical, magnetic and ^{57}Fe Mössbauer studies of sol-gel synthesized polycrystalline $Pr_{1-x}Al_xFeO_3$ (x= 0, 0.1, 0.2, 0.3, 0.4 and 0.5) samples are reported in this paper and the phase purity of the materials was confirmed from Rietveld refinement of XRD pattern. From the magnetization studies it is observed that the Al doping at Pr site changed the magnetic ordering of the systemat both room and low temperatures. The observed isomer-shift values from room temperature Mössbauer spectroscopy confirmed the charge state of the Fe ions and magnetic ordering in the compounds. Leakage current is observed to decrease with Al doping in the present work. From the leakage current density (J-E) measurements, it is observed that the space charge limited conduction (SCLC) dominates the conductionin lower and higher field regions for all the samples.

Keywords: *Rare-earth orthoferrites, Leakage current, Mossbauer spectroscopy*

Introduction

Recently, the rare earth orthoferrites ($RFeO_3$, R= Rare earth) have gained the attention of scientific community because of interesting technological applications and rich physics as well [1, 2, 3]. These belong to ABO_3 family, where A: Rare-earth element, and B: transition