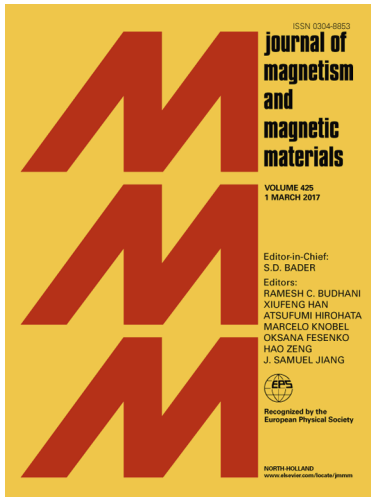

Research articles

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Impact of thermal oxidation on chemical composition and magnetic properties of iron nanoparticles

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Abstract

The main objective of this work is to study the influence of thermal oxidation on the chemical composition and magnetic properties of iron nanoparticles which were manufactured in a simple chemical reduction of Fe^{3+} ions coming from iron salt with sodium borohydride. The annealing processing was performed in an argon atmosphere containing the traces of oxygen to avoid spontaneous oxidation of iron at temperatures ranging from 200 °C to 800 °C. The chemical composition and magnetic properties of as-prepared and thermally-treated nanoparticles were determined by means of X-ray diffractometry, Raman spectroscopy, Mössbauer spectroscopy and vibrating sample magnetometry. Due to the magnetic interactions, the investigated iron nanoparticles tended to create the dense aggregates which