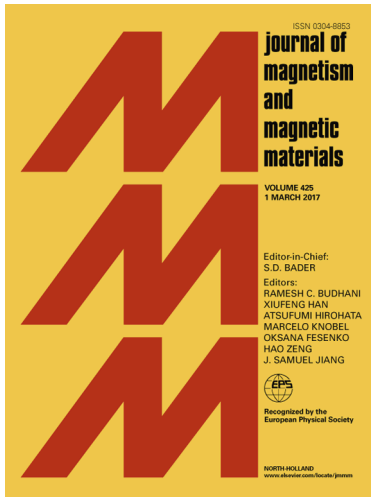

Structural and magnetic properties of $Sr_{0.8}La_{0.2}Co_{0.2}Fe_{11.8-x}Al_xO_{19}$ hexaferrite particles prepared via sol-gel auto-combustion method

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Structural and magnetic properties of $Sr_{0.8}La_{0.2}Co_{0.2}Fe_{11.8-x}Al_xO_{19}$ hexaferrite particles prepared via sol-gel auto-combustion method

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Abstract: M-type hexaferrite particles with chemical composition of $Sr_{0.8}La_{0.2}Co_{0.2}Fe_{11.8-x}Al_xO_{19}$ (x = 0.0, 0.2, 0.4, 0.6, 0.8, 1.0) were prepared using sol-gel auto-combustion technique followed by a heat treatment. X-ray diffraction patterns showed the presence of single hexaferrite phase with no detection of other phases for all samples. The atomic ratios obtained from energy dispersive X-ray spectroscopy were close to the initial stoichiometric ratios. The observation of the particles achieved using a field emission scanning electron microscope depicted a transition from multi-domain particles to single domain particles due to Al substitution. The room temperature Mössbauer spectral analysis demonstrated that Al^{3+} ions preferred 12*k* and 2*a* sites. DSC analysis showed that the Curie temperature (T_C) increased firstly to a maximum value of 707 K at x = 0.2, and then decreased