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Structural and magnetic properties of  $\text{Sr}_{0.8}\text{La}_{0.2}\text{Co}_{0.2}\text{Fe}_{11.8-x}\text{Al}_x\text{O}_{19}$  hexaferrite particles prepared via sol-gel auto-combustion method

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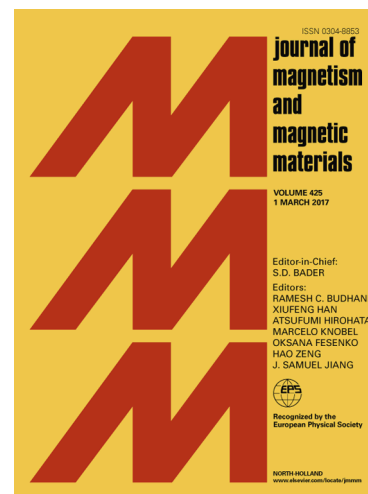
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 $\text{Sr}_{0.8}\text{La}_{0.2}\text{Co}_{0.2}\text{Fe}_{11.8-x}\text{Al}_x\text{O}_{19}$  hexaferrite particles prepared via  
sol-gel auto-combustion method

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**Abstract:** M-type hexaferrite particles with chemical composition of  $\text{Sr}_{0.8}\text{La}_{0.2}\text{Co}_{0.2}\text{Fe}_{11.8-x}\text{Al}_x\text{O}_{19}$  ( $x = 0.0, 0.2, 0.4, 0.6, 0.8, 1.0$ ) 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  $\text{Al}^{3+}$  ions preferred  $12k$  and  $2a$  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

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