

Effect of Nd^{3+} doping on magnetic and dielectric properties of $\text{SrFe}_{12}\text{O}_{19}$ hexaferrite synthesized by coprecipitation method

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Magnetic and dielectric properties of hexagonal ferrites important for applications in microwave absorbers are strongly determined by the processing conditions. We studied the dielectric and magnetic response of $\text{Sr}_{1-x}\text{Nd}_x\text{Fe}_{12}\text{O}_{19}$ ($x=0, 0.03, 0.05, 0.07, 0.09$) solid solutions obtained by coprecipitation method. The structure of the samples was controlled by X-ray diffraction and scanning electron microscope images revealed that the average size of plate-like shaped crystallites decreases with increasing x (from ~ 200 nm to 80 nm) and for $x=0.09$ the crystallites are oval. Nd^{3+} doping was found to result in an increase in the coercive field which we would like to relate to the domain wall pinning. The doping-induced changes were found to be monotonous with x up to 0.07. The observed dispersion in dielectric permittivity was found to be correlated with the frequency behavior of electric conductivity of the samples.