

Multiferroic Properties of Orthorhombic and Hexagonal GaFeO₃ Compound

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The multiferroic nature of gallium iron oxide has been intensively studied recently for its potential applications. The physical properties especially magnetism in GaFeO₃, depend strongly on the method of preparation. Therefore many efforts have been expended on fabrication of gallium iron oxide by Pechini modification of the sol-gel method. The perfectly ordered gallium iron oxide crystallizes in an orthorhombic crystal structure. Then the system forms a collinear antiferromagnetic ordering along [001] direction with the calculated magnetic moment of irons equal to $\mu_{\text{Fe}}=5\mu_B$. Any disorder of the cations origin leads to more complicated structures. In the light of neutron and Mössbauer measurements the very strong correlation of the magnetic ordering against the cation distribution among the sites has been proven.