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Anisotropy in the magnetic and multiferroic properties of $LuFe_2O_{4-\delta}$ single crystals with varying oxygen stoichiometry

G. BALAKRISHNAN, R.A. MCKINNON, M.R. LEES, Department of Physics, University of Warwick, Coventry CV4 7AL, UK — $LuFe_2O_4$ is a multiferroic, where the origin of the ferroelectricity is attributed to electron correlations and directly linked to the charge ordering of Fe^{2+} and Fe^{3+} in the lattice. The multiferroic properties of this system are known to be sensitive to the oxygen stoichiometry. Large single crystals of $LuFe_2O_{4-\delta}$ with varying oxygen stoichiometry have been produced by the floating zone technique. Detailed magnetic susceptibility, dielectric constant and polarization measurements have been carried out along specific crystallographic axes of the single crystals over a wide temperature range to study the anisotropic properties. The effect of altering the Fe^{2+}/ Fe^{3+} stochiometry on the physical properties of $LuFe_2O_{4-d}$ is discussed.

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