

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Effect of titanium substitution on the structural and magnetic properties of cobalt ferrite CAJETAN NLEBEDIM, DAVID JILES, Department of Electrical and Computer Engineering, Iowa State University — Spinel crystal structure in ferrites presents various degrees of freedom in altering their magnetic and related properties to specific applications. Such degrees of freedom include choice of cation site to substitute into, choice of substitution for either Fe or Co or even both, and the ability to alter the site occupancy of the substituted cation. In this work, the effect of co-substituting $\text{Ti}^{4+}/\text{Co}^{2+}$ into cobalt ferrite has been found to result in a non-linear variation in lattice parameter. This is in agreement with a previous report on a similar material that the rate at which cations substitutes into the cation sites varies with Ti^{4+} concentration. Ti^{4+} substitution resulted in almost a linear decrease in saturation magnetization. The coercivity and differential susceptibility varies inversely. The trend in the variation of the magnetic properties is remarkably consistent with the cation distribution, previously reported on a similar material. The correlation between the lattice parameter and magnetic properties further indicates that the observations are due to the cation distributions in the material.

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Date submitted: 15 Nov 2013

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