Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Effect on chemical substitution on properties of magnetoelastic properties of cobalt ferrite[1] DAVID JILES, Cardiff University, NARESH RANVAH, IKENNA NLEBEDIM, YEVGEN MELIKHOV, JOHN SNYDER, ANTHONY MOSES, PAUL WILLIAMS — There has been a recent interest in magnetic materials that can be used to sense or produce stress. Cobalt ferrite has emerged as a candidate material for these sensor and actuator applications because of its high magnetostrictive sensitivity and low hysteresis. However, there have been several studies to improve the properties of cobalt ferrite by chemical substitution. Substitutions of M^{3+}, where M=Mn, Cr, and Ga, have been tried along with Co^{+2}/Ge^{4+} co-substitution in place of some of Fe^{3+} in cobalt ferrite. The mechanisms by which these chemical substitutions change the magnetomechanical properties of cobalt ferrite depend on the site occupancy of these ions and their contribution to the moment of that site. These moment contributions in turn affect properties such as anisotropy, magnetization, Curie temperature and magnetostriction. In the current study the effect of site occupancy of different dopant ions on the magnetoelastic properties of cobalt ferrite has been analyzed. Anisotropy, magnetization and magnetostriction have been measured between 10 and 400 K. These properties have then been correlated to the site occupation preference of different dopant ions.

[1]This research was supported by the UK EPSRC under grant number EP/D057094 and by the US NSF under grant number DMR-0402716.

David Jiles
Cardiff University

Date submitted: 02 Dec 2009 Electronic form version 1.4