

Abstract Submitted
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Magnetic and Magnetoelastic Properties of Substituted Cobalt Ferrites¹ DAVID JILES, Wolfson Centre for Magnetism, Cardiff University, SEONG JAE LEE, Ames Laboratory, Iowa State University, JOHN SNYDER, EUGENE MELIKHOV, Wolfson Centre for Magnetism, Cardiff University — We report recent results on a family of compounds based on cobalt ferrite with various chemical additions that can be used to dramatically alter the properties. These have high magnetostriction, high sensitivity of magnetic induction to applied stress and are chemically very stable, making them attractive for use in magnetoelastic sensors. For practical applications a family of materials is needed. The magnetic properties, magnetoelastic response, and temperature dependences can be controlled by selecting the chemical composition and adjusting the site occupancies of cations. A series of Mn-, Cr-, and Ga-substituted cobalt ferrite compounds, $\text{CoMn}_x\text{Fe}_{2-x}\text{O}_4$, $\text{CoCr}_x\text{Fe}_{2-x}\text{O}_4$, and $\text{CoGa}_x\text{Fe}_{2-x}\text{O}_4$ (where $x=0.0$ to 0.8) have recently been investigated and these showed dramatic changes in properties including reductions of over 350K in Curie temperature. Another significant result was that the effects of the substituted contents (x) on magnetic and magnetoelastic properties were significantly different for each substituted cation due to the differences in cation site occupancies of the elements within the spinel crystal structure.

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