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Effect of Al³⁺ ion addition on the magnetic properties of cobalt ferrite at moderate and low temperatures

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Abstract

The magnetic properties of aluminum-substituted cobalt ferrite, with the chemical formula CoAl_xFe_{2-x}O₄, were investigated and synthesized using co-precipitation method. A coherent correlation between the saturation magnetization and aluminum concentration was observed. An increase in aluminum content lead to a decrease of coercivity (H-C) retentivity (M-R) and saturation magnetization (M-S). According to the growth in the sub spectral areas obtained by Mossbauer spectroscopy, it was estimated that the agreeable ferric ions belong essentially to the site B, where the Mossbauer portion of site A does not vary appreciably. The dependence of Mossbauer parameters on hyperfine magnetic field, isomer shift and quadruple splitting on aluminum ions content were discussed. (C) 2015 Elsevier B.V. All rights reserved.

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