Effect of Eu Substitution on Magnetic Behavior of Spinel Nickel Ferrites

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Abstract. Soft magnetic nickel ferrites with iron partly substituted by europium as the rare-earth metal having resultant chemical formula $Ni_{0.3}Eu_xFe_{2-x}O_4$ (with x being the substituting amount per formula unit) were studied. Ferrite samples were synthesized conventionally by means of solid-state reaction with proper metal oxides used as initial raw materials followed by thermal treatment - double-sintering at 950°C for 1 hour and 1200°C for 6 hours. XRD analysis approved the crystalline structure being mainly the inverse spinel with the hints of secondary phase, impossible to identify, for $x \geq 0.04$. The influence of rare-earth contents on important magnetic properties, such as, e.g., the Curie temperature, coercive field, remanent flux density, amplitude and initial permeability, hysteresis loop area, etc. was investigated.