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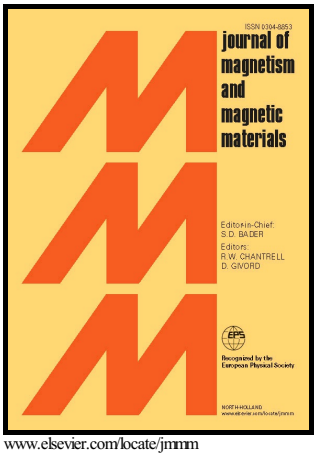

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Structure and magnetic properties evolution of rod-like $Co_{0.5}Ni_{0.25}Zn_{0.25}Dy_xFe_{2-x}O_4$ synthesized by solvothermal method

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Abstract

A series of Dy^{3+} doped Co–Ni–Zn ferrites with the formula $Co_{0.5}Ni_{0.25}Zn_{0.25}Dy_xFe_{2-x}O_4$ ($0.0 \le x \le 0.24$) have been successfully synthesized using the solvothermal method. X-ray diffraction and scanning electron microscope examinations indicate that a highly-crystallized cubic $Co_{0.5}Ni_{0.25}Zn_{0.25}Dy_xFe_{2-x}O_4$ with rod-like morphology is obtained when the precursor is calcined at 1000 ^oC in air for 3 h. Single phase $Co_{0.5}Ni_{0.25}Zn_{0.25}Fe_2O_4$ is obtained at 650 °C, but all samples consist of the main spinel phase in combination of a small amount of a foreign Dy_2O_3 phase after doping Dy. When the precursor is calcined at 1000 °C, the lattice parameter of the ferrites initially increase after doping Dy, but then become smaller with increasing Dy content. The