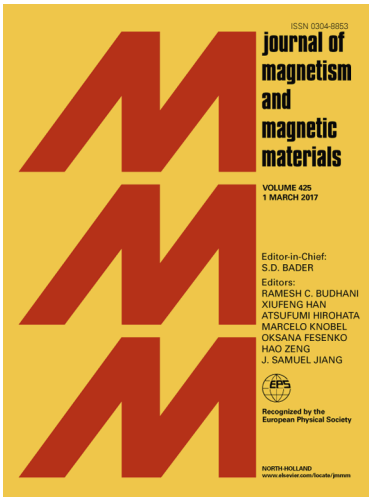

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Study of structural, morphological and magnetic properties Ag substituted cobalt ferrite nanoparticles prepared by honey assisted combustion method and evaluation of their antibacterial activity

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Abstract

Pure and Ag substituted cobalt ferrite nanoparticles (NPs) baring the composition $(1–x)CoFe_2O_4$: xAg (x = 0. 0.2) were synthesized by a novel honey assisted combustion method in order to investigate their structural and magnetic properties along withtheir antibacterial activity. XRD patters confirm the spinel phase of $CoFe_2O_4$ and the presence of silver (Ag) nanoparticles in the spinel network.The incorporation of Ag in $CoFe_2O_4$ spinel structure enhanced the size of the unit cell, resulting to higher value of lattice parameter (a) compared to the pure $CoFe_2O_4$. The sintering process promoted the growth of the crystallite sizes (D). The crystallite sizes of the synthesized and annealed powders were found in the range of 24–41 nm. From the EDX studies, it seemed that the distribution of Ag nanoparticles was non-uniform. The saturation magnetization (M_s) and coercivity (H_c) of the powders were influencedbyannealing as well as with the substitution of Ag. The highest value of saturation magnetization (60emu/g) was obtained by the $CoFe_2O_4$ nanoparticles with the coercivity value 1358 Oe. The saturation magnetization and coercivity of Ag doped $CoFe_2O_4$were less than that of pure $CoFe_2O_4$. The present cobalt ferrite nanoparticles and Ag doped cobalt ferrite nanoparticles have showed good antibacterial activities. But Ag doped cobalt ferrite