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Structural and Magnetic Properties of MgCe_xFe_{2-x}O₄ Nanoferrites

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Abstract content
   (Max 300 words)

MgCe_xFe_{2-x}O₄ (0 =< x <= 0.4) nanoparticles have been produced by glycol-thermal technique. All the samples were characterized by X-ray diffraction (XRD), Mössbauer and VSM measurements. The XRD results indicate single phase cubic spinel structure in samples with low concentration of Ce (x < or = 0.2). The particle size of the as-prepared compounds ranges between 8.7 nm and 16.6 nm. A general increase in the size of a unit cell from 8.352 Å (x = 0) to 8.413 Å (x = 0.2) occurs. This is explained on the basis of atoms involved. 57Fe Mössbauer spectra show transformation from ordered to paramagnetic spin state with increasing Ce concentration. The broad spectrum of the as prepared MgFe2O4 (x = 0) oxide changes to a well resolved magnetic splitting with increasing annealing temperature. The magnetization measurements show superparamagnetic behavior in all the compounds. A general decrease in magnetization with increasing x is observed. The coercive fields increase with decreasing measuring temperature from about 2 Oe at 300 K to 330 Oe at 10 K.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

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