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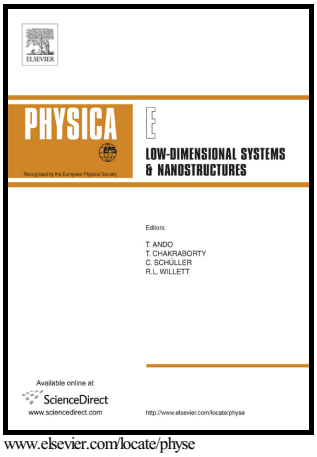

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Structural and Optical Characterization of Er-alkali-metals codoped MgO Nanoparticles Synthesized by Solution Combustion Route

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Abstract

Pure MgO, rare-earth (Er) doped MgO (MgO:Er),and alkali metal ions (Li, Na and K) co-doped MgO:Er [i.e. MgO:Er+X (X=Li, Na, and K)] nanopowders were synthesized by solution combustion method and characterized. The XRD analysis reveals the cubic structure and the substitution of dopants and co-dopants in MgO. Annealing at 800 °C, increases the sizes of nano-crystallites of all samples appreciably, indicating the grain growth and the improvement in crystallinity of all the samples. Increase in lattice parameter, *d* spacing and band gap were observed after annealing. Structural and morphological analysis using scanning electron microscope (SEM) and transmission electron microscope (TEM) studies has shown that the samples contain structures like agglomerated clusters. FT-IR spectra confirm the stretching mode of hydroxyl groups, carbonate and presence of MgO bonding. The characteristic wavelength ranging from 2600 cm^{-1} to 3000 cm^{-1} were assigned to transition of 4S3/2→4I13/2 and 4I11/2→4I15/2 of Er^{3+}.

Keywords: Nanostructure; Solution combustion; Powder diffraction; SEM; TEM; FT-IR spectra

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