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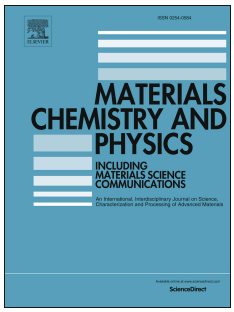

Structural, morphological and optical properties of $Ba_{1-x}Cu_xTiO_3$ (X = 0.2, 0.4, 0.6, 0.8) nanoparticles synthesizedby hydrothermal method

D. Kothandan, R. Jeevan Kumar, M. Prakash, K. Chandra Babu Naidu

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Structural, Morphological and Optical Properties of $Ba_{1-x}Cu_xTiO_3$ (X = 0.2, 0.4, 0.6, 0.8) Nanoparticles Synthesizedby Hydrothermal Method

D.Kothandan[1], R. Jeevan Kumar[3]*,M.Prakash[3], K.Chandra Babu Naidu[2*]

[1]Sreenivasa Institute of Technology and Management Sciences, Chittoor, A.P, India

[2]Dept. of Humanities and Sciences, Srinivasa Ramanujan Institute of Technology, Anantapuramu, A.P, India.

[3]Department of Physics, S.K. University, Anantapuramu, A.P, India.

Abstract

A series of $Ba_{1-x}Cu_xTiO_3$ (X = 0.2, 0.4, 0.6, 0.8) nanoparticles were synthesized via the hydrothermal technique. The diffraction study confirms the cubic phase formation of barium copper titanate ceramics. The high concentration of copper addition (x = 0.8) manifests that the crystal structure undergoes transformation from cubic to mixed phases (cubic and copper titanate).The X-ray density (D_x) and bulk densities (D_b) are decreasing with copper content. The surface morphology was investigated using field emission scanning and transmission electron microscopes (FESEM & TEM). The results provide the non-uniform grain structure. The average grain size is found to be varying between 57 to 181 nm. The TEM study shows the platelet like nanoparticles for x = 0.8 and similar observations were made from FESEM. The presence of metal oxide bonds (M-O) were evaluated from Fourier transform infrared spectra. The UV-Visible spectra attribute the optical band gap energy ranging from 1.56 to 1.46 eV.

Keywords: Structure; Ceramic Titanate; Nanoparticles; Optical Band Gap; Field Emission Scanning Electron Microscopy.

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*Corresponding authorsemail:rjkskuphy@gmail.com

chandrababu954@gmail.com