

Effect of gelatin on structural properties of lead-free piezoelectric ($K_{0.5}Na_{0.5}$) NbO_3 nanopowders synthesized by a modified sol-gel route in gelatin media

Gh. Khorrami*, M. Mousavi

Department of Physics, Faculty of Sciences, University of Bojnord

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Abstract: In this research, lead-free piezoelectric Sodium potassium niobate nanopowders ($K_{0.5}Na_{0.5}$) NbO_3 were synthesized using a modified sol-gel method. Nitrate sodium, nitrate potassium, and ammonium niobate oxalate were used as starting materials. Gelatin which is natural polymer was used as polymerization agent and distilled water was used as solvent. The crystal structure of the prepared powders is characterized using X-ray diffraction (XRD) and crystallite size, lattice strain and stress were estimated using Scherrer formula, Williamson-Hall (W-H), and Size-strain Plot (SSP) methods. TEM images showed that the morphology of the prepared particles is cubic, with the average size of about 100 to 200 nm. Selected area electron diffraction (SEAD) image of the samples were confirmed that the prepared particles have good crystallinity.

Keywords: ($K_{0.5}Na_{0.5}$) NbO_3 ; Modified Sol-gel; Piezoelectric; Nanopowder.

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*Corresponding author, Tel: 09353929173, Fax: 023 32397600, Email: khorrami1983@gmail.com