STRUCTURAL PHASE SEPARATION, OPTICAL AND MAGNETIC PROPERTIES OF BATI1-XMNXO3 MULTIFERROICS (SCI)

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TÓM TẮT:

This work presents influences of the Mn doping on structure, optical and magnetic properties of BaTi1-xMnxO3 (x = 0.0-0.12) prepared by conventional solid-state reaction. Detailed analyses of XRD patterns and Raman scattering spectra indicate a structure transformation from tetragonal-to-hexagonal in the BaTiO3 doped with Mn taking place at a threshold concentration of xc » 0.01. The increase of Mn-doping content in BaTi1-xMnxO3 created defect levels into forbidden gap that broadened the absorption band and depressed the photoluminescence emission of material in the visible light. Magnetic data recorded reveal that all the samples exhibite room-temperature ferromagnetic order, and there is a phase separation in magnetism as varying x values. Particularly, the samples with x = 0.5-0.7 exhibits a coexistence of two ferromagnetic phases with different coercivities, associated with tetragonal and hexagonal BaTiO3 structures. The nature of ferromagnetism was comprehensively explained by means of the magnetic exchange interactions between Mn3+ and Mn4+ ions in a lattice structure of the phases competition.