

STRUCTURAL, OPTICAL AND MAGNETIC PROPERTIES OF POLYCRYSTALLINE BaTi_{1-x}Fe_xO₃ CERAMICS (SCI)

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TÓM TẮT:

Polycrystalline BaTi_{1-x}Fe_xO₃ ceramics have been prepared by conventional solid-state reaction. Their structural, optical and magnetic properties are then studied by means of x-ray diffraction (XRD), Raman scattering (RS) and absorption spectrometers, and a physical properties measurement system. Detailed analyses of XRD patterns and RS spectra reveal the phase separation of the tetragonal-hexagonal structure at a threshold concentration of $x=0.005$. The increase in the Fe-doping content (x) leads to development of the hexagonal phase. Magnetic measurements prove that many BaTi_{1-x}Fe_xO₃ samples exhibit the room-temperature ferromagnetic order, excepting the samples with $x=0.02-0.06$. The ferromagnetism depends strongly on concentration of Fe impurities. The nature of this ferromagnetism is discussed by means of the results of structural analyses and optical absorption spectra