

INFLUENCES OF ANNEALING TEMPERATURE ON STRUCTURAL CHARACTERIZATION AND MAGNETIC PROPERTIES OF POLYCRYSTALLINE MN-DOPED BaTiO₃ (SCI)

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TÓM TẮT:

Polycrystalline samples of BaTiO₃ doped with 2.0 at.% Mn were prepared by solid-state reaction at various temperatures (T_{an}) ranging from 500 to 1350 C, used high-pure powders of BaCO₃, TiO₂, and MnCO₃ as precursors. Experimental results obtained from x-ray diffraction patterns and Raman scattering spectra reveal that tetragonal Mn-doped BaTiO₃ starts constituting as T_{an} 500 C. The T_{an} increase leads to the development of this phase. Interestingly, there is the tetragonal-hexagonal transformation in the crystal structure of BaTiO₃ as T_{an} 1100 C. Such the variations influence directly magnetic properties of the samples. Besides paramagnetic contributions of Mn²⁺ centers traced to electron spin resonance, the room-temperature ferromagnetism found in the samples is assigned to exchange interactions taking place between Mn³⁺ and Mn⁴⁺ ions located in tetragonal BaTiO₃ crystals.