

Synthesis and properties of bismuth zinc niobate pyrochlore powders prepared by chemical method

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Abstract

Bismuth zinc niobate pyrochlore ($\text{Bi}_2\text{O}_3\text{-ZnO-Nb}_2\text{O}_5$) powders have been successfully prepared by chemical method using the polymeric precursor route. Bismuth oxide, zinc acetate and ammonium niobium oxalate were used as starting reagents in the synthesis. The polymeric precursor method is based on chelation of metallic cations by citric acid and posterior polymerization by adding ethylene glycol. The formation mechanism of the pyrochlore phase was investigated by TG-DSC, FT-IR and X-ray diffraction (XRD). The morphology of the obtained powders was examined by scanning electron microscopy (SEM). It was found that at 500 °C the pyrochlore phase is already present and the increase of the temperature to 700 °C leads to a well crystallized nanopowder with grains of approximately 50 nm in diameter.