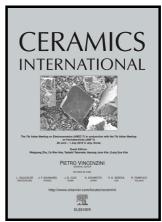
Author's Accepted Manuscript

Stabilization of α -BiFeO₃ structure by Sr^{2+} and its effect on multiferroic properties

F. Pedro-García, A.M. Bolarín-Miró, F. Sánchez-De Jesús, C.A. Cortés-Escobedo, Z. Valdez-Nava, G. Torres-Villaseñor



www.elsevier.com/locate/ceri

PII: S0272-8842(18)30277-3

DOI: https://doi.org/10.1016/j.ceramint.2018.01.251

Reference: CERI17383

To appear in: Ceramics International

Received date: 8 November 2017 Revised date: 11 January 2018 Accepted date: 29 January 2018

Cite this article as: F. Pedro-García, A.M. Bolarín-Miró, F. Sánchez-De Jesús, C.A. Cortés-Escobedo, Z. Valdez-Nava and G. Torres-Villaseñor, Stabilization of α-BiFeO₃ structure by Sr²⁺ and its effect on multiferroic properties, *Ceramics International*, https://doi.org/10.1016/j.ceramint.2018.01.251

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Stabilization of α -BiFeO₃ structure by Sr^{2+} and its effect on multiferroic properties

F. Pedro-García^a, A.M. Bolarín-Miró^a, F. Sánchez-De Jesús^{a,*}, C.A. Cortés-Escobedo^b, Z. Valdez-Nava^c, G. Torres-Villaseñor^d

 ^a Área Académica de Ciencias de la Tierra y Materiales, Universidad Autónoma del Estado de Hidalgo Mineral de la Reforma, 42184. Hidalgo, Tel. +527717172000 ext. 2280
*E-mail: fsanchez@uaeh.edu.mx

^b Instituto Politécnico Nacional, Centro de Investigación e Innovación Tecnológica, 02250. Ciudad de México

^cLAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France. ^dInstituto de Investigaciones en Materiales-UNAM, Ciudad de México, México.

Abstract

We report a study on the effect of the substitution of Bi^{3+} by Sr^{2+} on the stabilization of R3cstructure of $Bi_{1-x}Sr_xFeO_3$ ($0 \le x \le 0.3$, $\Delta x=0.05$), and its effect in the magnetic and dielectric behavior. Stoichiometric mixtures of Bi₂O₃, Fe₂O₃ and SrO were mixed and milled for 5 h using a ball to powder weight ratio of 10:1 by high-energy ball milling. The obtained powder were pressed at 900 MPa to obtain cylindrical pellets and sintered at 800°C for 2 h. X-ray diffraction and Rietveld refinement were used to evaluate the effect of Sr²⁺ on the crystal structure. In addition, vibrating sample magnetometry (VSM) and dielectric tests were used for describing the multiferroic behavior. The results show that Sr-doped BiFeO₃ particles present rhombohedral structure (R3c) characteristic of α -BiFeO₃ when the doping is below 0.10 mol of Sr. Additionally, a gradual decrease in the amount of secondary phases with the increase of the amount of strontium is observed. For doping concentration higher than 0.15 mol of Sr, a phase transition to an orthorhombic symmetry (β-BiFeO₃, Pbnm) is detected. Besides, changes in relative intensities of reflection peaks planes (110) and (104) are associated with the phase transformations and with the magnetic and dielectric behavior. The α-BiFeO₃ phase show antiferromagnetic behavior and high values of dielectric permittivity, whereas the β-BiFeO₃ phase show a ferromagnetic behavior and low dielectric permittivity.

Keywords: Bismuth ferrite; strontium doped BiFeO₃; multiferroic; high-energy ball milling; mechanochemical processing.

Download English Version:

https://daneshyari.com/en/article/7887942

Download Persian Version:

https://daneshyari.com/article/7887942

<u>Daneshyari.com</u>