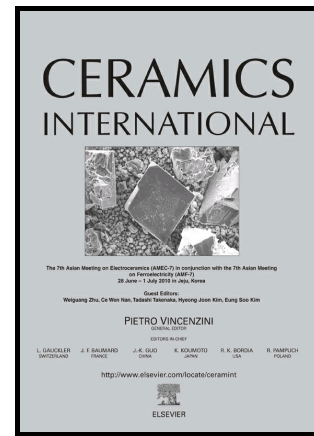


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Electrical and photoluminescence properties of Sm³⁺ doped**Na_{0.5}La_{0.5}Bi_{8-x}Sm_xTi₇O₂₇ ceramics**

Pengbin Wang, Xiangping Jiang*, Chao Chen, Xiang Xia, Yalin Jiang, Xiaohong Li,
Yunjing Chen, Gang Fan

*Jiangxi Key Laboratory of Advanced Ceramic Materials, School of Material Science
and Engineering, Jingdezhen Ceramic Institute, Jingdezhen, 333403, China.*

Abstract

In this study, Sm³⁺ doped Na_{0.5}La_{0.5}Bi_{8-x}Sm_xTi₇O₂₇ (NBT-BITL-*x*Sm, *x* = 0, 0.01, 0.015, 0.02, and 0.03) ceramics were synthesized via a conventional solid-state reaction process. The structural, electrical, and photoluminescence properties of NBT-BITL-*x*Sm ceramics were systematically investigated. The crystal structure of NBT-BITL-*x*Sm was refined using XRD Rietveld refinement and found to possess a single orthorhombic structure at room temperature. Raman spectroscopy revealed that Sm³⁺ ions preferred to substitute for Bi³⁺ located in the A-sites of pseudo-perovskite layers, inducing a slight decrease in orthorhombic distortion. Strong characteristic emission peaks of Sm³⁺ ions were observed in orange-red regions under a 407 nm laser source, and the sample with *x* = 0.015 achieved the optimal photoluminescent property. Dielectric measurements showed double anomaly permittivity peaks at the temperature of 589 and 600°C (*T_m* and *T_c*, respectively). The complex impedance spectrum indicated that the electrical conductivities mainly originated from crystal grains at high temperature. The activation energy was calculated to be 1.37–1.44 eV from Arrhenius fitting results. After Sm³⁺

* Corresponding author. Tel: +86-13979827680; fax: +86-798-8499328
E-mail addresses: jiangxp64@163.com (X. Jiang).

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