

## 准同型相界(MPB)附近BS-PT高温压电陶瓷研究

冯亚军, 徐卓, 李振荣, 张麟, 姚熹

西安交通大学电子陶瓷与器件教育部重点实验室, 西安 710049

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**摘要** (1-x)BiScO<sub>3</sub>-xPbTiO<sub>3</sub>陶瓷(简记BS-PT)在x=64.0%附近存在一个从菱方晶系过渡到四方晶系的准同型相界,

在此相界附近材料能获得优良的介电和压电性能. 本文选取PbTiO<sub>3</sub>含量在64.0%~65.5%

的准同型相界附近的材料组分, 利用传统的固相烧结反应法合成了纯钙钛矿相结构的BS-PT陶瓷,

通过对材料的相结构形成过程和内部形貌分析以及对介电、压电性能的研究, 发现在x=64.%的组分条件下, BS-

PT陶瓷材料获得了准同型相界范围内的最优的压电性能, 其室温压电常数d<sub>33</sub>可达500pC/N, 且居里温度(T<sub>c</sub>)

达到了438℃, 剩余极化强度和电致应变分别为44μC/cm<sup>2</sup>和3.5%. 研究表明, 准同型相界附近的BS-

PT陶瓷是一种优良的压电换能器和传感器材料.

**关键词** [BS-PT](#) [准同型相界](#) [高居里温度](#) [压电陶瓷](#)

分类号

## High Temperature Piezoelectric Ceramics (1-x)BiScO<sub>3</sub>-xPbTiO<sub>3</sub> Near the Morphotropic Phase

### Boundary (MPB)

FENG Ya-Jun, XU Zhuo, LI Zhen-Rong, ZHANG Lin, YAO Xi

Electronic Materials Research Laboratory, Key Laboratory of the Ministry of Education, Xi'an Jiaotong University, Xi'an 710049, China

**Abstract** (1-x)BiScO<sub>3</sub>-xPbTiO<sub>3</sub> (BS-PT) ceramics exhibits excellent dielectric and piezoelectric properties in the vicinity

of the morphotropic phase boundary (x=64.0% mol fraction PbTiO<sub>3</sub>), which separates the rhombohedral phase from

tetragonal phase. In our study, the pure perovskite BS-PT ceramics was obtained with compositions near the MPB for x

varying from 64.0% to 65.5% using traditional solid state reaction. The perovskite phase formation process and

microstructure were investigated and also the dielectric and piezoelectric properties were studied. The results show that

BS-PT ceramics with x=64.5% has an optimized piezoelectric characterization, its piezoelectric coefficient d<sub>33</sub> can reach

to as high as 500 pC/N at room temperature, the Curie temperature (T<sub>c</sub>) can reach to 438℃, with the remnant

polarization Pr=44μC/cm<sup>2</sup>, electrical field reduced strain 3.5%. Our research results show that the **BPT** ceramics with

the compositions near the morphotropic phase boundary is a good candidate material for the piezoelectric actuator and

transducers.

**Key words** [BS-PT](#) [morphotropic phase boundary](#) [high Curie temperature](#) [piezoelectric ceramics](#)

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通讯作者 冯亚军 [fengqi@stu.xjtu.edu.cn](mailto:fengqi@stu.xjtu.edu.cn)

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