Accepted Manuscript

Temperature–stable dielectrics based on Ni–doped $Bi_2Zn_{2/3}Nb_{4/3}O_7$ pyrochlore ceramics for low temperature co-fired ceramic

Qianyu Guo, Lingxia Li, Shihui Yu, Zheng Sun, Haoran Zheng, Weijia Luo

PII: S0925-8388(18)32341-7

DOI: 10.1016/j.jallcom.2018.06.220

Reference: JALCOM 46556

To appear in: *Journal of Alloys and Compounds*

Received Date: 21 March 2018

Revised Date: 18 June 2018

Accepted Date: 19 June 2018

Please cite this article as: Q. Guo, L. Li, S. Yu, Z. Sun, H. Zheng, W. Luo, Temperature–stable dielectrics based on Ni–doped $Bi_2Zn_{2/3}Nb_{4/3}O_7$ pyrochlore ceramics for low temperature co-fired ceramic, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.06.220.

Temperature–stable dielectrics based on Ni–doped $Bi_2Zn_{2/3}Nb_{4/3}O_7$ pyrochlore ceramics for low temperature co-fired ceramic

Qianyu Guo, Lingxia Li†, Shihui Yu†, Zheng Sun, Haoran Zheng, Weijia Luo

School of Microelectronics, Key Laboratory for Advanced Ceramics and Machining Technology of Ministry of Education, Tianjin University, Tianjin 300072, China

Abstract: As an admirable candidate of thermostable LTCC materials, $Bi_2(Zn_{1-x}Ni_x)_{2/3}Nb_{4/3}O_7$ ($0.0 \leq x \leq 0.5$) ceramics with improved dielectric properties have been prepared via conventional mixed oxide route. Microstructure analysis manifests that the phase transition occurs from monoclinic zirconolite phase (β-BZN) to cubic phase (α-BZN) for Ni doped specimens. The crystal field theory supported the analysis of the initial phase transition processes. From the structure transformation and electrical properties test result, the Ni^{2+} substituted Zn^{2+} shows an effective method to restrain the grain growth and improve dielectric constant when sintered at 925°C. The temperature coefficient of dielectric constant is controlled by phase composition and is found to be -6.4 ppm/°C at the two-phase coexistence region of the doping content x=0.35. The dielectric properties of ε=101.2, tanδ= 9.5×10^{-4} are obtained in this component. The features of the $Bi_2(Zn_{1-x}Ni_x)_{2/3}Nb_{4/3}O_7$ ceramics make them promising for use in high-frequency applications.

1. Introduction

With rapid development of economy and wireless communication, the temperature co-fired ceramics technology (LTCC) has obtained increasing attentions due to its low sintering temperature so as to co-fire with Ag electrode in integrating

† Corresponding author. Tel./fax: +86 2227402838
E-mail: lingxiali66@163.com (L. Li)
† Corresponding author. Tel./fax: +86 2227402838
E-mail: ysh728@126.com (S. Yu)