

FUNDAMENTAL STUDY ON MICROSTRUCTURE OF CeO₂-DOPED (Na_{0.5}Bi_{0.5})TiO₃ CERAMICS

Rozidawati Awang^{1,*}, Nurain Ab. Halim¹, Zalita Zainuddin¹, Mohammad Hafizuddin Haji Jumali¹, Muhammad Yahaya¹ and Muhammad Mat Salleh²

¹*School of Applied Physics, Faculty of Science and Technology, Universiti Kebangsaan Malaysia (UKM), 43600 UKM Bangi, Selangor, MALAYSIA*

²*Institute of Microengineering and Nanoelectronic (IMEN), Universiti Kebangsaan Malaysia (UKM), 43600 UKM Bangi, Selangor, MALAYSIA*

**Corresponding author: rozida@ukm.my*

ABSTRACT

The effect of CeO₂ additions and methods of preparation on the microstructure of (Na_{0.5}Bi_{0.5})TiO₃, (NBT) have been investigated. NBT ceramics was prepared using solgel technique and then were doped with the CeO₂ powders (0 – 0.4 wt%) using the solid state reaction method. The morphology and microstructure of the doped ceramics were investigated using SEM and XRD techniques, respectively. Based on the SEM images, the microstructure of ceramics remains unchanged with the additions of CeO₂. However, the microstructure of the ceramics reduced in size significantly by using the sol-gel technique as compared to the solely conventional solid-state processes. While XRD patterns indicate that CeO₂ with 0.1 – 0.3 wt% has diffused into the lattice of NBT ceramics.

Keywords: CeO₂-doped NBT; microstructure; sol-gel

<http://journal.masshp.net/wp-content/uploads/Journal/2012/Rozidawati%20Awang%20109-114.pdf>

REFERENCES

- [1] T. Takenaka, Ultrasonic Technology 8 (2001) 2-12
- [2] Y. Li, W. Chen, Q. Xu, J. Zhou, Y. Wan, H. Sun, Ceramics International 33 (2007) 95-99.
- [3] T. Haccart, E. Cattan, Remiens, Quantum Electronics & Optoelectronics 5 (2002) 78-88
- [4] F. Remondiere, B. B. Malic, M. Kosec and J. P. Mercurio, Journal of the European Ceramic Society 27 (2007) 4363–4366
- [5] J. G. Hou, Y. F. Qu, W. B. Ma & D. Shan, Journal Material Science 42 (2007) 6787-6791.
- [6] P. Pookmanee, S. Phanichphant, R. B. Heimann, Synthesis and Properties of BNT. Ceramic Forum International, German Ceramic Society. 78 (7) 2001 E27-E30
- [7] M. H. H. Jumali, M. R. M. Said, N. Y. Wee, M. Yahaya, M. M. Salleh, Sains

Malaysiana 39 (4) (2010) 621-626

[8] M. H. H. Jumali, S. M. Mohamad, M. R. M. Said, R. Awang, M. Yahaya, M. M. Salleh, *Advanced Materials Research* 364 (2012) 412-416

[9] S. Wu, Q. Xu, X. Zhou, T. Liu, Y. Li, *Materials Letters* 60 (2006) 1453-1458

[10] J. Hao, X. Wang, R. Chen, L. Li, *Materials and Physics* 90 (2005) 282-285

[11] W. Ge, H. Liu, X. Zhao, W. Zhong, X. Pan, T. He, D. Lin, H. Xu, X. Jiang, H. Luo, *Journal of Alloys and Compounds* 462 (2008) 256-261

[12] M. Chen, Q. Xu, B. H. Kim, B. K. Ahn, W. Chen, *Materials Research Bulletin*, 43(6) (2008) 1420–1430