

Chemical Composition of γ -Bi₂O₃ Phase and Its Influence on Varistor Properties

Z. Branković¹, G. Branković², D. Poleti¹, Lj. Karanović³ and J.A. Varela⁴

¹*Faculty of Technology and Metallurgy, Karnegijeva 4, 11001 Belgrade, Serbia&Montenegro*

²*CMS of Belgrade University, Kneza Višeslava 1a, 11000 Belgrade, Serbia&Montenegro*

³*Faculty of Mining and Geology, Dušina 7, Belgrade, Serbia&Montenegro*

⁴*Instituto de Quimica, UNESP, P.O. Box 355, 14800 Araraquara, SP, Brazil*

Abstract

Four varistor samples differing in chemical and phase composition of the starting Bi₂O₃ phase were prepared by the method of direct mixing of the constituent phases (DMCP), *i.e.* by sintering the mixture of the previously prepared phases. Compositions of constituent phases in sintered samples were investigated by changes of their lattice constants, and by EDS analysis. After sintering phase compositions of all investigated samples were the same: ZnO phase, spinel and γ -Bi₂O₃. It was found that γ -Bi₂O₃ phase is mainly stabilized with Zn²⁺ ions. All samples showed good electrical properties with nonlinearity coefficients up to 50 and small values of the leakage current. Electrical properties of the samples were discussed in terms of diffusion processes and redistribution of additives during sintering.