

The Influence of Mechanical Activation on Sintering Process of BaCO₃-SrCO₃-TiO₂ System

D. Kosanović¹, N. Obradović¹, M. Mitrić², V. Pavlović¹, M. M. Ristić³

¹Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Knez Mihailova 35/IV, 11000 Belgrade, Serbia

²The Vinča Institute, Belgrade University, Condensed Matter Physics Laboratory, P.O. BOX 522, 11001 Belgrade, Serbia

³Serbian Academy of Sciences and Arts, Knez Mihailova 35, 11000 Belgrade, Serbia

Abstract

In this article the influence of mechanical activation on sintering process of barium-strontium-titanate ceramics has been investigated. Both non-activated and mixtures treated in planetary ball mill for 5, 10, 20, 40, 80 and 120 minutes were sintered at 1100-1400 °C for 2 hours in air atmosphere. The influence of mechanical activation on phase composition and crystal structure has been analyzed by XRD, while the effect of activation and sintering process on microstructure was investigated by scanning electron microscopy.

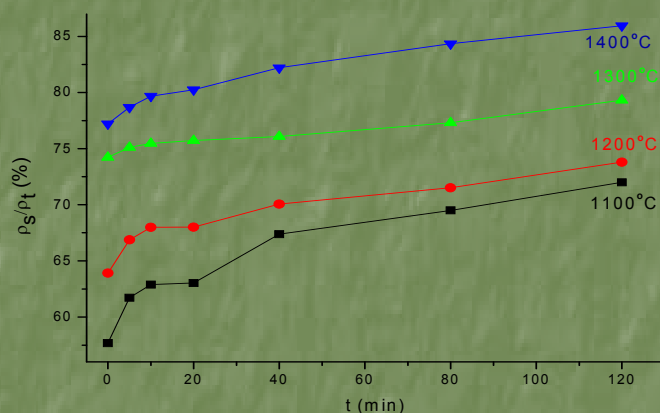


Fig. 1. Densities of BaSrTiO₃ sintered isothermally at 1100, 1200, 1300 i 1400 °C for 2h

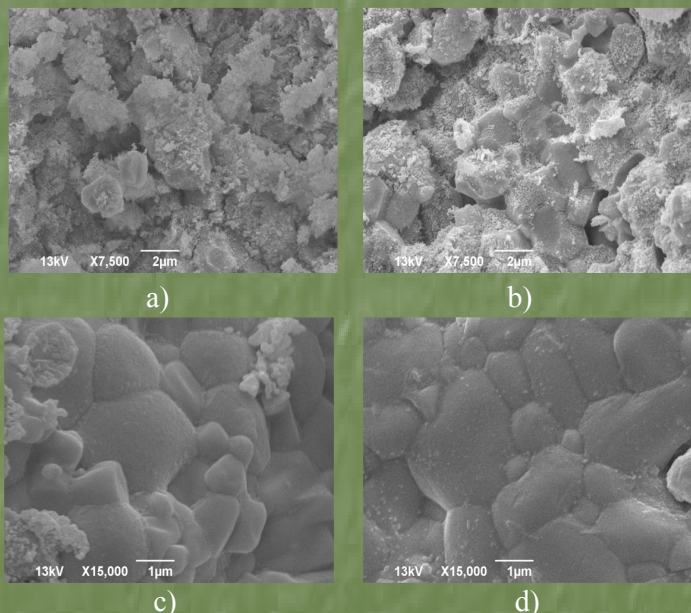


Fig. 2. Scanning electron micrographs of a) BST-0, b) BST-20, c) BST-80, d) BST-120 sintered at 1400 °C for 2h

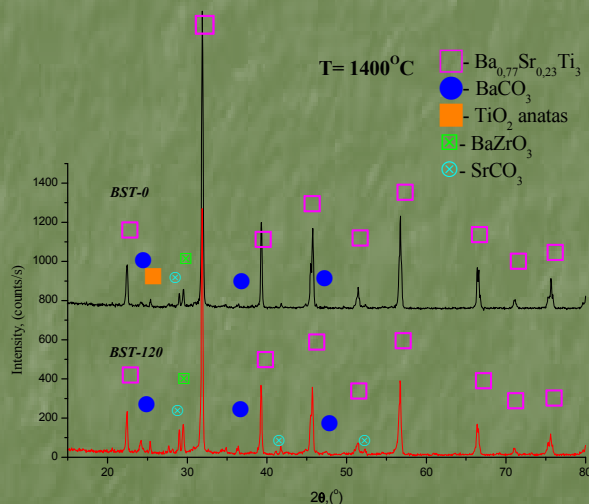


Fig. 3. XRD patterns of BST ceramics sintered at 1400 °C for 2h.

Conclusion

It has been established that temperature of 1100 °C was too low to induce final sintering stage for the system. XRD patterns indicated that almost pure barium-strontium-titanate phase was obtained after sintering process. The most dense samples are obtained after sintering at 1400 °C for 2h, according to SEM.