

SYNTHESIS AND CHARACTERIZATION OF MnO₂ DOPED BARIUM STRONTIUM TITANATE

Mousumi Banerjee¹, Siddhartha Mukherjee² and Saikat Maitra³

1 Dept. of Electrical Engineering, Bengal Institute of Technology Kolkata, India
(e-mail: sub_ju@rediffmail.com, Tel No. 00919433559626)

2 Dept. Of metallurgical Engineering, Jadavpur University, Kolkata, India
(e-mail: smukherjee03@yahoo.co.in Tel: 00919433434716)

3 Dept. of Chemical Engineering, Universiti Teknologi PETRONAS, Tronoh-31750, Malaysia (Author for correspondence, e-mail: maitrasaikat@rediffmail.com Tel. No. 0060149021395)

ABSTRACT

Barium strontium titanate ceramics (Ba_xSr_{1-x})TiO₃ with molar ratio $x = 0.60$ were prepared by solid state interaction of barium carbonate, strontium carbonate and rutile in requisite proportions. The samples were doped with 0.25, 0.50 and 1.0 wt% of MnO₂. The sintered compacts were characterized by measurement of different physico-mechanical properties. XRD analysis was carried out to determine the different phases present in the sintered samples and SEM analysis was used to assess the distribution of different phases in the microstructure. Measurement of the dielectric properties of the samples was done at different frequencies as well as at different temperatures. It was observed that the loss tangent values were significantly reduced with MnO₂ doping. The new formulation developed in this study has potential application in tuned circuits.

KEY WORDS: Barium Strontium Titanate, Powders-Solid State Reactions, Manganese Doping, Dielectric Properties, Microstructure