

Synthesis of Ba_{0.6}Sr_{0.4}TiO₃ nano powder through slow rate sol-gel route as a dielectric material

ABSTRACT

Ba_{0.6}Sr_{0.4}TiO₃ was prepared through slow rate sol-gel route, characterized and investigated to determine the suitability as a dielectric material in the capacitor of a DRAM cell. X-ray diffractometer results show that single phase formation occurred at 800°C. The crystalline size of Ba_{0.6}Sr_{0.4}TiO₃ was found to be in the range of 74.21 nm to 98.76 nm. Scanning electron microscopy analysis shows that the particles are spherical in nature and in the sample calcined at 800°C do not agglomerate. The dielectric constant range ranges from 408 to 1042 and the dielectric loss ranges (measured at 1 kHz) from 0.065 to 0.232.

Keyword: Barium strontium titanate; Sol-gel; High-k materials; Surface morphology; Dielectric characteristics