

Phase formation and surface morphology of nickel doped Ba_{1-x}Sr_xTiO₃ ceramics prepared by sol-gel technique

ABSTRACT

Varied compositions in the barium strontium titanate ternary system were prepared through the slow injection sol-gel technique. Nickel dopant was introduced through a general formula of Ba_{1-x}Sr_xTi_{1-y}Ni_yO₃ ($x = 0.4$ and 0.5 ; $y = 0.1$ and 0.4 mol-%). Thermogravimetric analysis revealed that barium strontium titanate gels were completely dried and stabilised at 1000°C. All barium strontium titanate samples were confirmed as phase pure perovskite by qualitative X-ray diffraction analysis in which Nickel-doped subsolidus solution was formed successfully after calcinations at 1000°C. On the other hand, there was a sign of agglomeration discernible in the prepared BST samples and the grain sizes were found to be in the range of 39.66–71.87 nm.

Keyword: DRAM; Nickel-doped barium strontium titanate; Sol-gel technique; Surface morphology; Thermogravimetric analysis; X-ray diffraction pattern