ELECTRICAL, STRUCTURAL AND THERMAL PROPERTIES OF NANO-CERAMIC (BI2O3)1-X-Y(DY2O3)X(SM2O3)Y AND (BI2O3)1-X-Y(DY2O3)X(TM2O3)Y TERNARY SYSTEM

M. Kış
Erciyes University, Kayseri, Turkey
mkis@erciyes.edu.tr

B. Erdoğan
Erciyes University, Kayseri, Turkey
bilge_erdogan_@hotmail.com

S. Durmuş
Dumlupınar University, Kütahya, Turkey
semradurmus@dpu.edu.tr

M. Arı
Erciyes University, Kayseri, Turkey
ari@erciyes.edu.tr

Keywords: Solid oxide fuel cell (SOFC); Ceramic electrolyte; Oxygen ionic conductivity; X-ray diffraction; Thermal analysis; 4-point probe technique.

ABSTRACT

Crystal structure and temperature depence ofSm_2O_3- Dy_2O_3 and Tm_2O_3- Dy_2O_3 dopedbismuth trioxide (Bi_2O_3) tenary solid solutions have been investigated. The $(Bi_2O_3)_{1-x-y}(Dy_2O_3)_x(Sm_2O_3)_y$ and $(Bi_2O_3)_{1-x-y}(Dy_2O_3)_x(Tm_2O_3)_y$ ternary systems were obtained with x=20,10 mol % and y=20,10 mol % dopant concentrations. The temperature dependence of the electrical properties of δ-phase of solid solution samples were measured by d.c. four point probe technique.The crystallographic structure of the samples were characterized by X-ray powder diffractions (XRD). The unit cell parameters were determined from the powder diffraction patterns.Thermal behavior and stability of the phases were investigated by Differential Thermal Analysis-Thermo Gravity (DTA-TG).