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Electrical Properties and Crystallographic Characterization of Gd2O3 Doped BI2O3 Polymorphs.

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The main aims of this study are to determine new phases of bismuth trioxide gadolinium trioxide binary system and the temperature dependence of the electrical transport properties. The reaction products obtained in an open air atmosphere were characterized by X-ray powder diffractions (XRD) and the unit cell parameters were calculated by using the diffraction patterns. The $\alpha+\beta$-Bi2O3, β-Bi2O3 and $\beta+\delta$-Bi2O3 crystal system were obtained by doping $0,01 \leq$ %Gd2O3 $\leq 0,02$ mole, $0,02 \leq$ %Gd2O3 $\leq 0,07$ mole and $0,08 \leq$ %Gd2O3 $\leq 0,15$ mole (at 750oC), respectively. The $\alpha+\beta$-Bi2O3, β-Bi2O3 and δ-Bi2O3 crystal system were obtained by doping $0,01 \leq$ % Gd2O3 $\leq 0,04$ mole, $0,05 \leq$ %Gd2O3 $\leq 0,08$ mole and $0,09 \leq$ %Gd2O3 $\leq 0,15$ mole (at 760oC,quench), respectively. The $\alpha+\beta$-Bi2O3 and δ-Bi2O3 crystal system were obtained by doping $0,01 \leq$ %Gd2O3 $\leq 0,08$ mole, $0,09 \leq$ %Gd2O3 $\leq 0,15$ mole (at 810oC, quench), respectively. Thermal behavior and thermal stability of the phases were investigated by thermal analysis techniques. The temperature dependence of the electrical properties of β-Bi2O3 solid solution and of δ-Bi2O3 solid solution was measured by four point probe method.

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