BISMUTH DOPING EFFECTS ON STRUCTURAL AND MORPHOLOGICAL PROPERTIES OF SODIUM TITANATE SYSTEM

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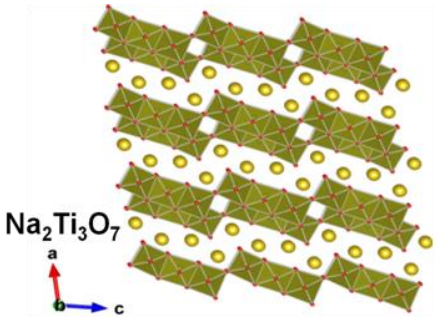
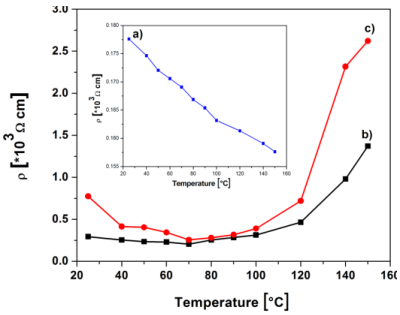
Abstract

Energy shortage and environmental pollution have become urgent problems that restrict social development and endanger the health of the planet. For sustainable development of society, the most effective route is the active development and utilization of clean and renewable energy sources [1]. In this regard, the sodium titanates are of great interest for possible applications such as photocatalysts [2], as fuel-cell electrolytes, [3] in the treatment of industrial wastewaters and contaminated groundwaters [4] and in a number of medical applications [5,6].

In this paper, we report the study of bismuth doping effects in the sodium titanate materials, synthesized by hydrothermal method. Moreover, the influences of the synthesis temperature and autoclaving time on the structural and morphological properties are presented. The structure and morphology of Bi-doped sodium titanate nanocrystals are studied in the context of their possible use for sensors application. These materials are prepared using hydrothermal method at 200°C for 12h followed by heat treatment at 600°C, 6 hours for a better crystallization. Characterization of the obtained compounds was achieved by X-ray diffraction (XRD), scanning electron microscopy (SEM), atomic force microscopy (AFM) and electrical behavior (ρ/T) was studied. The X-ray diffraction analysis showed that all samples are homogenous and crystallize in the monoclinic system with the P12/m space group. The obtained particles are as needle-like shape and their size decreases with increasing of dopant concentration.



*Crystal structure of Bi:**$Na_2Ti_3O_7$***



*Temperature dependence of the electrical resistivity in the Bi-doped **$Na_2Ti_3O_7$**: a)-Bi 1%, b)-Bi 2% and c) Bi 3%*

Acknowledgement

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