Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

The structural and mechanical behaviours of Boron-doped ZnO nanostructures[1] ABDULKADIR SENOL, Department of Physics, Abant Izzet Baysal University, 14280 Bolu, Turkey, SEVIM DEMIROZU SENOL, Department of Chemistry, Abant Izzet Baysal University, 14280 Bolu, Turkey, OZGUR OZTURK, ELIF ASIKUZUN, AHMET TOLGA TASCI, Department of Physics, Kastamonu University, 37100 Kastamonu, Turkey, CABIR TERZIOGLU, Department of Physics, Abant Izzet Baysal University, 14280 Bolu, Turkey — Undoped and Boron (B)-doped Zinc Oxide (ZnO) nanopowders were synthesized by Hydrothermal method. The structural and mechanical behaviours of B doped ZnO ($Zn_{1-x}B_x$ O, x=0, 0.05, 0.07, 0.11) were systematically examined. The crystal structure, phases, sizes and microstructure of Zn1-xBx O powder samples characterized by using X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). Microhardness values of all B doped ZnO powders were measured with different loads (0.245, 0.490, 0.980, 1.960 ve 2.940 N) using a digital Vickers microhardness tester. The experimental microhardness data were used to determine elastic modules, yield strength, and fracture toughness value of the samples. Additionally, the experimental results were analyzed using the various theoretical models namely, Kick's Law, Elastic/Plastic Deformation (EPD) models, Proportional Specimen Resistance (PSR), and Hays-Kendall (HK) approach. The Vickers microhardness measurements revealed that hardness of $Zn_{1-x}B_x$ O powder samples increased with B doping.

[1]This research partially supported by Abant Izzet Baysal University Scientific Research Projects Coordination Department under the Grant No. BAP-2013.03.02.609.

Abdulkadir Senol
Department of Physics, Abant Izzet Baysal University,
14280 Bolu, Turkey

Date submitted: 03 Nov 2014 Electronic form version 1.4