Bi_2Te_3와 Sb_2Te_3 박막제조와 물성연구

조성래†
울산대학교
(slcho@mail ulsan ac kr†)

We have investigated the structural and thermoelectric properties of (Sb1-xBix)2Te3 thin films on CdTe(111) Analysis of X-ray diffraction patterns (Θ-2Θ scans and rocking curves) of the films shows that they are of high quality and that they are well aligned with their (00.l) axis normal to the substrates Measurements of the temperature-dependent thermopower, resistivity and Hall coefficient of the films were performed with respect to the binary composition of Sb and Bi, x For the samples in the range 0 2 < x < 0 3, the room temperature thermopower values are in the range 184~159 μV/K and the room temperature carrier concentrations were 3 93~5 13 x 1019 cm-3 and the mobilities were 24 6~64 0 cm2/V s Thermopower and electrical conductivity of the undoped Bi2Te3 films were 200 μV/K and 103 (Ω-cm)-1, respectively, comparable to the single crystal bulk value We could observe the degenerate and nondegenrate behavior in the transport measurements by controlling the doping level The temperature dependencies of the thermopower, Hall mobility and electrical conductivity for the doped and undoped samples will be discussed