MAGNETIC PROPERTIES IN BI_2SE_3 BULK SYSTEM

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Abstract - Polycrystalline bulk samples of Bi_2 $(Se_{1-x}Te_x)_3$system with $0 \leq x \leq 0.9$ were prepared by the conventional melting method. All compounds show a metal-semiconductor conductivity transition, and the conductivity of the pristine Bi_2Se_3 compound increases with the low Te doping ratio (x=0.3) then decreases monotonically for further amounts. The magnetic measurements show a ferromagnetic behavior at low temperatures in all composites, this is asserted by the hysteresis loops at 60K that exhibit a proportional relation between the coercive field and the Te ratio. The Seebeck coefficient of Bi_2Se_3 compound is positive showing up the p-type conduction. However, introducing Te increases the n-type conduction with a decrease in the Seebeck coefficient absolute value. In addition, Bi_2Se_3 compound is found to exhibit high room temperature power factor and figure of merit values of 16.4 $\mu W/cm.k^2$and 10.61, respectively, due to the relatively high Seebeck coefficient & electrical conductivity and the low thermal conductivity.