Thermoelectric properties of multi-layered Bi-Te/In-Se/Bi-Te thin film deposited by RF magnetron sputter

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Abstract : Thermoelectric properties of a multi-layered thin film, which was composed with indium selenide and bismuth telluride, were investigated. The structure of the layered thin film is Bi-Te /In-Se/ Bi-Te and it was prepared on sapphire substrate by RF magnetron sputter using stoichiometric Bi_2Te_3 (99.9%) and In_2Se_3(99.99%) target at room temperature. Then, it was annealed at temperature range of 150 – 500℃ in Ar ambient. Structural characterizations were done using X-ray diffraction(XRD, BRUKER, D8, 60kW) and transmission electron microscopy (TEM, FEI, Tecnai, F30 S-Twin), respectively. Cross-section of multi-layer structure was observed by Scanning electron microscopy (SEM). The resistivity and Seebeck coefficient of these samples were also measured by conventional equipment at room temperature. The maximum value of power factor was 1.16 μ W/k^2m at annealing temperature of 400℃.

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