Short Communication

The Thermoelectric Properties of Electrochemically Deposited Te-Sb-Bi Films on ITO Glass Substrate

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In this study, we use ITO glass to deposit thermoelectric thin films by using electrochemically deposition method. With electrochemical deposition, we deposit Te-Bi-Sb thin films on ITO glasses, trying to probe into different influences on thermoelectric characteristics by changing Sb^{3+} consistency and current density. The finished Te-Bi-Sb thin films will be observed by Scanning Electron Microscope (SEM) to realize the microstructure, also, be identified the crystal structure with XRD, and electrical analysis. The result finds out the thin film is a P-type thermoelectric material. Owing to the variation of current density or electrolyte density affects and changes the structure of Te-Bi-Sb film, the study categorizes three types of forming structures: Ball-type, Mixed-type, and Acicular-type; the ion content of the precipitated film can be controlled by alter current or electrolyte density. Good thermoelectric material requires high Seebeck coefficient, and the best one in the study is in the condition of 38mM-2.1mA/cm², which results in 32.89μV/K. Also, power factor is a criterion to evaluate a material, and bigger factor equals to better quality. In this study, we get the best power factor in the condition of 15mM-2.1 mA/cm², with the result of 49.5505α²/p.

Keywords: Electrodeposition, Thermoelectric thin film, Seebeck

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