

Accepted Manuscript

Influence of compactness and formation of metallic secondary phase on the thermoelectric properties of Cu₂ZnSnS₄ thin films

Sunil Kumar, Mohd Zubair Ansari, Neeraj Khare



PII: S0040-6090(17)30839-8
DOI: doi:[10.1016/j.tsf.2017.11.001](https://doi.org/10.1016/j.tsf.2017.11.001)
Reference: TSF 36333
To appear in: *Thin Solid Films*
Received date: 16 July 2017
Revised date: 23 October 2017
Accepted date: 2 November 2017

Please cite this article as: Sunil Kumar, Mohd Zubair Ansari, Neeraj Khare , Influence of compactness and formation of metallic secondary phase on the thermoelectric properties of Cu₂ZnSnS₄ thin films. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Tsf(2017), doi:[10.1016/j.tsf.2017.11.001](https://doi.org/10.1016/j.tsf.2017.11.001)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Influence of compactness and formation of metallic secondary phase on the thermoelectric properties of $\text{Cu}_2\text{ZnSnS}_4$ thin films

Sunil Kumar, Mohd Zubair Ansari and Neeraj Khare*

Department of Physics, Indian Institute of Technology Delhi, Hauz Khas, New Delhi-110016, India.

Abstract

Thermoelectric studies of $\text{Cu}_2\text{ZnSnS}_4$ (CZTS) thin films deposited at different substrate temperatures by ultrasonic assisted chemical vapor deposition technique have been carried out. In order to identify the effect of compactness, crystallinity and formation of secondary phases (Cu_{2-x}S and SnS_2) on the thermoelectric properties of CZTS thin films, the films were deposited at different substrate temperatures. Detailed analysis of temperature dependent electrical resistivity (ρ) and Seebeck coefficient (S) have been carried out. Significant enhancement in the value of thermoelectric power factor ($S^2\rho$) is achieved in CZTS film deposited at 375°C substrate temperature, which is correlated to the compactness of thin films, improved crystallinity and presence of metallic secondary phase. Furthermore, Surface topography and surface potential studies also carried out to study the roughness and distribution of interfaces between CZTS and secondary phases (Cu_{2-x}S and SnS_2) in CZTS thin films.

Key words: Copper zinc tin sulfide; Thin films; Copper sulfide; Tin sulfide; Seebeck coefficient; Electrical conductivity; Ultrasonic assisted chemical vapor deposition

Corresponding Author

Electronic mail: nkhare@physics.iitd.ernet.in

Download English Version:

<https://daneshyari.com/en/article/8033172>

Download Persian Version:

<https://daneshyari.com/article/8033172>

[Daneshyari.com](https://daneshyari.com)