Contribution ID: **168** Type: **Poster Presentation**

Optimization of deposition voltage for growth of CdZrS thin films for window layer of CdTe-based solar cell device application.

Tuesday, 4 July 2023 16:25 (1 minute)

CdZrS thin films were synthesized by the two-electrode electrodeposition method at different growth voltages (1535-1570) mV with intervals of 5 mV on conductive glass substrate fluorine-doped thin oxide (FTO). Structural, optical, electrical, surface morphology, surface roughness, and elemental composition of the as-prepared and annealed CdZrS thin films were investigated by using X-ray diffraction (XRD), UV-vis spectrophotometry, photoelectrochemical cell analysis (PEC), scanning electron microscopy (SEM), scanning probe microscopy (SPM) and energy-dispersive X-ray spectroscopy (EDS) respectively. The structural characteristics revealed that the films have cubic and hexagonal mixed phases. Their energy band gap was found to change with the deposition voltage. PEC analysis verified that both the as-deposited and the annealed samples are p- and n-type conductivity. The surface morphology and roughness study demonstrates that the film completely covered the glass substrate and that the form, grain size, and morphology all altered with deposition cathode voltage. The elemental composition analysis confirmed the presence of Cd, Zr, and S in the films, and their percentage composition varied with deposition voltage. The overall analysis shows the addition of Zr in CdS thin films increased the band gap, and therefore, the prepared materials have potential application in p-n junction solar cells as a window (buffer) layer.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

Primary author: MOHAPI, TSHEPO KARABO WILLIAM (UNIVERSITY OF THE FREE STATE)

Co-authors: Mr YIMAMU, A.U. (UFS); Dr TSHABALALA, K.G. (UFS); Dr MOTLOUNG, S.J. (UFS)

Presenter: MOHAPI, TSHEPO KARABO WILLIAM (UNIVERSITY OF THE FREE STATE)

Session Classification: Poster Session 1

Track Classification: Track A - Physics of Condensed Matter and Materials