

5<sup>th</sup> International Conference on

# Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

## Fabrication and characterization of copper doped cadmium sulphide thin film solar cell

**Sabur Abiodun Ayinde**  
The Federal Polytechnic, Nigeria

The fabrications of electronic components, especially solid-state devices and microelectronic integrated circuits, have undoubtedly found the widest and most demanding applications for thin-film depositions. With a view to fabricating a solar cell, a prepared precursor of Copper Cadmium dithiocarbamate was used for the deposition of CuCdS thin films at 420°C on ITO coated glass substrate by MOCVD technique as the absorber layer. Aluminium doped Zinc Oxide (AZO) was also deposited by spray pyrolysis at 350°C as the window layer on the deposited absorber layer. Silver paste was drop-dried on the deposited window layer as the ohmic contact. The result of the deposited layered thin films and the solar cell were analyzed using Rutherford Backscattering Spectroscopy and Energy Dispersive X-ray (EDX), UV Visible spectrophotometer, Keithley four-point probe instrument, and I-V analysis. The RBS analysis of the deposited CuCdS film revealed the percentage composition of Cu=4.20%, Cd=10.77%, S=33.74%, and O=51.27%. Film thicknesses of 133nm and 889nm were recorded for AZO and CuCdS thin film respectively as obtained from the RBS analysis. The composition of AZO as observed by EDX is Al=1.13%, Zn=66.40%, and O=21.61%. The UV-visible analysis of AZO film revealed that the film had an optical transmittance of 60% in the visible portion of the spectrum with a direct bandgap of 3.25eV, while bandgap of CuCdS is 2.41eV. The absorbance of the CuCdS film was observed to be low in the VIS/NIR regions and high in UV region. The sheet resistance and resistivity of AZO film are  $9.58 \times 10^6 \Omega/\text{square}$  and  $1.27 \times 10^{-2} \Omega\text{cm}$  respectively, while  $1.17 \times 10^9 \Omega/\text{square}$  and  $10.40 \Omega\text{cm}$  were obtained as the sheet resistance and resistivity of CuCdS film respectively. The I-V analysis of the fabricated solar cell showed that, under dark condition, it behaves like a diode or semiconductor current rectifier. The fill factor as extracted from the device and its corresponding conversion efficiency are 0.6911 and 4.38% respectively.

### Biography

Sabur Abiodun Ayinde is a PhD student at Obafemi Awolowo University where he had his masters in Engineering Physics in 2015. He is a 33 years academic staff of The Federal Polytechnic, Ede, Nigeria. He has worked in a manufacturing industry after the graduation of his first degree and has spent the past 7 years of his life as a polytechnic teacher. He has attended a series of conferences and has published more than 8 papers in reputed journals. In his quest to know how things work, he likes to solve challenging problems in materials and solid state electronics. He is happily married with a kid and has always had the desire to render community services to the people.

saburayinde@yahoo.com

### Notes: