INVENTORS

ASSOC. PROF. DR. YARUB AL-DOURI
MR. AUTHMAN SALIM

CONTACT DETAILS

Institute of Nano Electronic Engineering, University Malaysia Perlis, 01000 Kangar, Perlis
Email: yarub@unimap.edu.my

$Cu_2Zn_{1-x}Cd_xSnS_4$ NANOSTRUCTURES TO AMELIORATE SOLAR CELL EFFICIENCY

Patent Filling Number: PI 2012-002112

COMMERCIAL POTENTIAL

$Cu_2Zn_{1-x}Cd_xSnS_4$-based photoelectronics have unlimited markets to be benefited society and life. Due to its high value and distinguished potential applications, $Cu_2Zn_{1-x}Cd_xSnS_4$ provides low cost and high efficiency. The obtained patent will secure our copyrights and help us to licensing and transfer the knowledge safety to display the academic entrepreneurship. The knowledge is fulfilled via its achieving the scientific goal and purpose to the society.

NOVELTY

$Cu_2Zn_{1-x}Cd_xSnS_4$ has been attracted for photodetectors, optoelectroics and PV's technologies, due to its high efficiency reaches up to 9.5%.

INVENTIVENESS

Its inventiveness proved that our suggested $Cu_2Zn_{1-x}Cd_xSnS_4$ is the FIRST and NUMBER 1 worldwide.

Fig 1: SEM images at X=0 & 1.

SCIENTIFIC VALUE

$Cu_2Zn_{1-x}Cd_xSnS_4$ is a likely interfacial layer in $Cu_2Zn_{1-x}Cd_xSnS_4$ based solar cells. It is thus important to investigate and understand the photoelectronics behaviour of $Cu_2Zn_{1-x}Cd_xSnS_4$ to improve the solar cells efficiency and to develop alternative buffer layer materials containing no heavy metals. We have synthesized monodispersed kesterite phase $Cu_2Zn_{1-x}Cd_xSnS_4$ nanostructure over the entire Cd concentrations. The band gap of $Cu_2Zn_{1-x}Cd_xSnS_4$ nanostructure decreases linearly from 1.9 eV (X = 0) to 1.48 eV (X = 1).

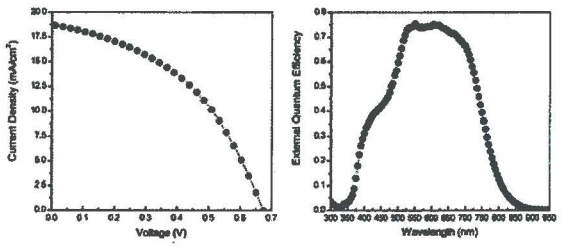

Fig 2: I-V characterization.

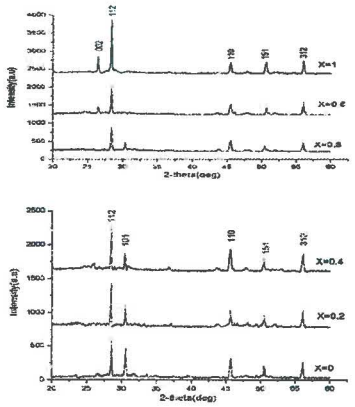

Fig 3: X-ray diffraction patterns at X=0 & 1.

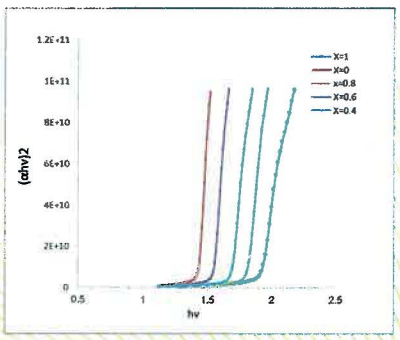

Fig 4: Band gap versus composition (x).