M. A. Majeed Khan, J Nanomedic Nanotechnol 3:1
doi: http://dx.doi.org/10.4172/2157-7439.S1.07

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Nanotechnology & Nanomedicine
March 12-14, 2012 Omaha Marriott, USA

TITLE

Spray-deposited CuInS2 nanocrystalline thin film suitable for solar cells

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Recently, chalcopyrite semiconductors have been successfully applied as absorber layers for polycrystalline thin film solar cells. The photovoltaic device is suited to the low-cost power generation system. There is a need to prepare low-cost absorbers to reduce the cost of device fabrication and produce higher efficiency cells in the near future. Among them the ternary compound $CuInS_2$ (CIS) has the potential for high conversion efficiency due to its direct bandgap of 1.5 eV, which well matches with the solar spectrum and its high absorption coefficient of approximately 10^5 cm^{-1}. $CuInS_2$ thin film has been deposited on glass substrates using the spray pyrolysis technique at 300°C. The crystallinity of the spray-deposited $CuInS_2$ films was generally good. CuInS2 films were characterised characterized by XRD, TEM, HRTEM, EDS and UV–vis. XRD calculations show that the crystallite size of the films ranges from 35 nm to about 40 nm. TEM micrograph show that the film grown on glass subtract has single phase nano-sized (30–40 nm) particles of $CuInS_2$. XRD and SAED patterns indicated polycrystalline nature of the nanoparticles. The UV– vis absorption spectra showed the as-synthesized $CuInS_2$ NCs had fine absorption in the visible light region and the energy band gap was estimated to be 1.52 eV.

Biography

M. A. Majeed Khan has completed his Ph.D at the age of 30 years from Jamia Millia Islamia University. He is the Assistant Professor of King Abdullah Institute for Nanotechnology, King Saud University, Riyadh, Saudi Arabia. He has published more than 40 research papers in reputed international journals. He is a reviewer of many reputed international journals.