

Semiconductor Nanofilm Based Schottky-Barrier Solar Cells

Authors : Mariyappan Shanmugam, Bin Yu

Abstract : Schottky-barrier solar cells are demonstrated employing 2D-layered MoS₂ and WS₂ semiconductor nanofilms as photo-active material candidates synthesized by chemical vapor deposition method. Large area MoS₂ and WS₂ nanofilms are stacked by layer transfer process to achieve thicker photo-active material studied by atomic force microscopy showing a thickness in the range of ~200 nm. Two major vibrational active modes associated with 2D-layered MoS₂ and WS₂ are studied by Raman spectroscopic technique to estimate the quality of the nanofilms. Schottky-barrier solar cells employed MoS₂ and WS₂ active materials exhibited photoconversion efficiency of 1.8 % and 1.7 % respectively. Fermi-level pinning at metal/semiconductor interface, electronic transport and possible recombination mechanisms are studied in the Schottky-barrier solar cells.

Keywords : two-dimensional nanosheet, graphene, hexagonal boron nitride, solar cell, Schottky barrier

Conference Title : ICNOP 2015 : International Conference on Nanotechnology, Optoelectronics and Photonics

Conference Location : Stockholm, Sweden

Conference Dates : July 13-14, 2015