Semiconductor Nanofilm Based Schottky-Barrier Solar Cells

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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 are studied with 2D-layered MoS2 and WS2 are studied by Raman spectroscopic technique to estimate the quality 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.

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