Photovoltaic behavior of selenized SnSe solar cells

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SnSe is an absorber with promising optoelectronic properties and low environmental constraints of interest for high-efficiency solar cells. Thin films of SnSe absorber layers were grown by selenization of sputtered tin precursor layers using rapid thermal annealing system. The effect of selenization temperature (Ts) that varied in the range of 250 – 450 °C for a fixed sulphurization time of 30 min on SnSe film was studied through various characterization techniques. The X-ray diffraction measurements indicated that all the grown films had the (111) crystal plane as the preferred orientation and exhibited orthorhombic crystal structure. The optical energy band gap values were estimated using the transmittance spectra and found to be varied from 1.0 eV to 1.3 eV with Ts. The Hall effect measurements showed that all the films were p-type conducting nature. The SnSe based thin film solar cell was developed that showed a conversion efficiency > 1%.