Abstract

In this study, tin selenide was prepared at different ratios using tin and selenium pellets in glass tube filled with argon and then heated up to 350°C, also, tin doped zinc oxide was prepared using tin pellets and zinc granules in a similar procedure followed when preparing tin selenide. The resulting materials were cut into ingots, respectively and used in preparing thin films by resistive evaporation. The evaporation was done using Edwards auto 306 coating unit. The chamber pressure was maintained at 5.0 x 1O-5mbars during the film deposition. Thin films of tin-selenide and those of tin doped zinc oxide were characterized for optical properties and sheet resistance. The optical measurements were done using UV-VIS-NIR spectrophotometer Solid State 3700 DUV in the visible range (380-750nm) and the transmittance spectra data obtained was analyzed using the SCOUT software. The transmittance for zinc oxide ranged between 75% to 90% and that of tin selenide was below 60% with their band gap energies obtained as 2.95eV and 1.40eV respectively. The electrical characterization measurements were carried out using a four point probe at room temperature (25°C) to obtain the sheet resistivity. The value of resistivity for tin selenide was 20.1 Ocm while that of tin doped zinc oxide was found to be 24.30cm at 4% doping concentration. The SnSe/ZnO:Sn p-n junction solar cell was also fabricated by double depositing the optimized films on a microscope glass slide. The current voltage (1- V) characterization of the p-n junction diode was done using a solar cell simulator. and the data obtained was used to calculate solar cell parameters; open circuit voltage Voc= 0.5716 V, FF = 0.6654 and the short circuit current Isc = l.0799 mAlcm2 .The resulting solar cell efficiency 11 of 0.41 % was higher than that obtained by previous study using ZnO of 0.117%.