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Optimization of Sn_xSe_y Deposited by Reactive Thermal Evaporation for Solar cell Application

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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. The resulting materials were cut into ingots which were used in preparation of thin films by thermal evaporation. The evaporation was done using Edwards auto 306 coating unit. The chamber pressure was maintained at 5.0×10^{-5} mbars during the film deposition. Thin films of tin-selenide produced using various ratios 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 films with ratio of 1:1 showed the highest transmittance of 85% with a band gap energy obtained as 1.40eV. 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 was 20.1 Ωcm .
