PROPERTIES OF SPRAY PYROLYSED CdSe$_{0.6}$Te$_{0.4}$ FILMS

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The films deposited on titanium substrates were used as photoelectrodes. The as deposited films did not exhibit any photoactivity. The films were annealed in argon atmosphere at 500°C for 10 min. After heat treatment, the films exhibited photoactivity. Amongst the different compositions, films with composition CdSe$_{0.6}$Te$_{0.4}$ exhibited maximum photocactivity; hence, further studies were carried out only on films of this composition. The load characteristics of the electrodes of the above composition were studied at different intensities. At 80 mWcm$^2$, a $V_{oc}$ of 0.6V, $J_{sc}$ of 12 mAcms$^{-2}$, $ff$ of 0.5 and $\eta$ of 4.5 % were obtained. After photoetching the films in 1:50 HCl, the output parameters were found to increase. A $V_{oc}$ of 0.65V, $J_{sc}$ of 16 mAcms$^{-2}$, $ff$ of 0.55 and $\eta$ of 7.15 % were obtained. Mott-Schottky plots indicated n-type behaviour. A flat band potential of –1.15V(SCE) was observed. Spectral response behaviour indicated maximum photocurrent at 1.58 eV. This value matches well with bandgap of 1.56 eV obtained for this composition from optical absorption measurements. Maximum quantum efficiency of 0.56 was obtained at this wavelength.

The above results point to the possibility of preparing efficient photoelectrodes for PEC cells by the above method. The stability of the cells was studied under sunlight illumination, and they were found to be stable for more than one year.

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