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Indium doping effects of CdSe nanocrystalline films for solar cell applications

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Energy storage capacity, conversion efficiency with clean power to the environment makes PEC solar cell to find potential applications in field of energy. Suitable bandgap and high stability makes CdSe (Cadmium Selenide), a promising material for the solar cell applications. Also the performance of CdSe based devices are influenced by doping with suitable material. In our present work electron beam (EB) evaporation method was employed to deposit CdSe and Indium doped CdSe (with In concentration of 25, 50 and 75%) thin films at different substrate temperatures and the films were optimized for the preparation of (Photo electrochemical) PEC solar cells. The EDX analysis shows the increase in the percentage of indium with the increase in the concentration of doping and the X-ray analysis shows the shifting in the peak position which confirms the incorporation of indium. The grain sizes were found to be in the range of 20-24 nm and it is found to decrease with increase in concentration. The calculated energy gap value decreased with increase in concentration. PEC solar cell is fabricated using CdSe: In films prepared by EB technique with the thickness of 400 nm and substrate temperature of 100°C. The I-V studies performed under the illumination of 100 mW/cm² and it is found that the 25% of indium in CdSe showed an efficiency of 2.66% and fill factor of 0.41.

Biography

N.J.Suthan Kissinger has completed his PhD at the age of 31 years from Bharathiar University, India and postdoctoral studies from Chonbuk National University, School of Advanced Materials Engineering, South Korea. He is currently working as an Assistant Professor in Physics in Jubail University College, Saudi Arabia. He has organized many conferences and published more than 25 papers in reputed journals and has been serving as an referee for many reputed journals. He has been teaching for more than 15 years.

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