Preparation, characterization, modification and application of nano-sized cadmium chalcogenide thin-films: enhancement of light conversion efficiency and stability

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Abstract:

In earlier studies in light-to-electricity conversions, new simple techniques to modify characteristics of monolithic semiconductor electrodes (such as n-Si and n-GaAs) had been used. A combination of cooling rate and coverage with electro-active ions embedded into polymer matrix, enhanced both conversion efficiency and stability of the electrodes. Recently, research has been focused on chemical bath deposited (CBD) thin-film semi-conducting (SC) electrodes. However, such thin-film electrodes suffer low efficiency of conversion, and low stability under photo-electrochemical (PEC) conditions. To enhance efficiency and stability of new CBD-based thin-film SC electrodes, we employed our earlier techniques, cooling rate and coverage with electro-active species, to cadmium chalcogenide (CdX: where X = S or Se) thin-film electrodes. The results are encouraging. Both electrode efficiency and stability of CdS electrodes have been significantly enhanced. Moreover, CBD-based CdSe films, which have not been described before in PEC systems, has been prepared here and stabilized for the first time ever.

In this presentation, details of preparation, modification, characterization results and PEC characteristic will be described.

Key words: Solar energy, CdS, CdSe, thin film electrodes.

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