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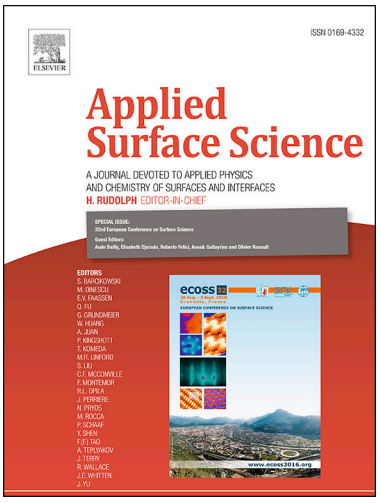

Full Length Article

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Improved stability toward photo-electrochemical behavior of multi-chalcogenide CdSeS thin films

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Abstract:

The present study deals with the synthesis of polycrystalline *n*–CdSeS composite films on FTO-coated glass substrate routed through galvanostatic method of deposition at constant temperature from the electrolytic solution containing respective precursors, while varying the concentration of elemental sulfur in the bath. Band gap energies of the nano-structured films were found to lie within the range 2.26–2.48 eV. The structure, composition and morphology of the film matrices were revealed through the respective techniques, XRD, UV-VIS spectroscopy and electron microscopy, while, their photo-electrochemical (PEC) properties were determined through several electrochemical investigations. The best ternary CdSeS film was identified with 0.15M S concentration in the preparative bath. This particular film shows a photoconversion efficiency of 0.94% which is higher than the individual binary systems. The optimized film bears high carrier concentration, almost twice than that of CdSe and thrice than that of CdS films and shows significant photo-response. Furthermore, the inherent stability of the matrix increases with the incorporation of S and the film developed at 0.15M S is found to be ~100 times more stable than the bare CdSe films.

Keywords CdSeS composite film; Photo-electrochemical cell; EIS; potentiodynamic polarization; Anodic stripping voltammetry

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