Short Communication

Controllable Preparation of $\text{Zn}_x\text{Cd}_{1-x}\text{S}$ Films by Chemical Bath Deposition for Enhanced Photocatalytic Activity

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Composition-tunable $\text{Zn}_x\text{Cd}_{1-x}\text{S}$ alloy films were synthesized using the method of chemical bath deposition (CBD). When the Zn/Cd molar ratios were tuned based on the initial materials, their film structures ranged from primarily hexagonal CdS to primarily cubic ZnS, accompanied by gradual macromorphological changes from leaf-like to rod and spherical particles. Moreover, with an increase in the proportion of Zn, blue shift was observed in both the photoluminescence spectrum and the ultra violet absorption spectrum, which indicates the highly controlled properties of $\text{Zn}_x\text{Cd}_{1-x}\text{S}$ when the composition of the materials was tuned. It was found that $\text{Zn}_x\text{Cd}_{1-x}\text{S}$ alloy films showed significant enhancement in photocatalytic activity for methyl orange degradation under visible irradiation. The degradation efficiency was 2.3 times higher than that of pure ZnS under visible light irradiation.

Keywords: Thin films, Metals and alloys, Photocatalytic, Blue shift, Semiconductors

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