

Photoelectrochemical water splitting cell using $\text{CuInS}_2/\text{CdS}/\text{ZnO}$ heterostructure

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In this research, photoanodes using $\text{CuInS}_2(\text{CIS})/\text{CdS}/\text{ZnO}$ are fabricated. All process are solution-based. CIS and CdS layers are deposited onto ZnO NWs and this structure is good for light harvesting and charge separation. $\text{CuInS}_2(\text{CIS})$ layer has a narrow band gap, so has a great light absorptivity. CdS layer also has a good absorptivity and it is acted as a intermediate layer between CIS layer and ZnO nanowire(NW). ZnO NWs are fabricated via hydrothermal method, CdS layer via successive ion layer adsorption and reaction(SILAR) method and CIS layer via precursor solution spin coating. light absorbance is improved in visible light region($\sim 750\text{nm}$) compared to bare ZnO NW and CdS/ZnO NW. this photoelectrode has generated a greatly improved photocurrent density of 13.8 mA cm^{-2} at 0.3 V vs. SCE under 1 sun illumination.