

BiVO₄ photoanode with well controlled oxygen vacancy for enhanced photoelectrochemical properties

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BiVO₄ photoanode for photoelectrochemical cell was synthesized by various methods. Through the 2-step electrodeposition method, thickness controlled BiVO₄ film with porous structure could be prepared. For enhancing crystalline quality of BiVO₄, V precursor was aged in MeOH solvent before reaction. Aged V precursor could make optimized BiVO₄ crystal and enhanced film morphology. Various condition of gas annealing was conducted to prepared BiVO₄ samples for oxygen vacancy control. Modified BiVO₄ samples with N₂ gas and H₂ mix gas showed 25% and 40% enhanced photocurrent density each. Not only photocurrent value but also onset potential was improved with cathodic shift. Enhanced photoelectrochemical properties of modified BiVO₄ photoanode was analyzed through UV-vis. absorption and tauc plot, XPS, EIS, Mott-Schottky measurements. The modification method could be useful tool for oxide material based photoelectrochemical water splitting system.