Supplementary Information

Ag₃PO₄/SnO₂ Semiconductor Nanocomposites with Enhanced Photocatalytic Activity and Stability

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Experimental

Catalyst Preparation

The Ag₃PO₄ were prepared by a simple stirring process at room temperature. 0.25 g CH₃COOAg was well dissolved in aqueous solution. Na₂HPO₄ aqueous solution (0.075 M) was added drop by drop to the above solution. The resulting mixture was constant magnetic stirring at room temperature for 4 h in the dark. The resulting products were washed with deionized water for several times, and finally dried at 50 °C for 5 h in a vacuum.

The Ag₃PO₄/SnO₂ were prepared by a simple stirring process at room temperature. Typically, Na₂HPO₄ (0.021 g,) and Na₂SnO₃·3H₂O (0.008 g,) were dissolved in CH₃COOAg aqueous solution (0.03 g, 35 mL deionized water) then stirred for 24 h in the dark. The resulting products were washed with deionized water for several times, and finally dried at 50 °C for 5 h in a vacuum.

Catalyst Characterization

Characterization: Scanning electron microscopy (SEM) images and energy dispersive X-ray analysis (EDX) spectroscopy were taken on a FEI-quanta 200 scanning electron microscope with acceleration voltage of 20 kV. Transmission electron microscopy (TEM) and high-resolution TEM (HRTEM) images were obtained with a FEI/Phillips Tecnai 12 BioTWIN transmission electron microscope and a CM200 FEG transmission electron microscope, respectively. The normal TEM samples were prepared by dropping the solution onto a copper grid with polyvinyl formal support film and dried in air, respectively. The crystal structure of the resultant products was characterized by X-ray powder diffraction (XRD) by using a X’Pert-ProMPD (Holand) D/max-γAX-ray diffractometer with Cu Kα radiation (λ = 0.154178 nm). Room temperature UV–Vis absorption was recorded on a Lambda 750 (PerkingElmer) spectrophotometer in the wavelength range of 200–800 nm.

Catalyst Activity

0.2 g photocatalyst (P25, Ag₃PO₄, Ag₃PO₄/SnO₂) was suspended in 100 mL aqueous solution of 60 ppm MO. The solution was stirred for 1 h without light to ensure the establishment of an adsorption–desorption equilibrium. Visible light are obtained by using cutoff filters to remove light (150 W, Xenon lamp) of λ < 420 nm, and during the irradiated, 3 mL aliquots were removed at certain time intervals and analyzed on a UV-Vis spectrophotometer (Lambda 750 PerkingElmer spectrophotometer) to record concentrations. Before the spectroscopy measurement, these photocatalysts were removed from the
photocatalytic reaction systems by centrifugation.

**Fig. S1** SEM image of Ag₃PO₄ nanoparticles.

**Fig. S2** UV-vis absorption spectra of Ag₃PO₄ and Ag₃PO₄/SnO₂.