Supporting information

Facile synthesis of sheet-like ZnO assembly composed of small ZnO particles for highly efficient photocatalysis

Yu Hong, Chungui Tian,* Baojiang Jiang, Aiping Wu, Qi Zhang, Guohui Tian, Honggang Fu*

Key Laboratory of Functional Inorganic Material Chemistry, Ministry of Education of the People's Republic of China, Heilongjiang University, Harbin 150080 P. R. China

Fax: (+86) 451 8666 1259; Tel: (+86)451 8660 9115

E-mail: tianchungui@yahoo.com.cn, fuhg@vip.sina.com

1. SEM and TEM test of precursor

Fig.S1 SEM and TEM images of glycerol zinc precursor.
2. XRD test of precursor

![XRD pattern of glycerol zinc precursor](Fig.S2)

Fig.S2 XRD pattern of glycerol zinc precursor.

3. IR test of precursor

![IR spectra of Glycerol and glycerol zinc precursor](Fig.S3)

Fig.S3 IR spectra of Glycerol and glycerol zinc precursor
4. TG analysis of precursor

![TGA curve](image)

**Fig. S4** TG analysis of glycerol zinc precursor.

5. XRD patterns of ZnO sheets in narrow range

![XRD patterns](image)

**Fig. S5** XRD patterns of ZnO-400, ZnO-600 and ZnO-800 in narrow range of 24 to 42 degree.
6. IR test of ZnO sheets

![IR spectra of ZnO sheets](image)

Fig. S6 IR spectra of ZnO-400, b) ZnO-600 and c) ZnO-800.

7. The photodegradation curve of MO under UV-light irradiation in the absence of catalysts

![Photodegradation curve](image)

Fig. S7 The photodegradation curve of MO under UV-light irradiation with no use of catalyst.
8. The photocatalytic activity of ZnO-400, ZnO-600, ZnO-800 and P25 TiO₂ for photodegradation of 2-chlorophenol

![Photodegradation curve](image)

**Fig. S8** The photodegradation curve of 2-chloro phenol under UV-light irradiation over ZnO-400, ZnO-600, ZnO-800 and P25 TiO₂.

9. The synthesis and characterization of Ag/ZnO-600 sheets

The Ag modified ZnO-600 (Ag/ZnO-600) was prepared through a two-step assembled method. First, the Ag particles were obtained by a NaBH₄ reduction method as follows. A 20 mL solution with a final concentration of 0.25 mM AgNO₃ and 0.25 mM trisodium citrate in water was prepared. While stirring vigorously, 0.6 mL of 50 mM NaBH₄ was added all at once. Stirring was stopped after 30 s.

Synthesis of silver-modified ZnO sheets: ZnO sheets (0.2 g) were dispersed in 10 mL solution which contained 5 mL ethanol and 5 mL coupling agent KH550. After stirring at the room temperature for 24 h, the KH550 decorated ZnO sheets were obtained. The product was washed by ethanol and water in order. After that, Ag NPs sol (60 mL) was added, and stirred for 2 h. After washing with water for several times, the silver modified ZnO sheets were finally obtained.
Fig. S9 XRD pattern of Ag/ZnO-600. For comparison, the XRD pattern of original ZnO-600 is also given.

From the patterns, we can see that the peaks belonging to Silver are very weak, indicating the low content of Ag in Ag/ZnO-600 samples. The calculated value of Ag in ZnO is about 0.8% on the basis of experimental parameters.