

## Supporting Information

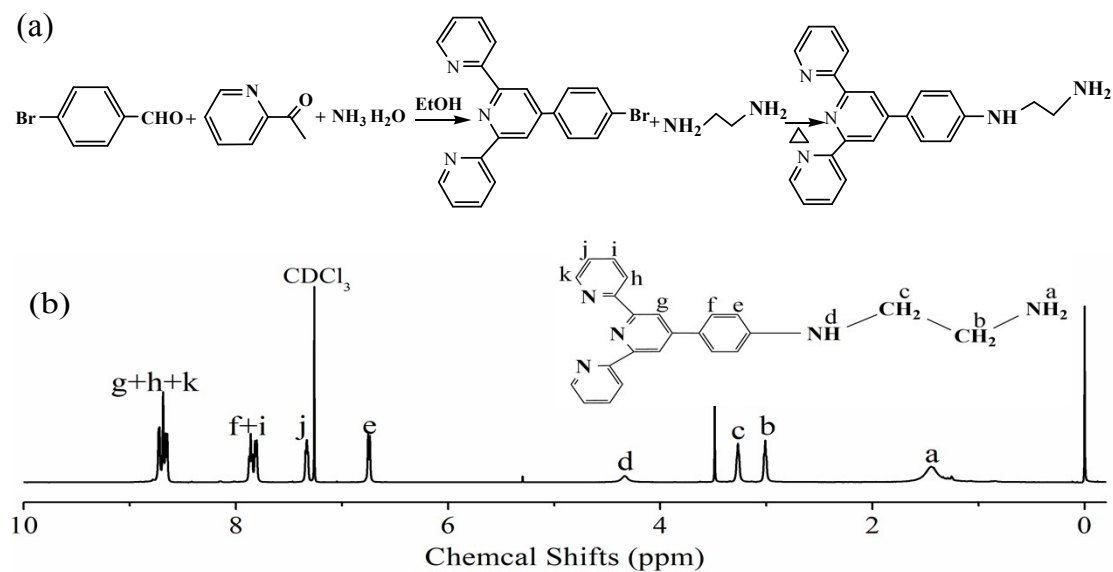
**Macroporous polymer resin with conjugated side-chains:  
An efficient Ag nanoparticles support for preparing  
photocatalyst**

Lin Wang,<sup>a</sup> Xuejiao Chen,<sup>a</sup> Yandong Duan,<sup>a</sup> Qingzhi Luo,<sup>a\*</sup> Desong Wang<sup>ab\*</sup>

- a. School of Sciences, Hebei University of Science and Technology, Shijiazhuang 050018, People's Republic of China. E-mail: [dswang06@126.com](mailto:dswang06@126.com), Fax: +86311-81669962, Tel:+86311-81669962 (D. W.); E-mail: [lqz2004-1@163.com](mailto:lqz2004-1@163.com), Fax: +86311-81669970, Tel: +86311-81669970 (Q. L.)*
- b. State key Lab of Metastable Materials Science and Technology, Yanshan University, Qinghuangdao, 066004, People's Republic of China. E-mail: [dswang06@126.com](mailto:dswang06@126.com), Fax: +86335-8058006, Tel: +86335-8058006 (D. W.)*

## Synthesis of TE.

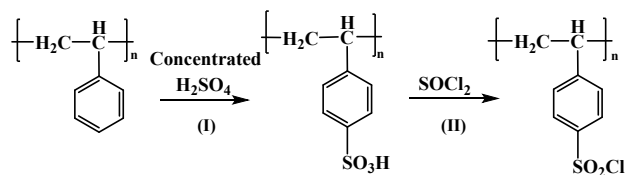
4'-(p-ethanediamine phenyl)-2,2':6',2''-terpyridine (TE) was prepared as following. As step I in Fig. S1a, acetylpyridine (4.48 g, 0.04 mol), ammonium hydroxide (NH<sub>3</sub>·H<sub>2</sub>O, 80 mL), KOH (3.4 g, 0.06 mol) and bromobenzaldehyde (4 g, 0.02 mol) were added to ethanol (120 mL) under stirring and refluxed at 90 °C for 24 h. After reaction, the white powders of 4'-(p-Bromophenyl)-2,2':6',2''-terpyridine were collected after filtering and washing with ethanol. In step II in Fig. S1a, a solution of 4'-(p-Bromophenyl)-2,2':6',2''-terpyridine (2.79 g, 0.12 M) in 2-methoxyethanol (60 mL) was mixed with ethanediamine (30 mL) and CuCl (10 mg) as catalyst, which was refluxed and stirred for 3 d. After that, the yellow-blue precipitate was collected by filtration. The resulting powders (2.6 g, 7.3 mmol) were added to the aqueous mixture (100 mL) of ethylenediaminetetraacetic acid disodium salt (EDTA-2Na) (3.6 g, 12.3 mmol) and NaOH (10 mg, 0.25 mmol) under stirring for 30 min, and the crude product was obtained by filtration. The crude product was purified by silica gel chromatography using a CH<sub>2</sub>Cl<sub>2</sub> and MeOH (10:1 by volume) as eluent and the yellow-green TE was obtained. The structure of TE was confirmed by <sup>1</sup>H NMR spectra (Fig. S1b)



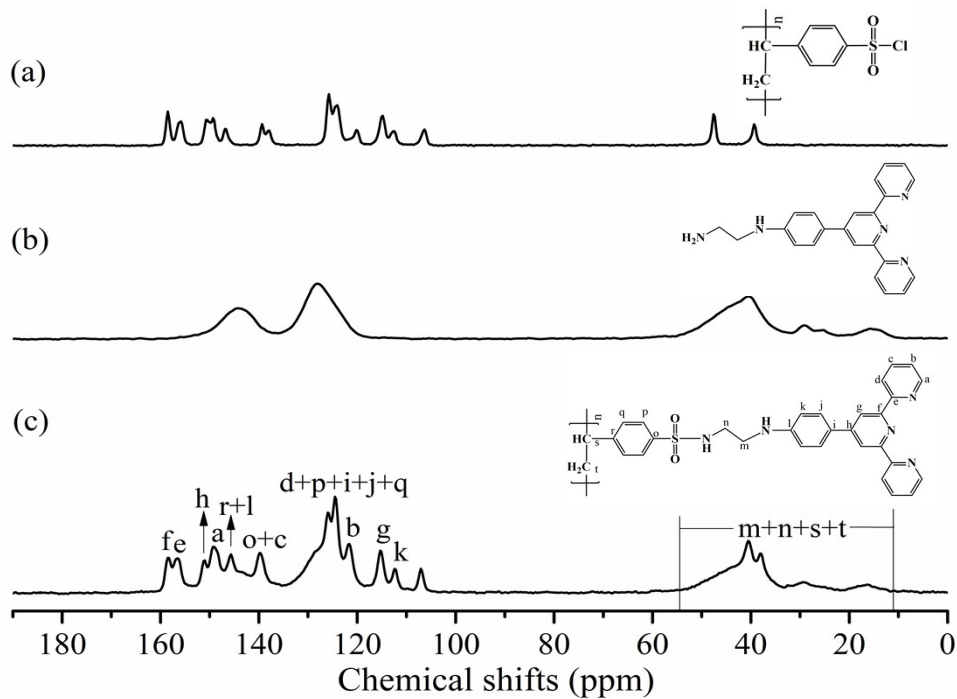
**Fig. S1.** (a) Synthetic routes of TE; (b)  $^1\text{H}$  NMR spectrum of TE.

### Preparation of chlorosulfonated-resin.

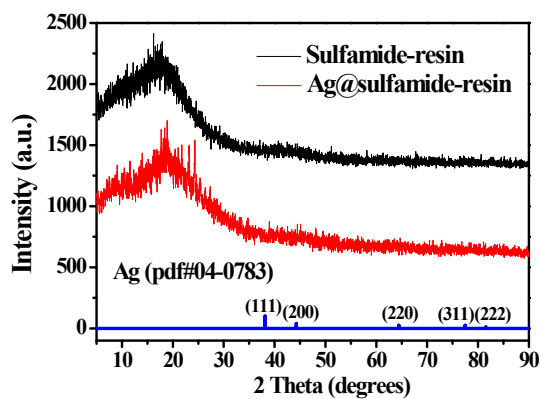
Chlorosulfonated-resin was synthesized as following. Firstly, the sulfonated macroporous resin was synthesized by blending concentrated  $\text{H}_2\text{SO}_4$  (98%, 40 mL) and porous resin (3.0 g) for overnight (see step I in Fig. S2). This gave a final sulfonation degree of  $9 \text{ mmol}\cdot\text{g}^{-1}$ . Secondly, the resulting sulfonated macroporous resin (3.0 g) was added to a mixture of thionyl chloride ( $\text{SOCl}_2$ , 20 mL) and N, N-dimethylformamide (DMF, 200  $\mu\text{L}$ ) under stirring at  $60^\circ\text{C}$  for 8 h. Finally, the reaction mixture was filtrated and the final yellow solid powder of chlorosulfonated-resin was obtained (see step II in Fig. S2). All the solvents used were anhydrous.



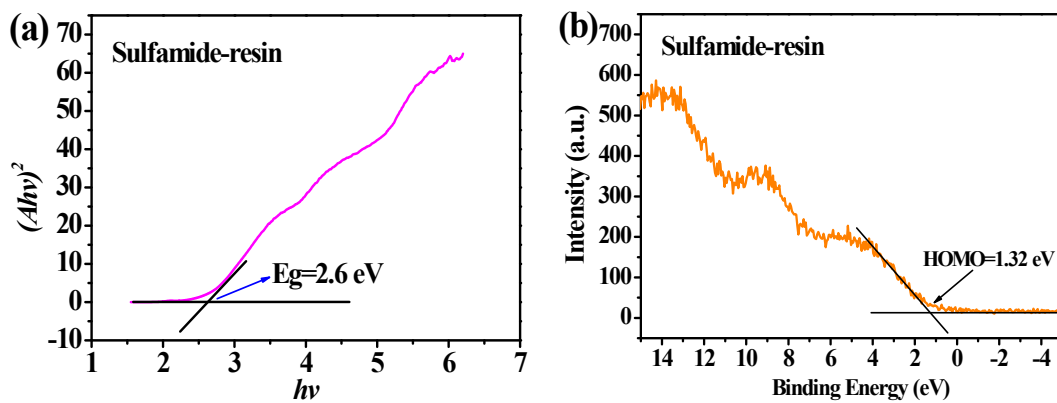
**Fig. S2** Synthetic route of chlorosulfonated-resin.



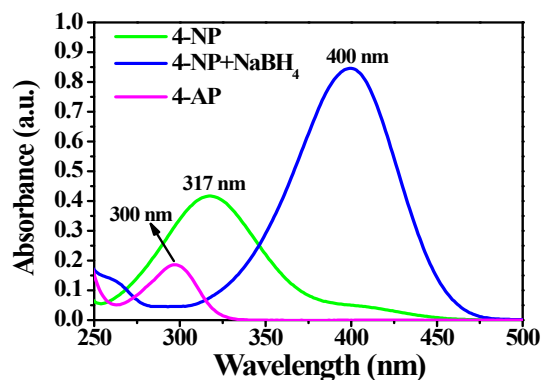
**Fig. S3**  $^{13}\text{C}$  NMR spectra of chlorosulfonated-resin, TE and sulfamide-resin.



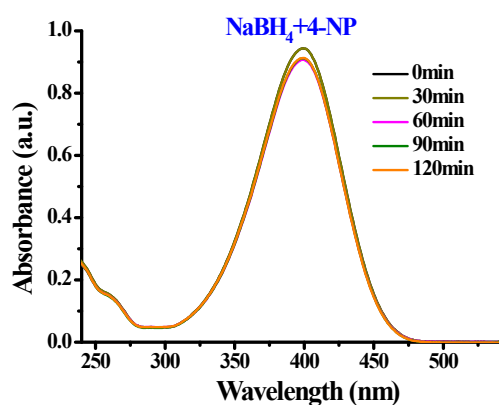
**Fig. S4** X-ray diffraction patterns of pure Ag nanoparticles, sulfamide-resin and Ag@sulfamide-resin.



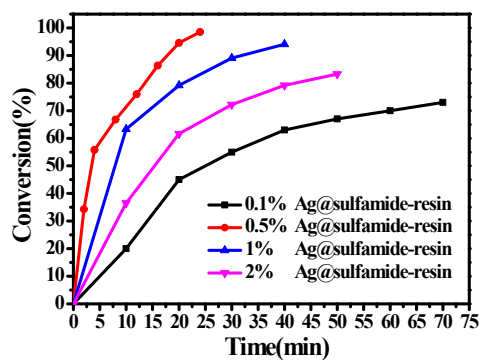
**Fig. S5** (a) The curve of  $(ah\nu)^2$  vs.  $h\nu$  of sulfamide-resin; (b) VB-XPS spectrum of sulfamide-resin.



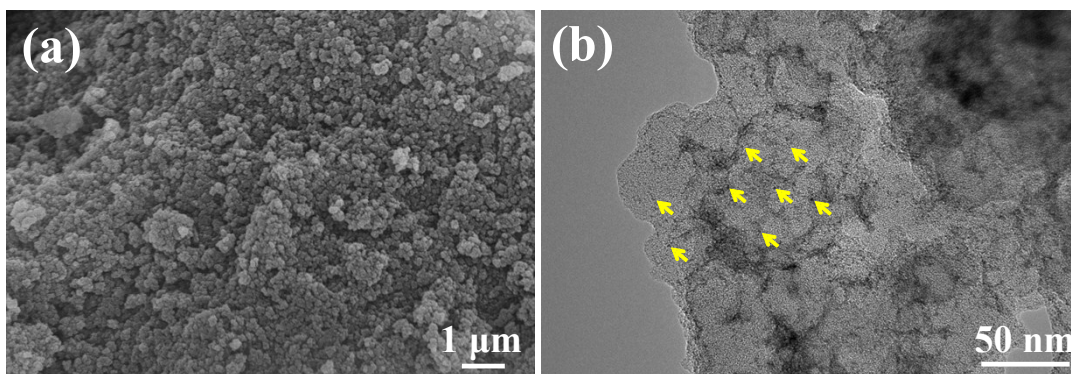
**Fig. S6** UV-Vis spectra of 4-AP, 4-NP before and after addition of NaBH<sub>4</sub> solution.



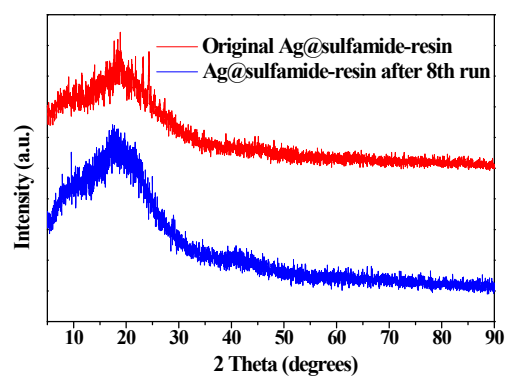
**Fig. S7** Time-dependent UV-Vis spectra of catalytic reduction of 4-NP only with NaBH<sub>4</sub>.



**Fig. S8** The conversion efficiency of 4-NP by sulfamide-resin with different Ag amount.



**Fig. S9** SEM image (a) and TEM image (b) of Ag@sulfamide-resin after 8th run



**Fig. S10** X-ray diffraction patterns of Ag@sulfamide-resin before and after 8th run.