Supporting Information

A Direct Route to Spherical Mesoporous Molecular Sieves MCM-48 modified by Bi_2WO_6 as High Activity Visible-Light-Driven Photocatalysts

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1. Photochemical Experiments:

The photocatalytic activity was evaluated by measuring the decomposition of the aqueous solution of Acid Orange 7 (AO7, 20 mg L^{-1}) and terephthalic acid (20 mg L^{-1}). A 500 W halogen lamp was used as the light source of the homemade photoreactor, cooled with flowing water in a quartz cylindrical jacket around the lamp. The short wavelength components ($\lambda < 420$ nm) of the light were cut off using a glass optical filter. The distance between the lamp and the center of the quartz tube was 10 cm. For a typical photocatalytic experiment, a total of 0.06 g of catalyst powders was added to 60 mL of the above AO7 solution in the quartz tube and the PH value of solution was adjusted to 6 by pH meter. Prior to irradiation, the suspensions were magnetically stirred in the dark for 30 min to ensure the establishment of an adsorption/desorption equilibrium. The above suspensions were kept under constant

airequilibrate conditions before and during the irradiation. At given time intervals, about 4 mL aliquots were sampled, and centrifuged to remove the remaining particles. The residual AO7 solution was then analyzed by recording variations in the UV-vis absorption of AO7 using a Cary 100 ultraviolet-visible spectrometer.

2. Analysis Techniques:

X-ray powder diffraction (XRD) patterns of all samples were recorded on a Rigaku D/MAX-2550 diffractometer by using Cu Kα radiation of wavelength 1.541 Å, typically running at a voltage of 40 kV and current of 100 mA. The Raman spectra were recorded on the inVia Reflex spectrometer equipped with an optical microscope at room temperature. For excitation, the 785 nm line from an Ar^+ ion laser was focused. The BET specific surface area (S_{BET}) and BJH pore size distribution were determined by nitrogen adsorption at 77.3 K (Micromeritics ASAP 2020). Samples were degassed at 473 K for 5h prior to the measurement. The surface morphologies and particle sizes were observed by transmission electron microscopy (TEM, JEM-2011), using an accelerating voltage of 200 kV. The diffuse reflectance UV-visible (UV-vis) spectroscopy was recorded with a VARIAN Cary 500. The instrument employed for X-ray photoelectron spectroscopy studies was a Perkin-Elmer PHI 5000C ESCA System with Al Kα radiation operated at 250 W.

3. Raman spectra

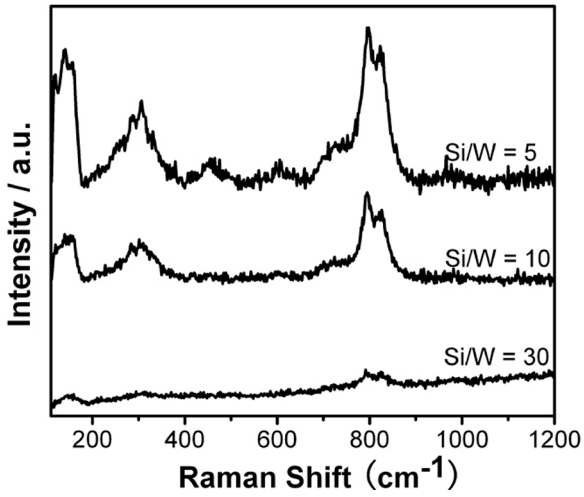

Fig. S1 Raman spectra of Bi_2WO_6/MCM-48 composites prepared with different Si/W ratios.

4. N_2 adsorption-desorption isotherms

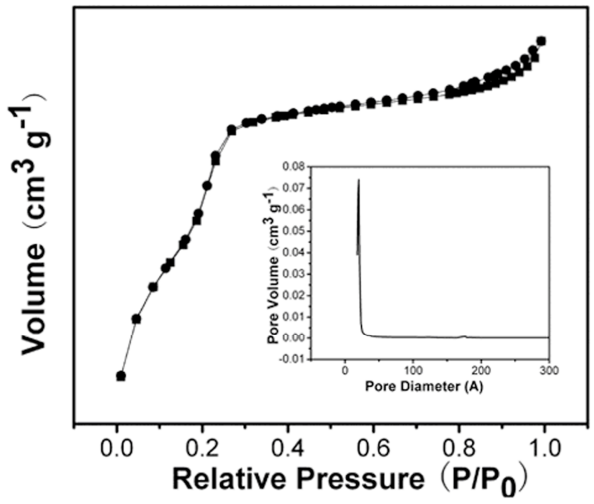

Fig. S2 N_2 adsorption-desorption isotherms of Bi_2WO_6/MCM-48 (Si/W = 30). The inserts are BJH pore size distributions.

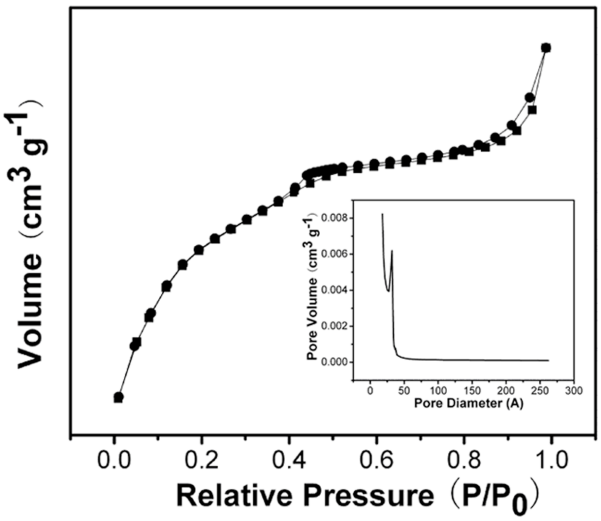

Fig. S3 N_2 adsorption-desorption isotherms of Bi_2WO_6/MCM-48 (Si/W = 10). The inserts are BJH pore size distributions.

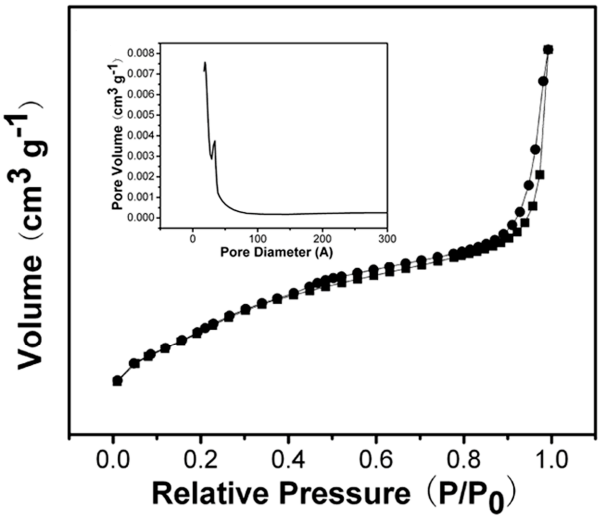

Fig. S4 N_2 adsorption-desorption isotherms of Bi_2WO_6/MCM-48 (Si/W = 5). The inserts are BJH pore size distributions.

5. Photocatalytic activity under UV irradiation

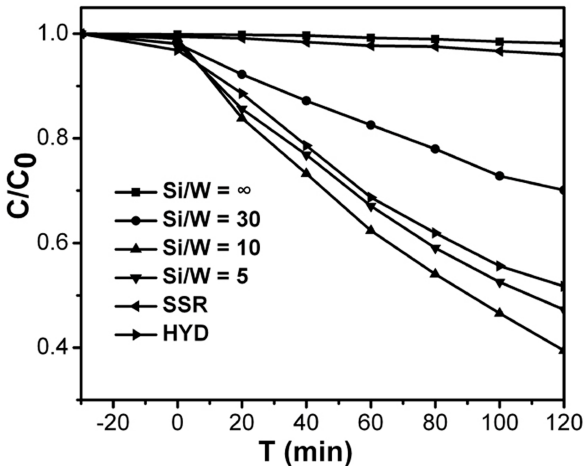

Fig. S5 Photocatalytic activity of different samples towards AO7 under UV irradiation

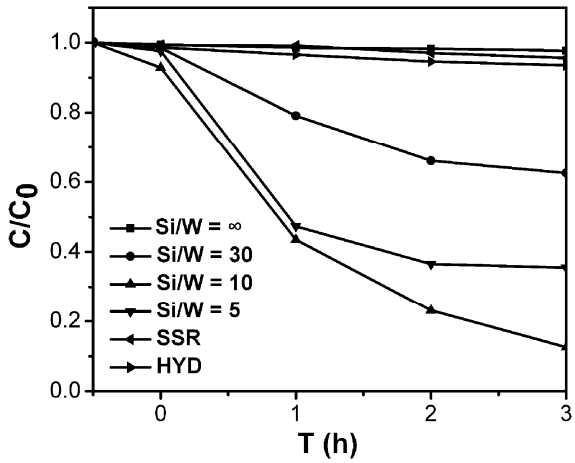

Fig. S6 Photocatalytic activity of different samples towards terephthalic acid under visible light irradiation

6. XPS

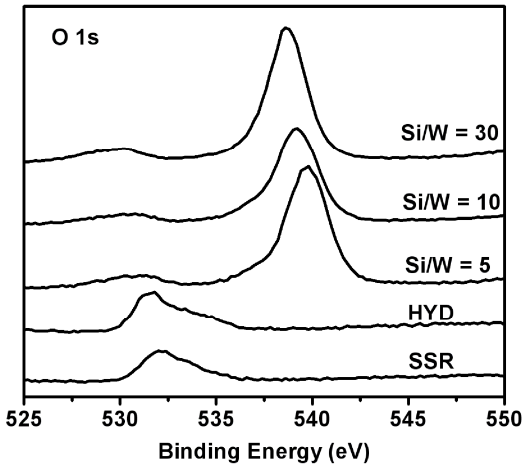

Fig. S7 O1s XPS of different samples