Supporting Information

POM/Ag functionalized mesoporous silica coated magnetic Fe_3O_4 core-shell composite as efficiency and recyclable photocatalyst

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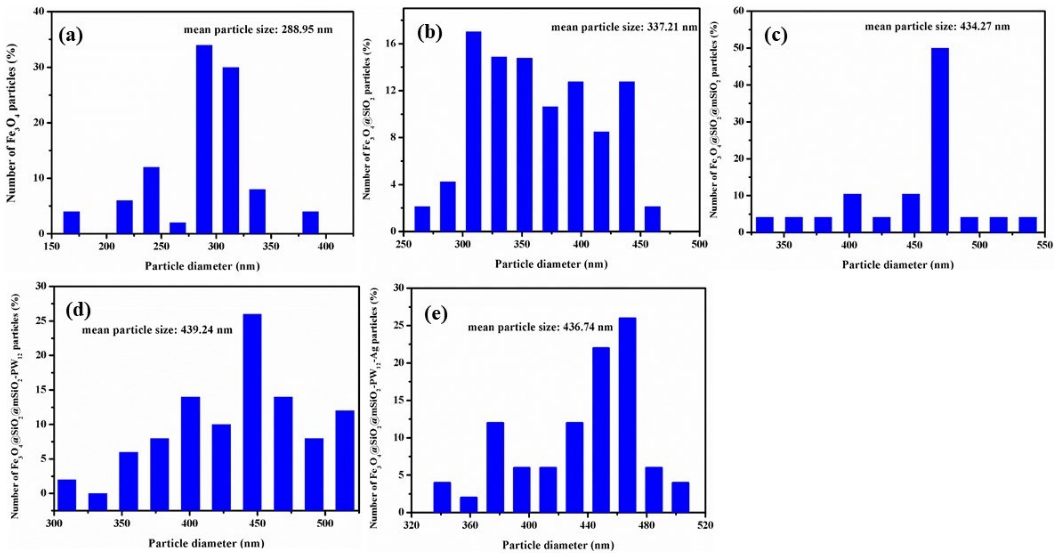

Fig. S1 Size distribution of the as-prepared (a) Fe_3O_4; (b) Fe_3O_4@SiO_2; (c) Fe_3O_4@SiO_2@*m*SiO_2; (d) Fe_3O_4@SiO_2@*m*SiO_2-PW_{12} and (f) Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/Ag samples.

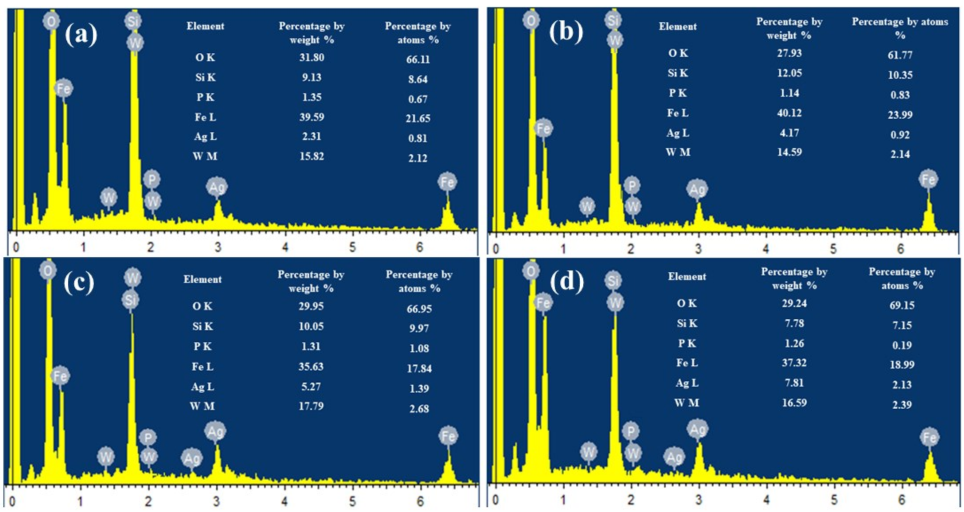

Fig. S2 The EDX spectra of (a) Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/$Ag_{1.2}$; (b) Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/$Ag_{3.7}$; (c) Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/$Ag_{5.3}$ and Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/$Ag_{6.4}$ samples, respectively.

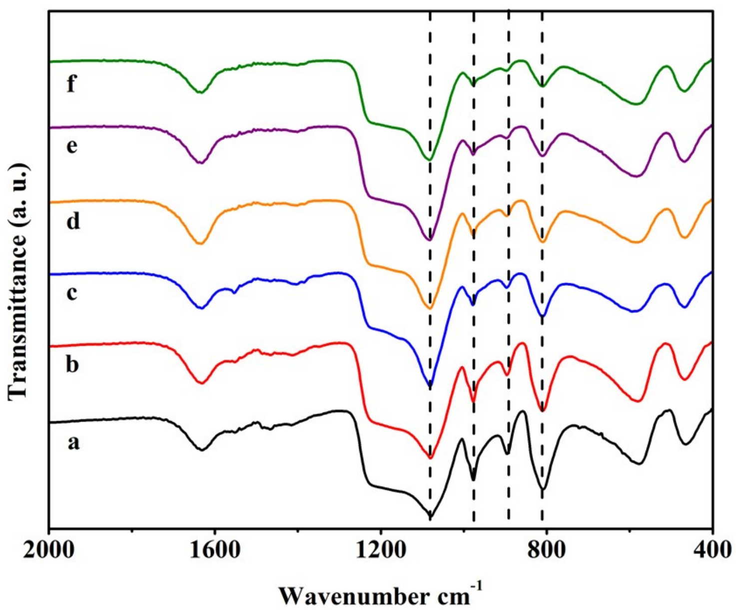

Fig. S3 FT-IR spectra of Fe_3O_4@SiO_2@*m*SiO_2-PW_{12} with PW_{12} loadings of 3.57, 8.82,14.52, 18.65, 20.01 and 20.36*wt*.%.

Table S1 The BET surface area, average mesoporous size and total pore volume of as-synthesized composites.

Samples	S_{BET} ($m^2 \cdot g^{-1}$)	Average mesoporous size (nm)	Total pore volume ($cm^3 \cdot g^{-1}$)
Fe_3O_4@SiO_2@*m*SiO_2	273	2.7	0.21
Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}	198	2.3	0.17
Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/Ag	172	2.1	0.15

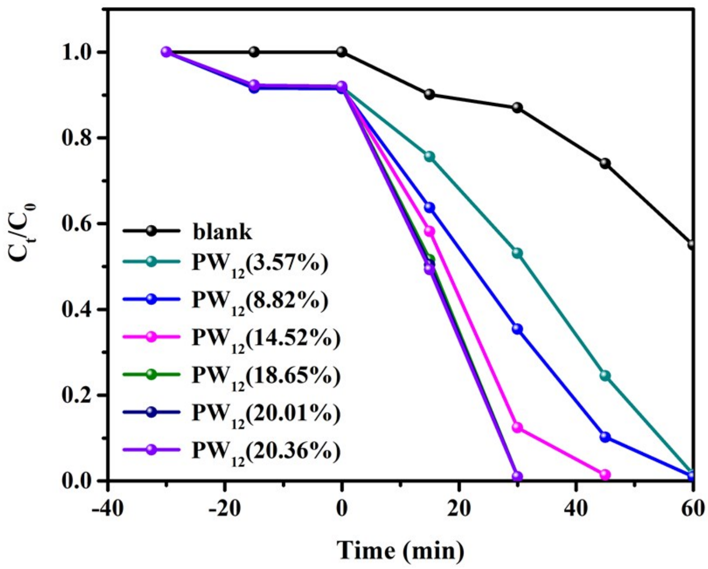

Fig. S4 The profiles of photo-degradation of MO underultraviolet lightFe_3O_4@SiO_2@*m*SiO_2-PW_{12}

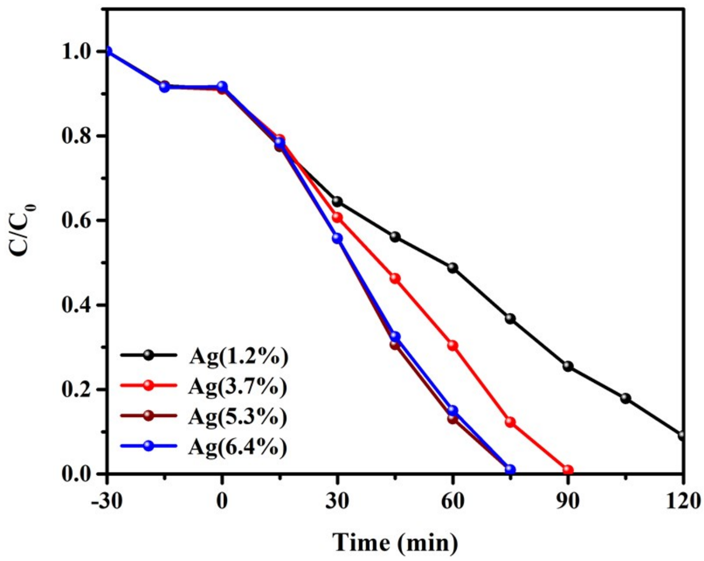

Fig. S5 The profiles of photo-degradation of MO under simulated sun lightupon Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/Ag with different Ag loadings.

Table S2. Lifetimes (τ_1 and τ_2) and relative intensities of different samples.

Samples	τ_1 (ns)	τ_2 (ns)	A_1.(%)	A_2.(%)	τ_{av} (ns)
Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}	1.0697	6.2174	72.59	27.41	0.4155
Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/Ag	1.1353	5.5610	53.17	46.83	0.4802

Note: A two-exponential function equation is used to fit the decay time, $\tau_{av} = (A1\cdot\tau_1^2+A_2\cdot\tau_2^2)/(A_1\cdot\tau_1+A_2\cdot\tau_2)$, where τ and A are decay time and the relative magnitude ofcomponents, respectively. The average lifetime τ av is employed for comparison.

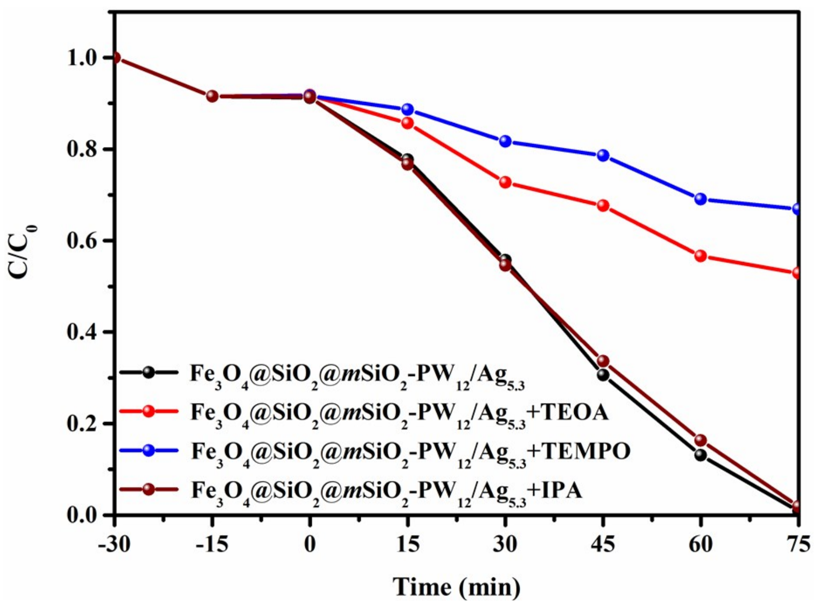

Fig. S6 The effects of various scavengers photodegradation of MO for Fe_3O_4@SiO_2@*m*SiO_2-PW_{12}/Ag simulated sun light irradiation.