Supplementary Information for

Uniform Spatial Distribution of Nanostructured Ag/AgCl Plasmonic Photocatalyst and Its Segregative Membrane towards Visible-light Driven Photodegradation

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Experiment section

The synthesis of Ag/AgCl/TMS-400 membrane

Firstly, tissue paper (commercial household product) was immersed into water followed by violent magnetic stirring for 12 h to break down the tissue paper to obtain the dispersed tissue fibers. Then, 15 mg Ag/AgCl/TMS-400 powder were dispersed into 3 mg tissue fibre suspension with 1 h stirring. Finally, the free-standing membrane was obtained by vacuum filtration of the mixture suspension.

Photocatalytic experiment for Ag/AgCl/TMS-400 membrane

For the measurement of the photocatalytic activity of as-prepared Ag/AgCl/TMS-400 membrane, MO and MB were selected as the target organic pollutants. The illumination source for the measurement was the same with the powder test. The as-prepared membrane was placed into 20 mL aqueous solution of MO (4 mg/L) and MB (5 mg/L) for 1h in dark for the adsorption/desorption equilibrium of organic dye. 2 mL solution was taken out every 1 h and the UV-vis absorption spectra of the residual MO and MB solution were analysed by a Shimadzu 2550 UV-vis spectrometer. The concentrations were obtained from the absorption intensity at the peak of MO (463 nm) and MB (562 nm) in the UV-vis absorption spectra.

Figure S1

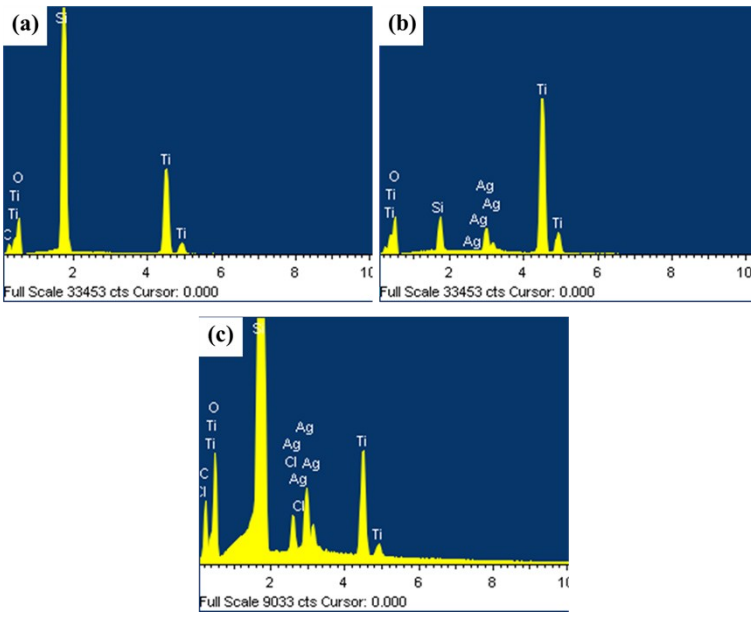

Figure S1. The EDX spectra of (a) H-TMS, (b) Ag-TMS, (c) AgCl/TMS (the peak of Si element came from the substrate for holding the samples).

Figure S2

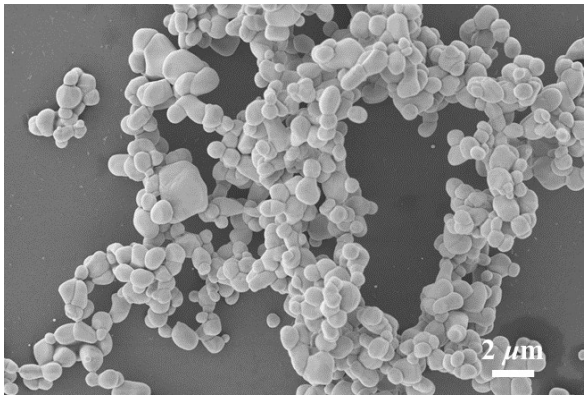

Figure S2. FESEM image for AgCl NPs prepared by traditional method.

Figure S3

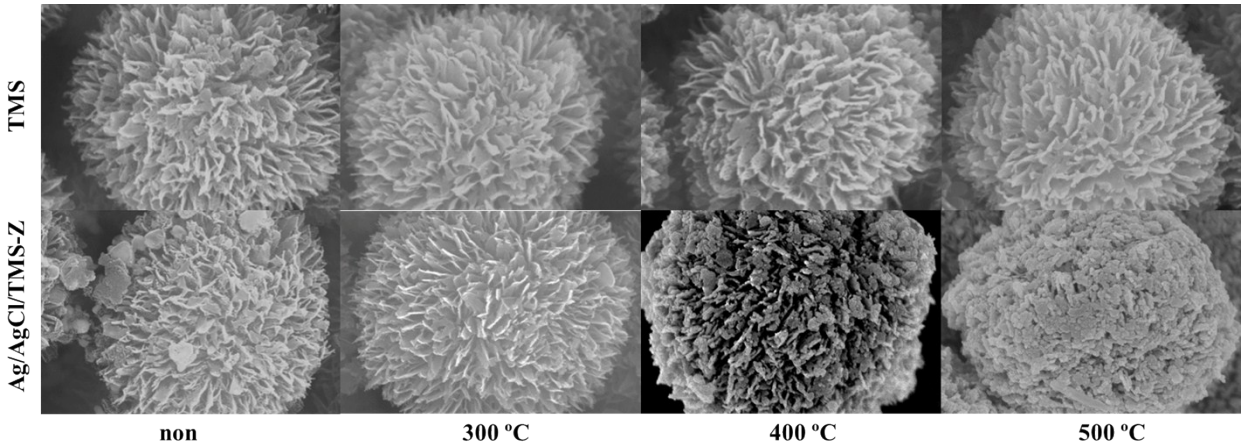

Figure S3. FESEM images for H-TMS and Ag/AgCl/TMS with heat treatment of non-heat, 300 ºC, 400 ºC, 500 ºC respectively.

Figure S4

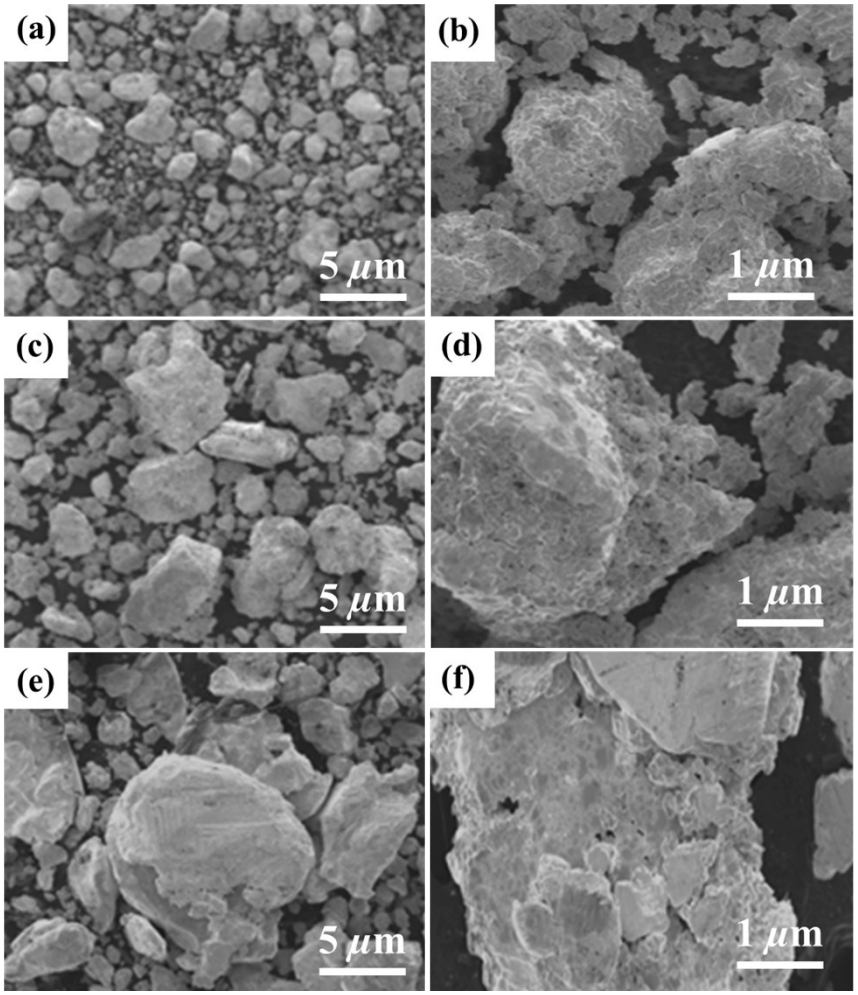

Figure S4. FESEM images for AgCl particles with (a, b) non-heat treatment, (c, d) 300 ºC heat treatment, (e, f) 400 ºC heat treatment.

Figure S5

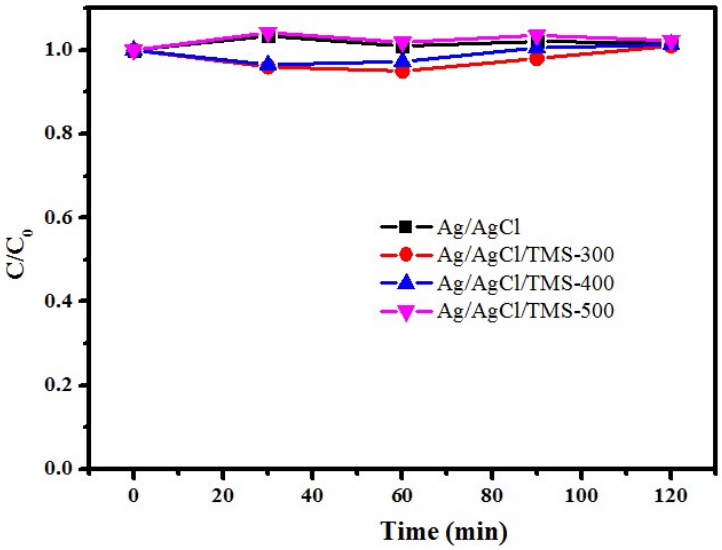

Figure S5. Absorption curves of MO on the different photocatalysts under dark condition.

Figure S6

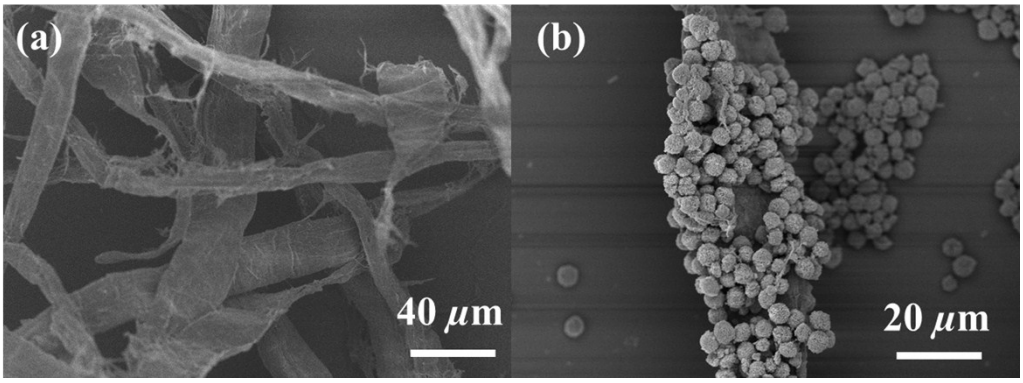

Figure S6. FESEM images for (a) tissue fibres after violent magnetic stirring, (b) dispersive tissue fibre with the attachment of Ag/AgCl/TMS-400 on the surface.

Table S1

Table S1. The BET surface area and average pore radius of samples

	BET Surface Area (m^2/g)	Average Pore Radius (nm)
H-TMS	241	4.7
Ag/AgCl/TMS-non	237	5.3
Ag/AgCl/TMS-300	134	11.7
Ag/AgCl/TMS-400	91	15.8
Ag/AgCl/TMS-500	69	20.3