

Supporting Information

Ion chromatography (ICS-1100, Dionex Ionpac™ AG11-HC, Current Speed: 1.0 ml·min⁻¹, Temperature:30 °C, Pressure:1604 psi, SRS current: 8 mA) was used to detect the Ag⁰ content in the sample Ag/AgCl-1, Ag/AgCl-2, and Ag/AgCl-3. All samples at 45 °C for 24 hours in vacuum. 0.1 g silver chloride dissolved in 25 ml of 1 mol·L⁻¹ aqueous ammonia. All of the results were shown in the table S1.

The added photocatalytic activities experiments were done under the 250 W Xenon lamp (HAL-320, Asahi Spectra Co., Ltd.). The experiments were performed at room temperature as follows: 100 mg of the photocatalyst was added to 100 mL of MO solution (10 mg·L⁻¹) in a Pyrex reactor. Before illumination, the suspension was stirred in the dark for 30 min to ensure the establishment of an adsorption-desorption equilibrium between the photocatalyst and MO. The dispersion was then exposed to the light irradiation under stirring. At given time intervals, 4 mL of the suspension was pipetted into a centrifuge tube and centrifuged at 8000 rpm for 2 min to remove the remnant photocatalyst. The results were shown in figure S5. After irradiation for 10 min, about 97% of MO was removed over the Ag/AgCl-2. The results is similar with ref. 2 and 40.

Table S1 Atomic composition analysis and the Ag:AgCl ratio

sample	atomic composition (Ag:Cl)	atomic ratio of Ag ⁰ to Ag ^I
Ag/AgCl-1	51.2 : 48.8	4.9:100
Ag/AgCl-2	52.3 : 47.7	9.6:100
Ag/AgCl-3	53.1 : 46.9	13.2:100

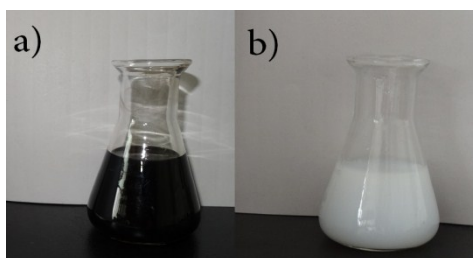


Figure S1. The digital images of (a) Ag⁰ seeds and (b) AgCl in aqueous dispersion.

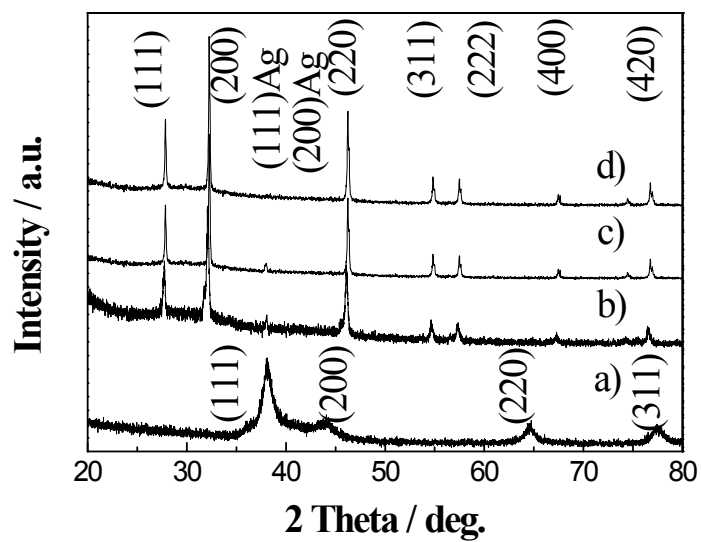


Figure S2. XRD patterns of (a) the Ag⁰ seeds, (b) the reddish powder sample of AgCl@Ag, and the samples with flower-like morphology (c) and pseudo-cubic morphology (d).

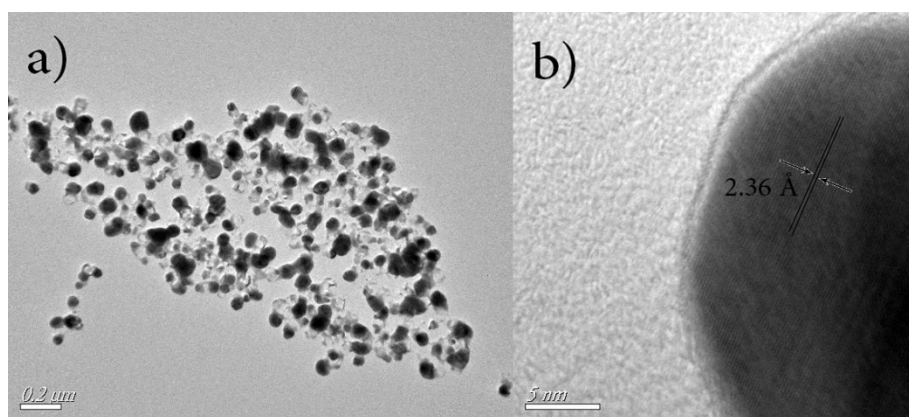


Figure S3. (a) TEM and (b) HRTEM images of the Ag seeds.

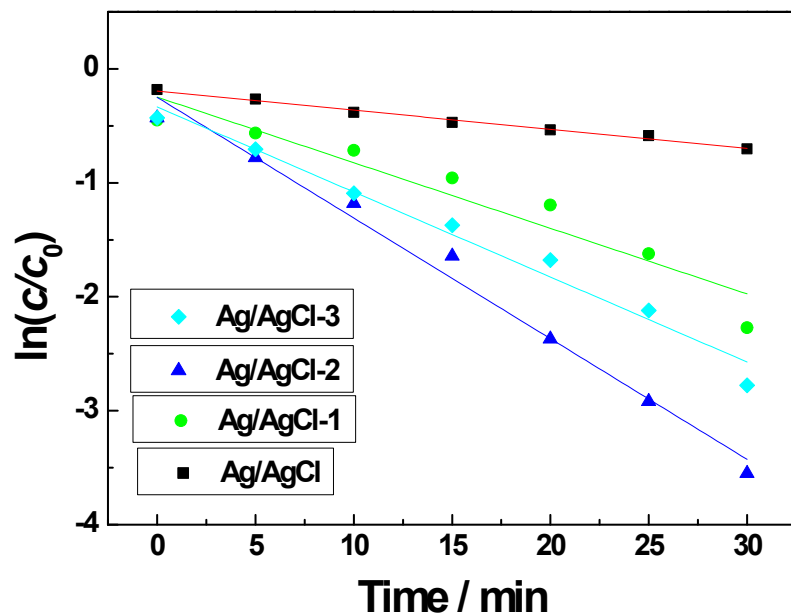


Figure S4. Pseudo-first-order plots of $\ln(c/c_0)$ vs. reaction time in the presence of Ag/AgCl and AgCl catalysts.

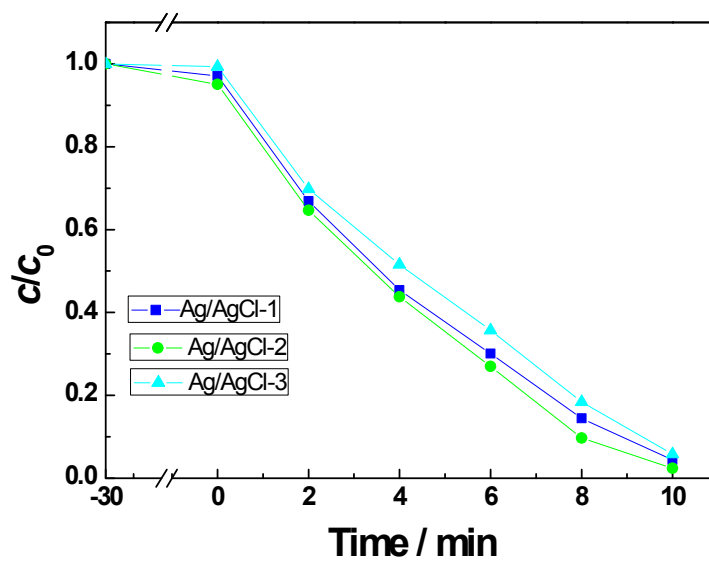


Figure S5. Photodegradation of MO with catalysts of Ag/AgCl hollow cubes under Xe lamp irradiation. c_0 is the initial concentration of MO aqueous solution ($10 \text{ mg}\cdot\text{L}^{-1}$), and c is the instantaneous concentration of MO solution during photodegradation.

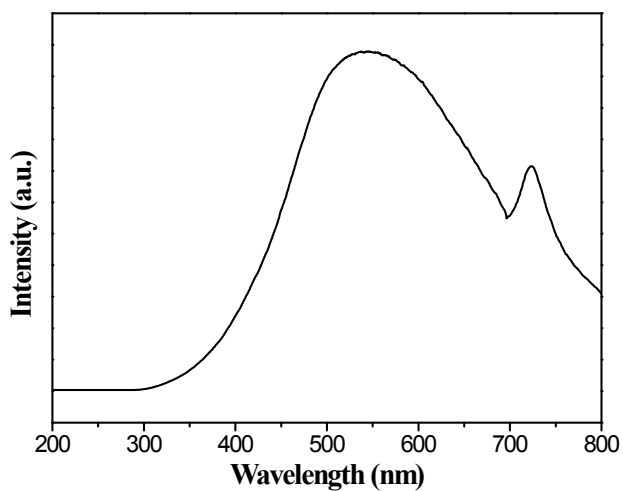


Figure S6. The output spectrum of the tungsten lamp