Electronic Supplementary Information (ESI)

Construction of Magnetic visible-light-driven Fe_3O_4@SiO_2@AgCl:Ag nanophotocatalysts

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Synthesis of $Fe(acac)_3$ particles

Saturated aqueous solution of $FeCl_3$ was added gradually to a mixture of ethanol and acetylacetone with the volume ratio of 1:1 to form a homogeneous solution. CH_3COONa saturated solution was then dropwisely added to the above solution until membrane-shaped product emerged. After being filtered and dried in a vacuum, a crude blood-red product was collected. Finally, the product was recrystallized in methanol.

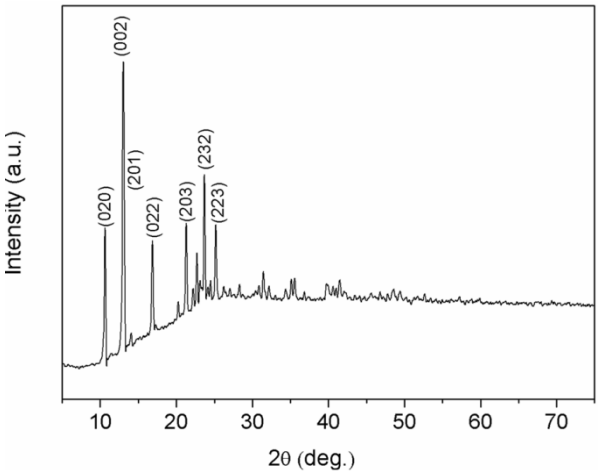

Figure S1. XRD pattern of $Fe(acac)_3$ particles

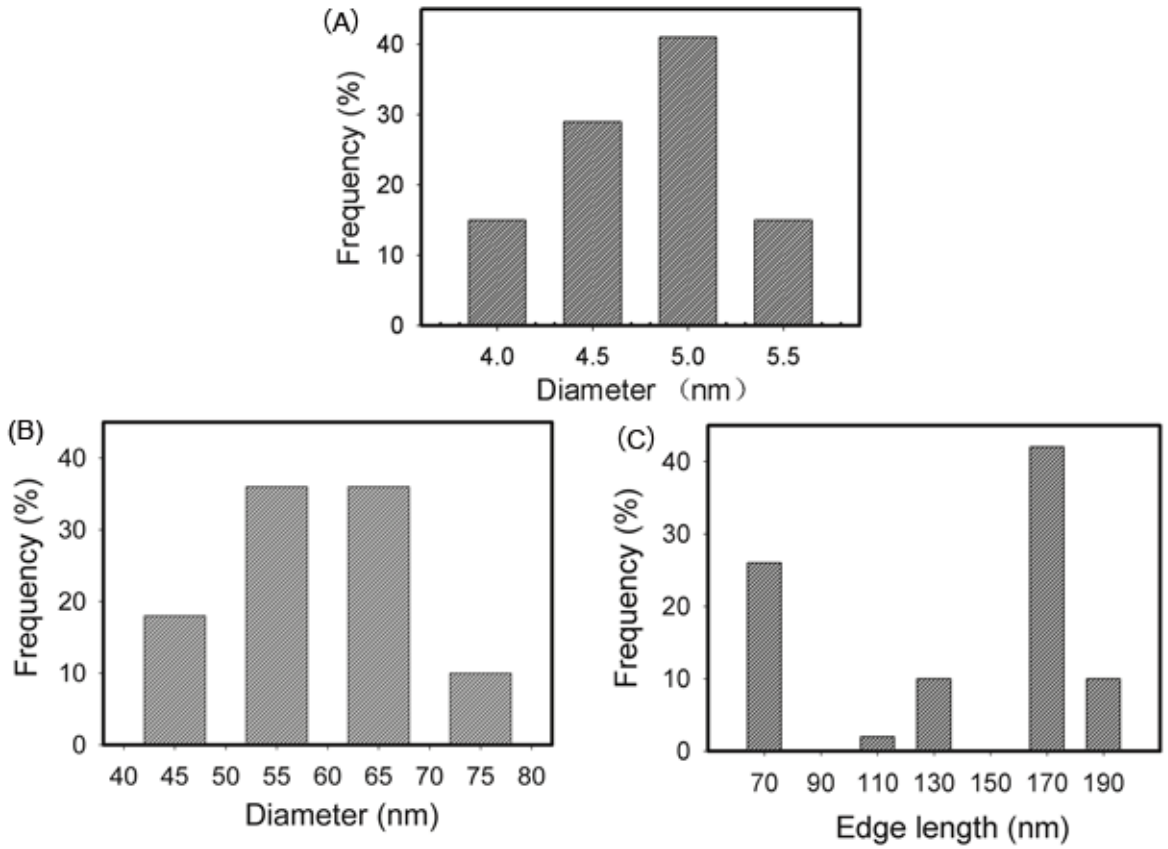

Figure S2. Size distribution diagrams of (A) Fe_3O_4 nanoparticles, (B) Fe_3O_4@SiO_2 nanoparticles, and (C) Fe_3O_4@SiO_2@AgCl:Ag nanocomposites.

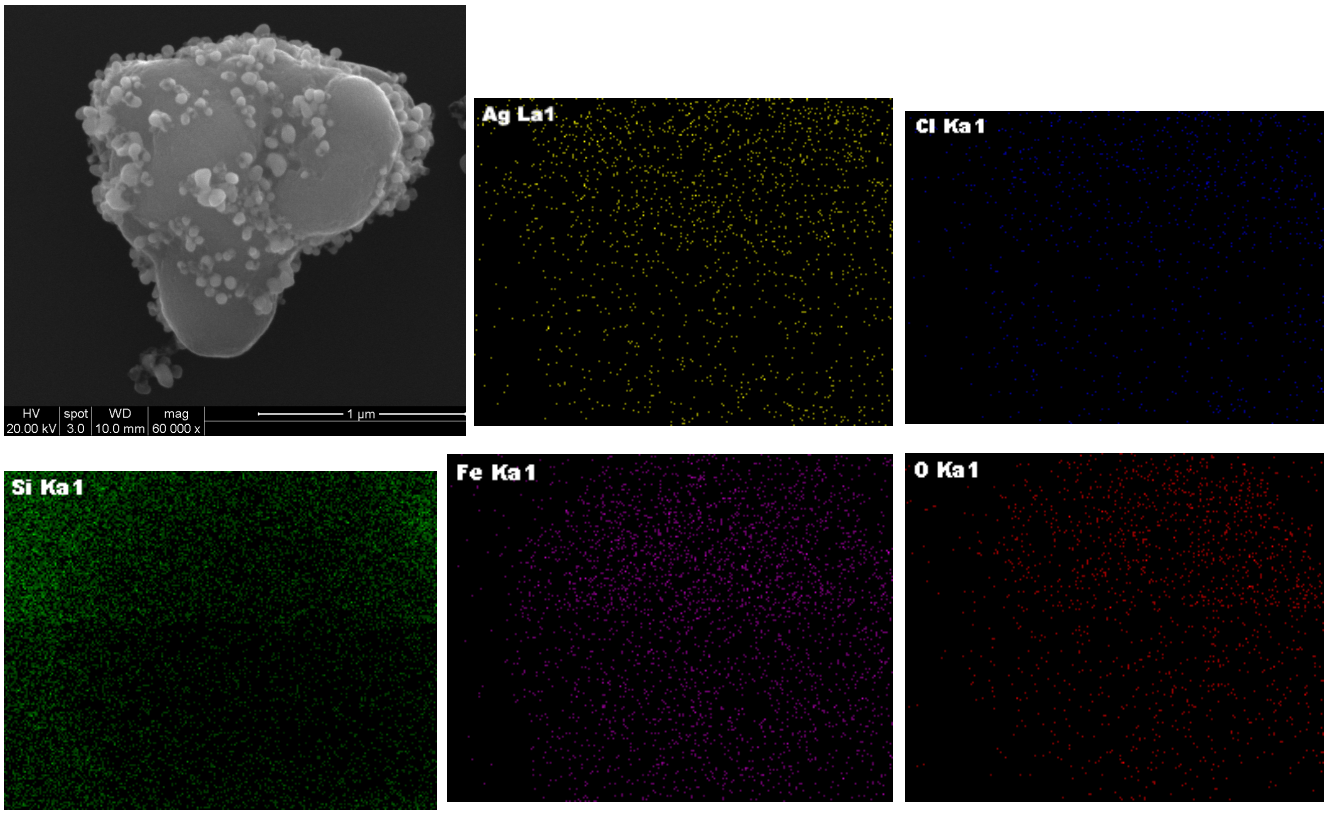

Figure S3. SEM-EDS elemental mapping of Fe_3O_4@SiO_2@AgCl:Ag nanocomposite. Upper left is an SEM image of the nanocomposite

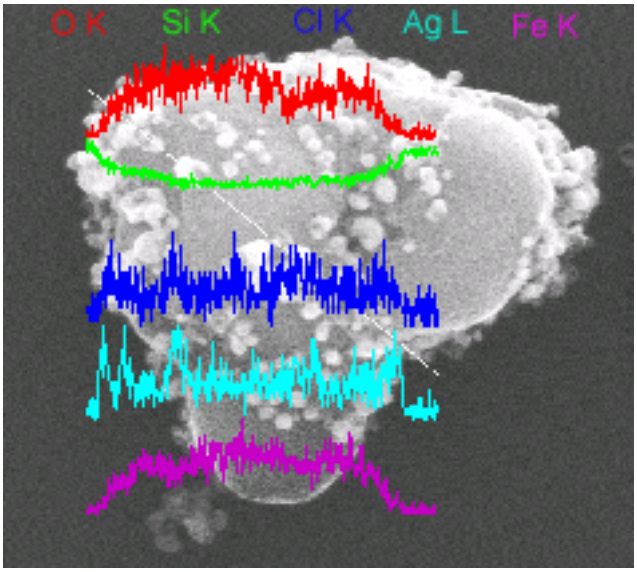

Figure S4. SEM EDS line profile of the as-synthesized sample. The image shows that the target structure is composed of Fe_3O_4@SiO_2@AgCl.

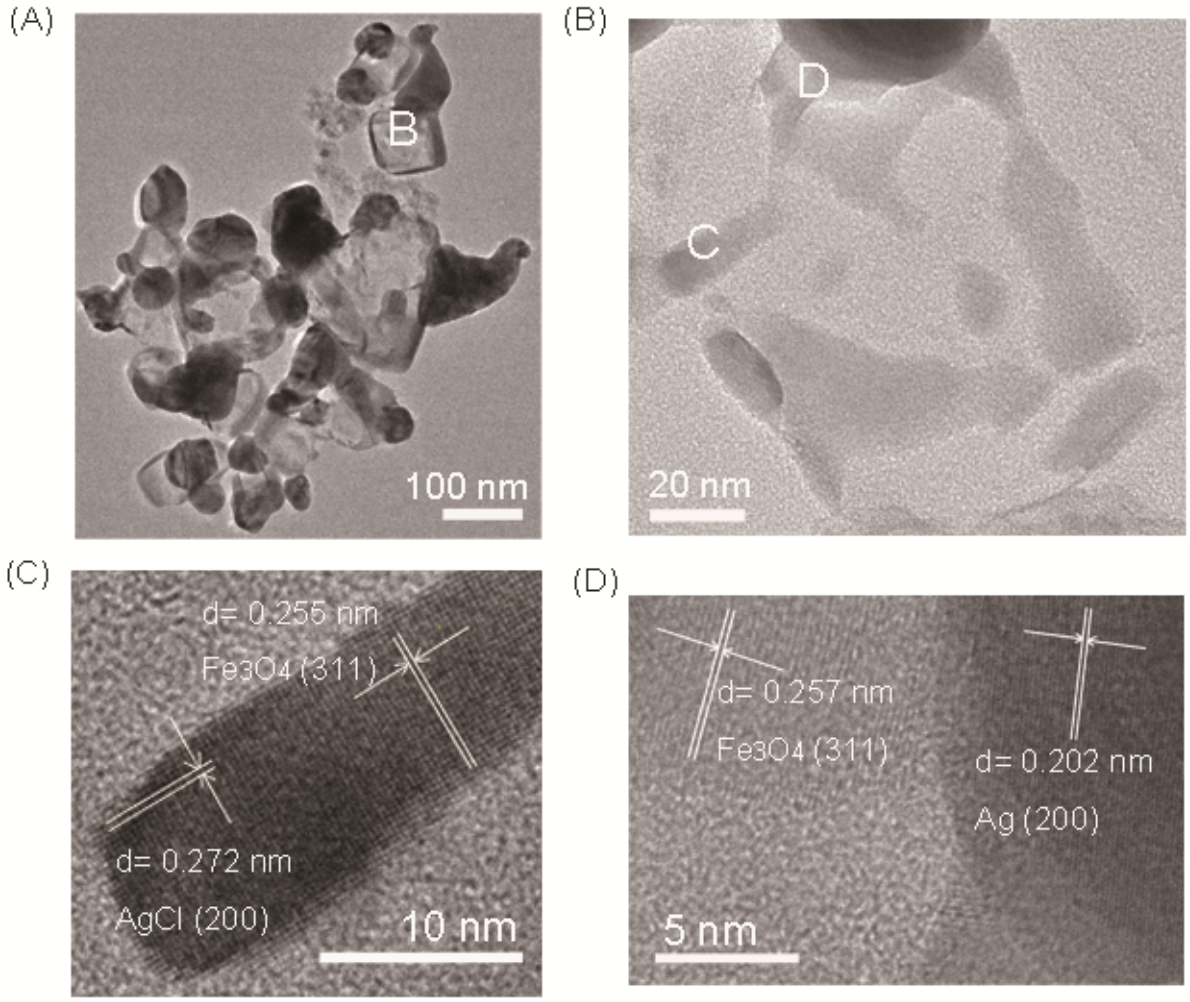

Figure S5. (A) TEM image of big cubic shaped Fe_3O_4@SiO_2@AgCl:Ag nanoparticles, (B) Higher magnification image of labeled B in (A), (C, D) HRTEM images of C, D portion in (B). These images clearly show that Fe_3O_4@SiO_2@AgCl nanoparticles are successfully constructed via the present facile solution-based synthetic route.

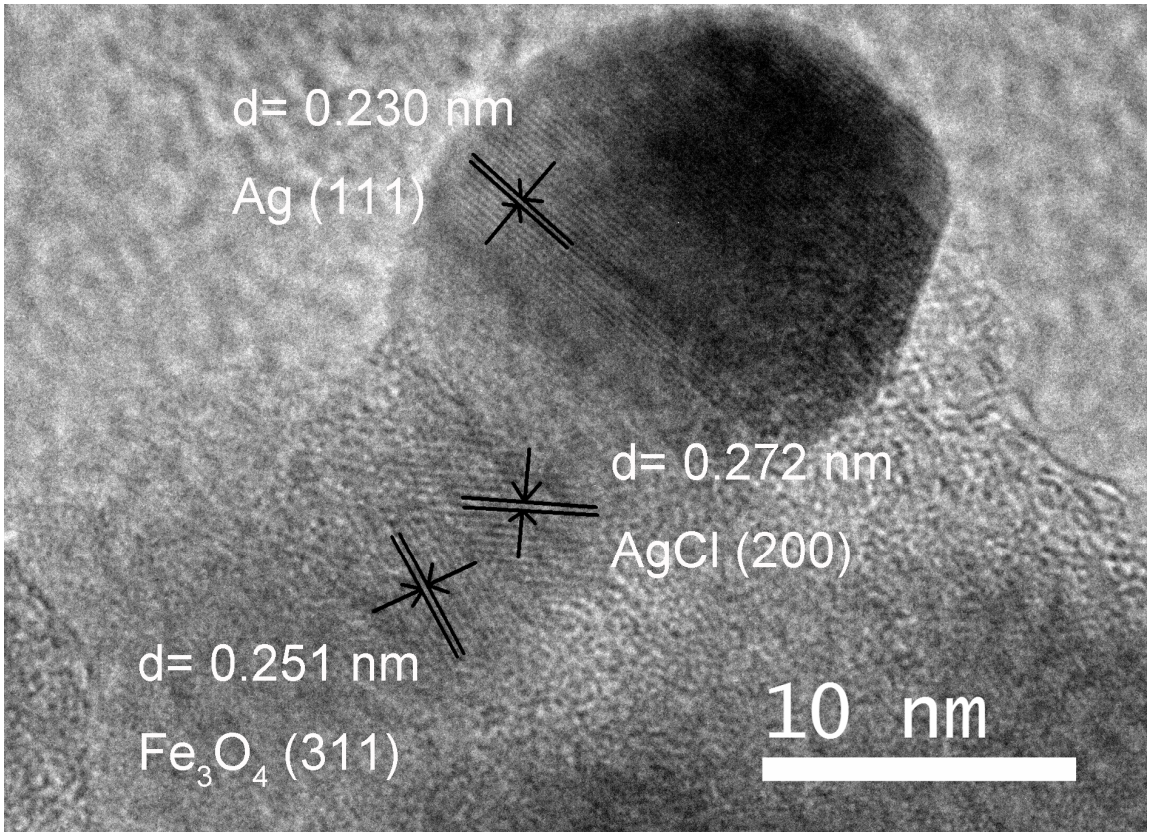

Figure S6 HRTEM image of small spherical nanoparticles. The image reveals that small nanoparticles also possess the target Fe_3O_4@SiO_2@AgCl structures.

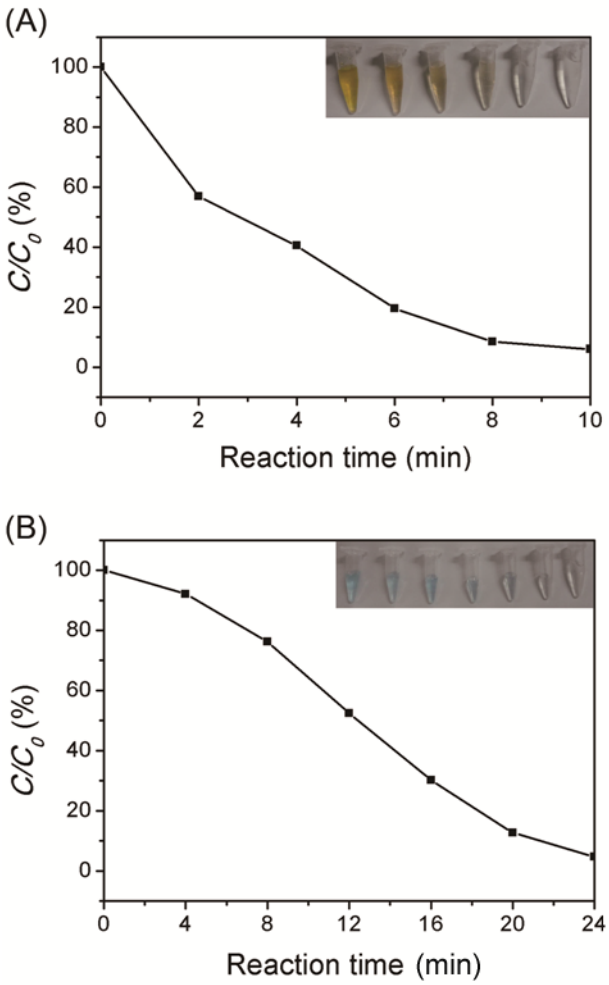

Figure S7. The normalized concentration of the MO (A) and MB (B) molecules as a function of reaction time. The inset is dye color changes with the reaction proceeds.

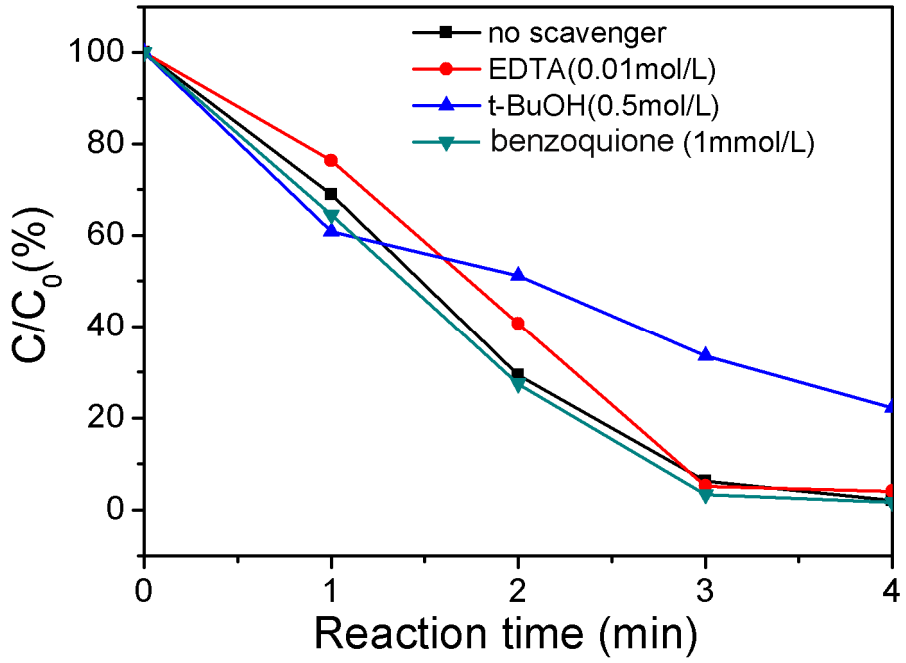

Figure S8. The dye concentration during photodegradation as a function of reaction time with the addition of different scavengers.