Supporting Information

Sunlight–Driven Plasmonic Photocatalysts Based on Ag/AgCl Nanostructures Synthesized *via* an Oil-in-Water Medium: Enhanced Catalytic Performance by Morphology Selection

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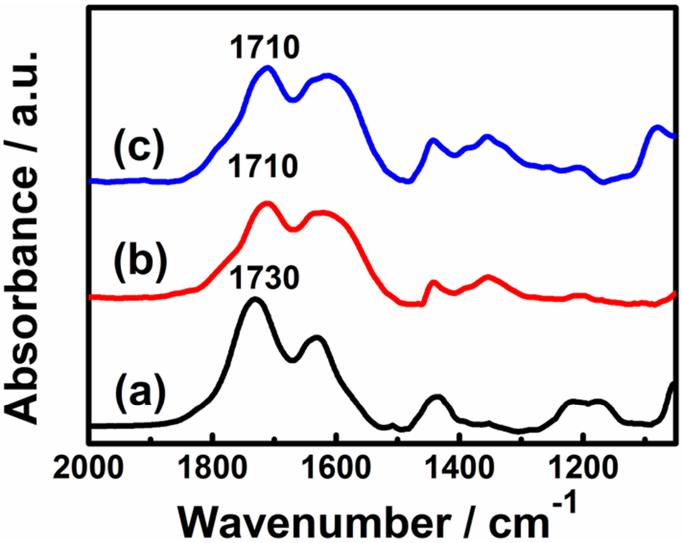

Fig. S1. FT–IR spectra of the original powdery GO naonsheets (a), Ag/AgCl/GO nanospheres (b) and Ag/AgCl/GO quasi–nanocubes.

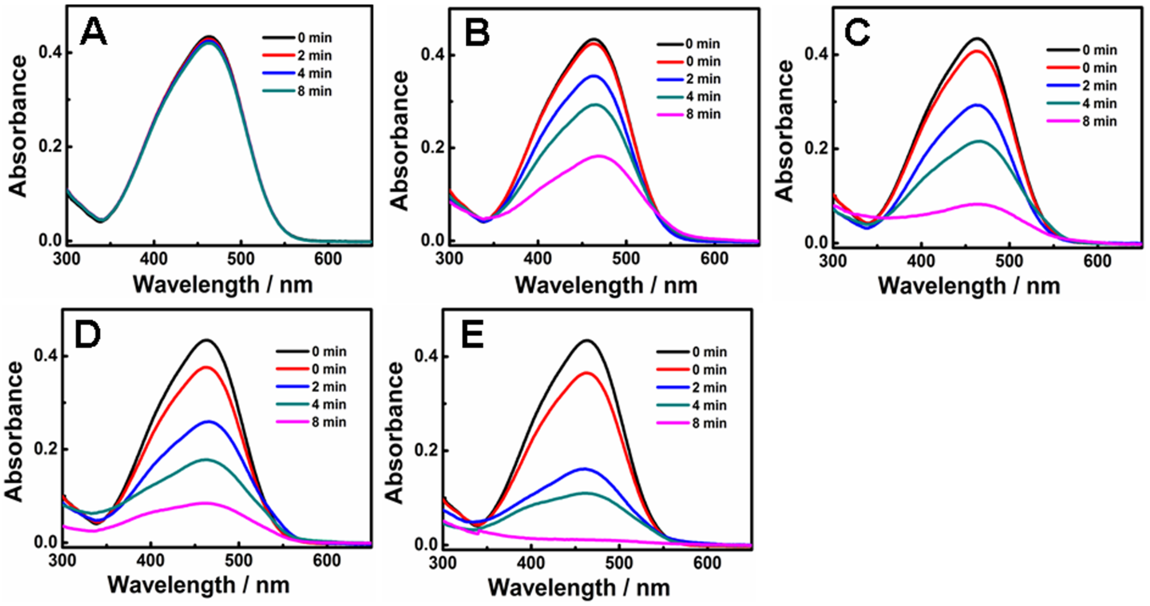

Fig. S2. Real–time absorption spectra of MO dye during the photodegradation process over various Ag/AgCl–based photocatalysts under sunlight illumination. A: a blank experiment, where no catalyst is used. B: bare Ag/AgCl nanospheres. C: bare Ag/AgCl quasi–nanocubes. D: Ag/AgCl/GO nanospheres. E: Ag/AgCl/GO quasi–nanocubes. The black and red curves marked as 0 min in each panel are the absorption spectra detected from the original MO solution before (black) and after (red) the dark adsorption experiment, respectively.

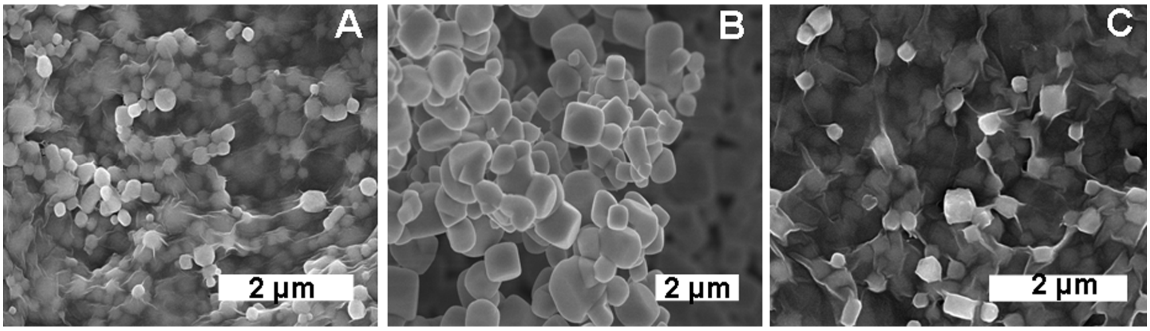

Fig. S3. SEM images of Ag/AgCl/GO nanospheres (A), bare Ag/AgCl quasi–nanocubes (B) and Ag/AgCl/GO quasi–nanocubes (C) after the photocatalytic degradation of MO dye under visible–light irradiation.

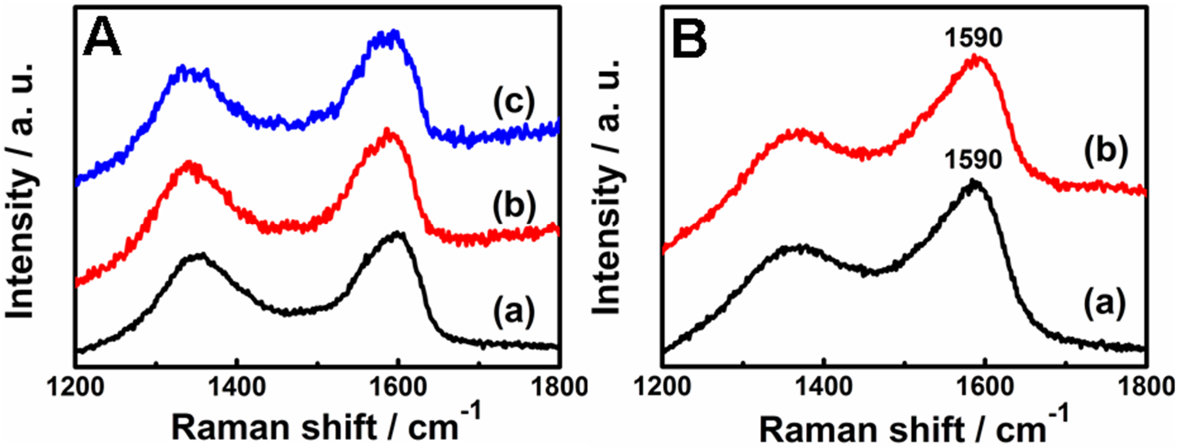

Fig. S4. A: Raman spectra of the original powdery GO naonsheets (a), Ag/AgCl/GO nanospheres (b) and Ag/AgCl/GO quasi–nanocubes (c) before the photocatalytic performance. B: Raman spectra of Ag/AgCl/GO nanospheres (a) and Ag/AgCl/GO quasi–nanocubes (b) after the photocatalytic degradation of MO pollutant under visible–light irradiation. As known, besides the FT-IR spectra, the efficient hybridization of GO and the other components could also be verified by the Raman spectra of the composite, where it has been demonstrated that the G-band of GO shifts to lower frequency when it is hybridized with an electron donor component, while it shifts to higher frequency when an electron acceptor component is hybridized.[1-3] The Raman spectra of our Ag/AgCl/GO hybrid nanocomposites together with that of powdery GO nanosheets were measured. As shown in Fig. S4 A, a G-band at ca. 1600 cm^{-1}, which is a typical Raman character of GO nanosheets, could be observed from the original powdery GO species.[4] In contrast, the G-band shifts to a lower frequency at 1590 cm^{-1} for Ag/AgCl/GO hybrid nanocomposites. These results further confirms the successful hybridization of GO with Ag/AgCl species and it indicate the occurrence of charge transfer between Ag/AgCl and GO of our GO-based hybrid nanocomposites, where Ag/AgCl and GO species work as electron donor and electron acceptor components, respectively.[1-3, 5]

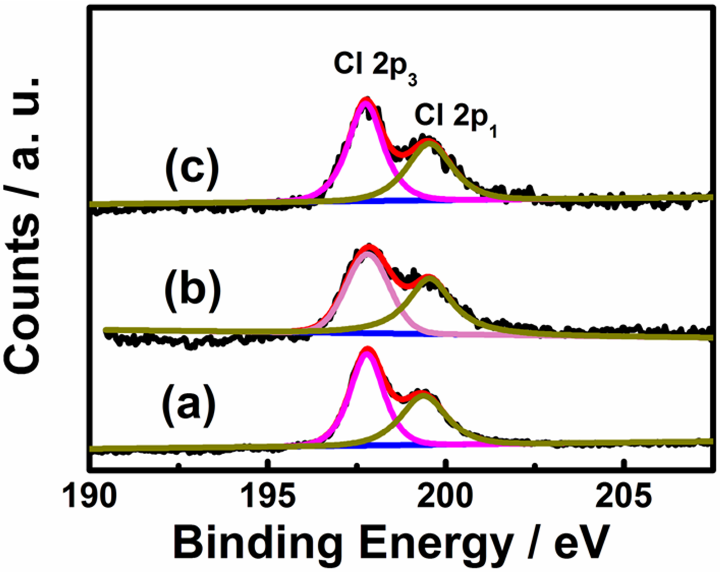

Fig. S5. XPS spectra of Cl 2p of the Ag/AgCl/GO nanospheres (a), Ag/AgCl quasi–nanocubes (b) and Ag/AgCl/GO quasi–nanocubes (c) after the photocatalytic degradation of MO dye under visible–light irradiation.

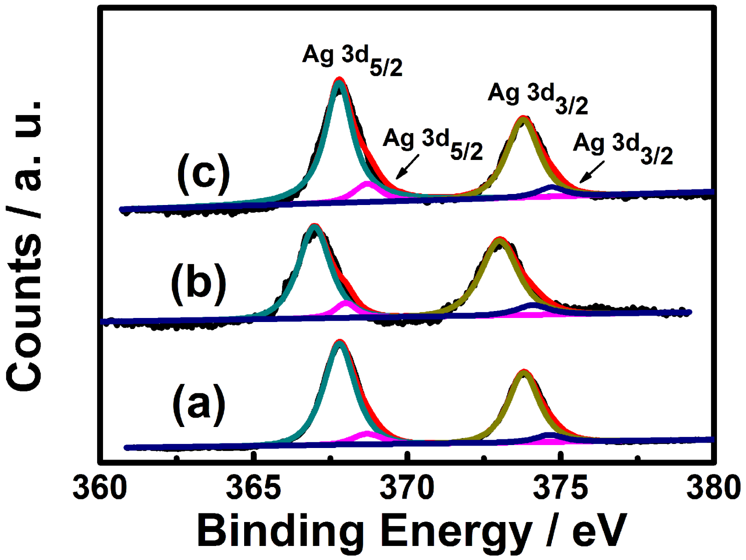

Fig. S6. XPS spectra of Ag 3d of the Ag/AgCl/GO nanospheres (a), Ag/AgCl quasi–nanocubes (b) and Ag/AgCl/GO quasi–nanocubes (c) after the photocatalytic degradation of MO dye under visible-light irradiation.

Supporting Notes and references

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