Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics
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Supporting Information

A novel visible-light-response plasmonic photocatalyst CNT/Ag/AgBr and its photocatalytic properties

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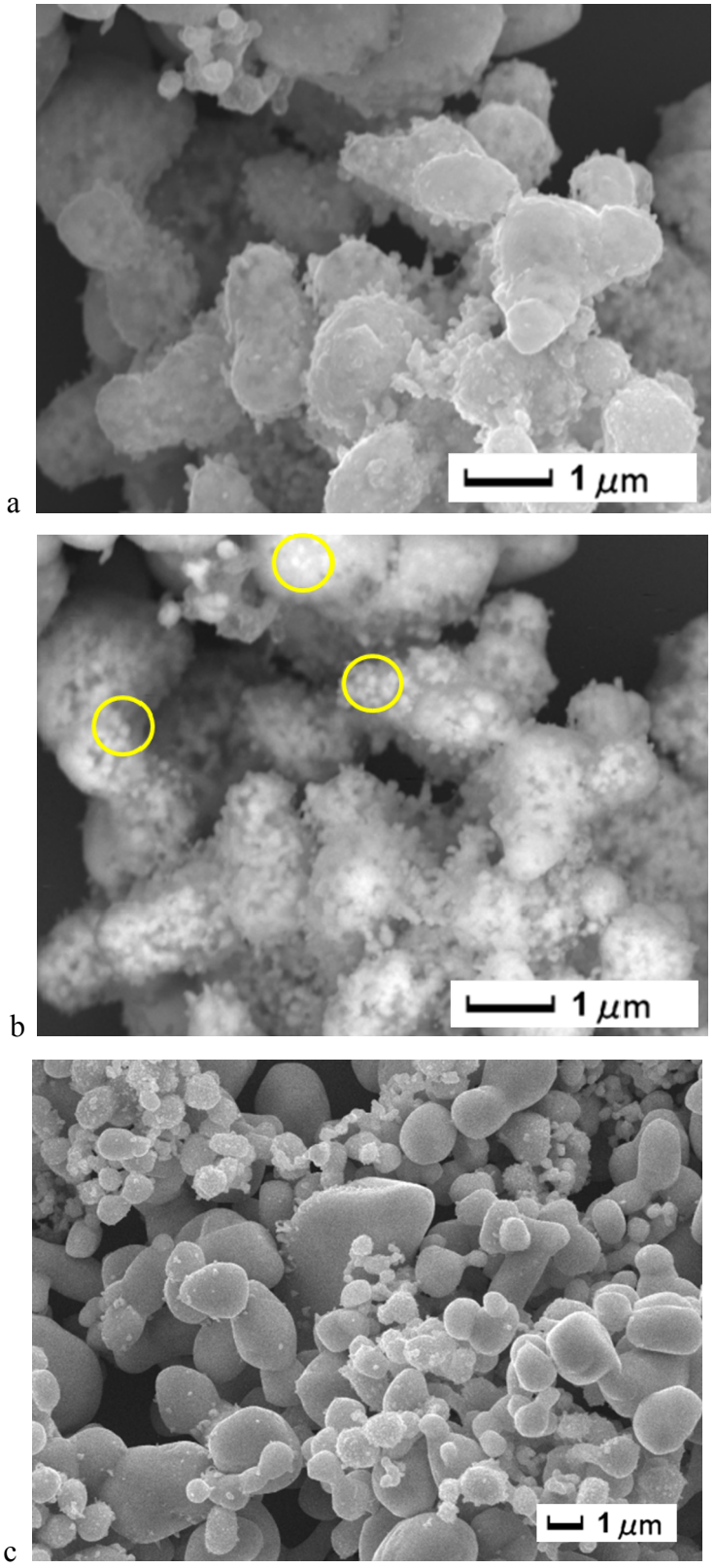

Fig. S1 (a) SEM image and (b) back scattering electron (BSE) image of the Ag/AgBr composite, in which both the (a) and (b) micrographs are taken in the same field. (c) The overall SEM image of the Ag/AgBr.

As shown in Fig. S2 a, the CNT/Ag/AgBr is mainly in the shape of particle. The surface of the particle is enlarged in Fig. S2 b. It is clear that CNTs cover the surface of the Ag/AgBr particles, and the diameter size of the CNTs are mainly at about 20-30 nm.

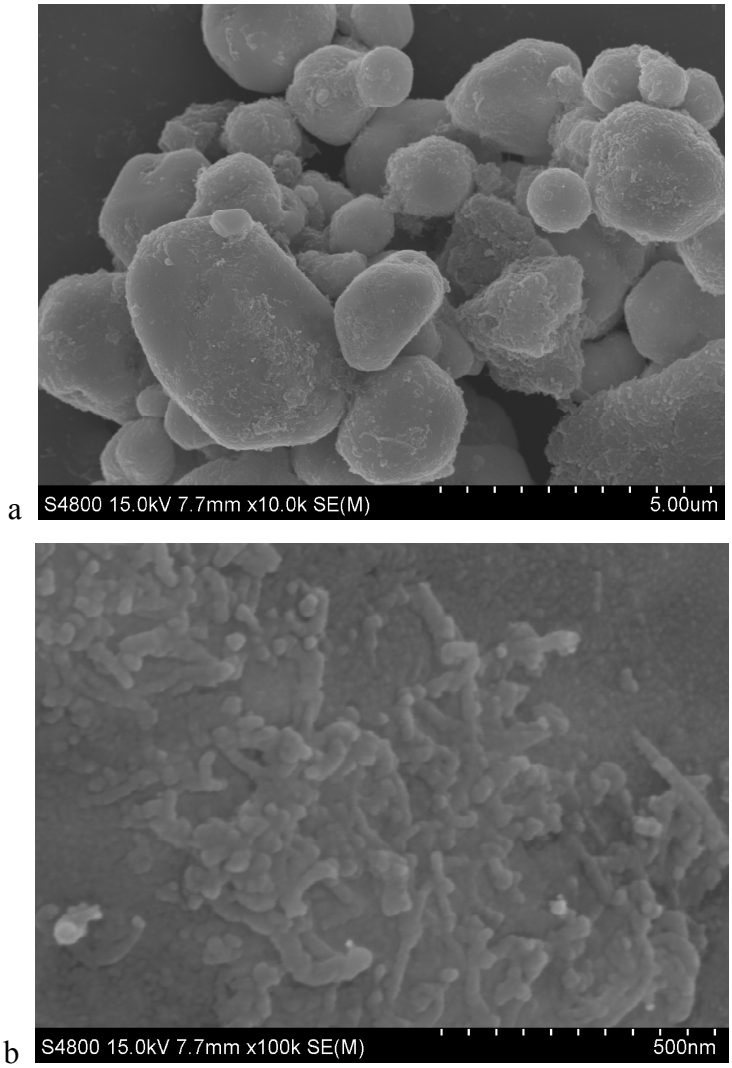

Fig. S2 The SEM images of CNT/Ag/AgBr with a high CNT content of about 41.4 at% (CNT : $AgNO_3$=5 wt%)

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As shown in Fig. S3, it is clear that the addition of the graphite does not enhance the photocatalytic ability of Ag/AgBr obviously. And the CNT/Ag/AgBr showed much higher photocatalytic ability than Ag/AgBr and graphite/Ag/AgBr. The emphasis of this work is investigating the effect of CNTs on the photoactivity of the CNT/Ag/AgBr composite. This is just a comparison of common carbon material and CNTs in this system.

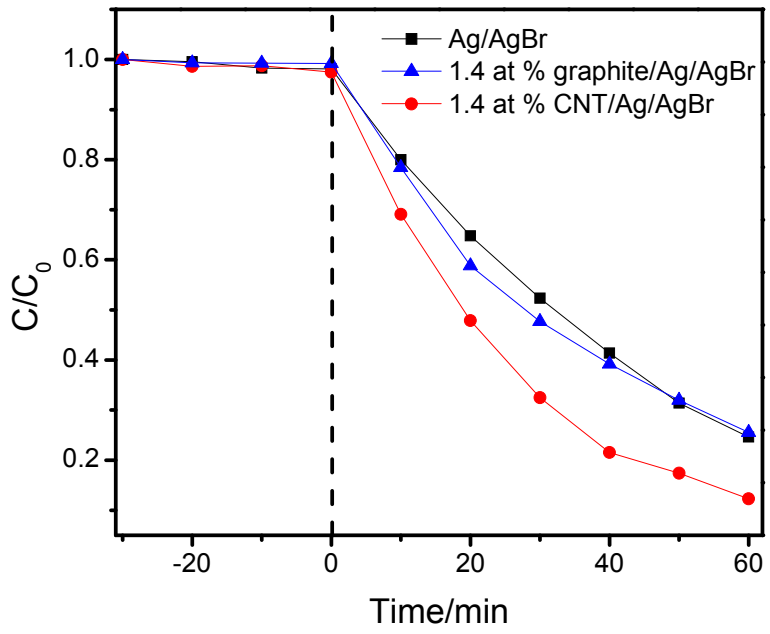

Fig. S3 The comparison of the photocatalytic ability of pure Ag/AgBr, 1.4 at % graphite/Ag/AgBr and 1.4 at % CNT/Ag/AgBr.

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The degradation of 4-chlorophenol under visible-light irradiation with 1g L^{-1} catalyst.

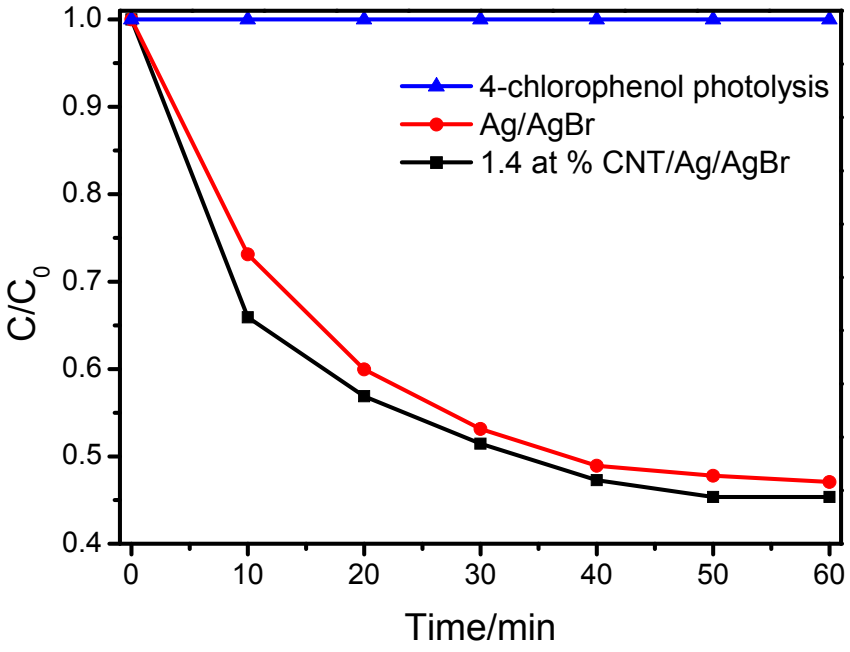

Fig. S4 The degradation of 4-chlorophenol (4-CP) under visible-light irradiation.

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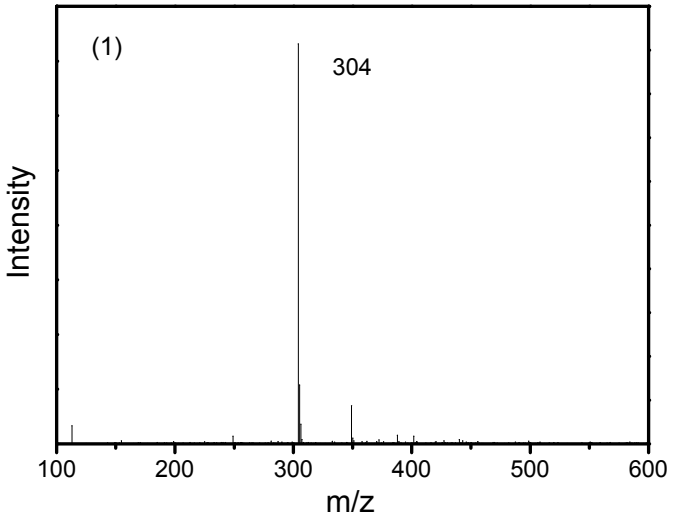
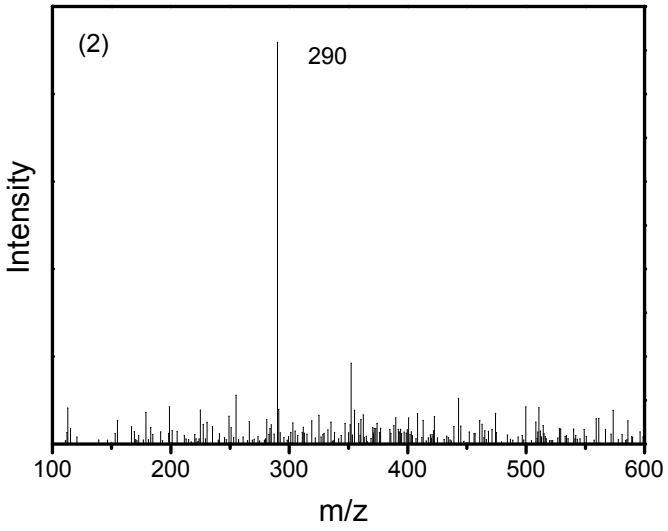
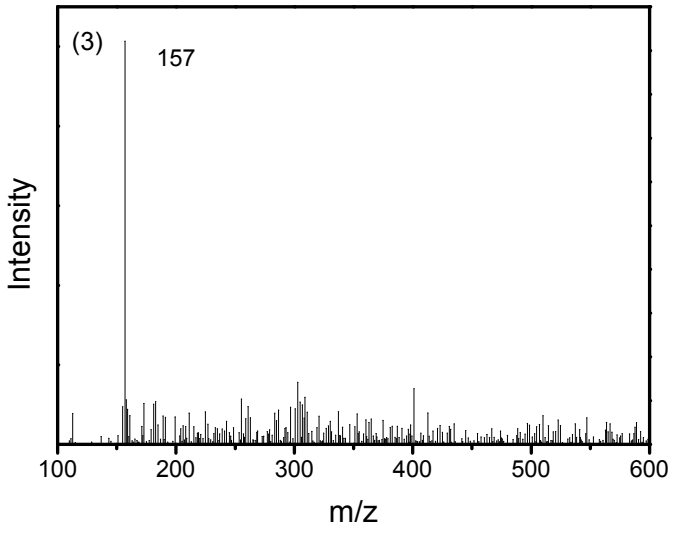
In order to investigate the degradation products clearly, the LC/MS were used to investigate the dye solution (50 mg L^{-1}) which had been degraded for 40 min and 3 h by 1.4 at % CNT/Ag/AgBr. The MS results of the degradation products with Ag/AgBr can be seen as follows (Fig. S5). The degradation products with Ag/AgBr showed the similar results.



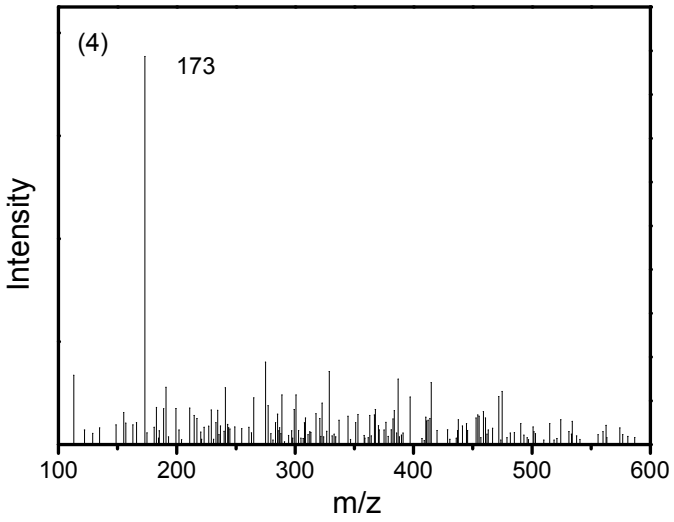
a



b



c



d

Fig. S5 The degradation products analyzed by MS analysis (a, b, c and d).

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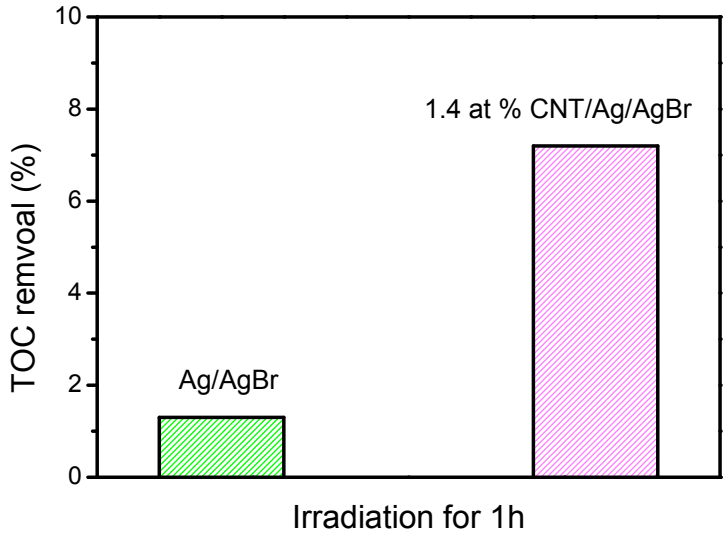

Fig. S6 The TOC removal of the dye solution in the presence of the catalyst for 1 h.