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## **Electronic Supplementary Information**

## Research on the influence of alkyl ammonium bromides on the properties

## of Ag/AgBr/GO composites

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**Fig. S1** The magnified XRD spectra of as-synthesized Ag/AgBr/GO composites with 20 from 36 ° to 40 °. (a) Ag/AgBr/GO-CTAB, (b) Ag/AgBr/GO-DTAB, (c) Ag/AgBr/GO-TBAB, and (d) Ag/AgBr/GO-TMAB.



**Fig. S2** The magnified XPS spectra of Ag 3d of the resultant Ag/AgBr/GO composites with binding energies from 368 to 371 eV: (a) Ag/AgBr/GO-CTAB, (b) Ag/AgBr/GO-DTAB, (c) Ag/AgBr/GO-TBAB, and (d) Ag/AgBr/GO-TMAB.



**Fig. S3** TEM images of (a) Ag/AgBr/GO-CTAB, (b) Ag/AgBr/GO-DTAB, (c) Ag/AgBr/GO-TBAB and (d) Ag/AgBr/GO-TMAB after the photocatalytic degradation of MO dye under visible-light irradiation.



**Fig. S4** Raman spectra of four detection/light cleaning cycles of MO on the surface of Ag/AgBr/GO-DTAB.



**Fig. S5** Raman spectra of the detection/light cleaning cycle of MO on the surface of Ag/AgBr/GO-TBAB. The Raman signal of MO on the surface of Ag/AgBr/GO-TBAB was still remaining after visible light irradiation.



**Fig. S6** Raman spectra of the detection/light cleaning cycle of MO on the surface of Ag/AgBr/GO-TMAB. The Raman signal of MO on the surface of Ag/AgBr/GO-TMAB was still remaining after visible light irradiation.