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Supplementary Information

$BaTiO_3$/graphene nanocomposites: Synthesis and Visible Light Photocatalytic Activity

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Table S1. Samples and Corresponding Experimental Conditions.

Sample	$Ba(NO_3)_2$ (g)	NaOH (g)	Graphene oxide (g)	P25 (g)	solvothermal time (h)	solvothermal temperature (°C)
$BaTiO_3$/ 0wt% graphene	0.4940	19.20	0.00	0.1190	24	200
$BaTiO_3$/ 2wt% graphene	0.4940	19.20	0.016	0.1190	24	200
$BaTiO_3$/ 5wt% graphene	0.4940	19.20	0.04g	0.1190	24	200
$BaTiO_3$/ 8wt% graphene	0.4940	19.20	0.064	0.1190	24	200

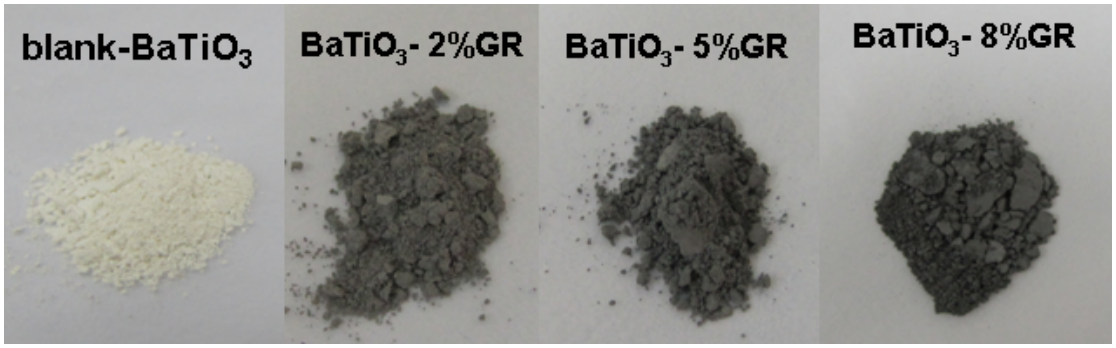

Fig. S1 Photographs of the samples of blank-$BaTiO_3$ and $BaTiO_3$/graphene nanocomposites with different nominal weight addition ratios of graphene.

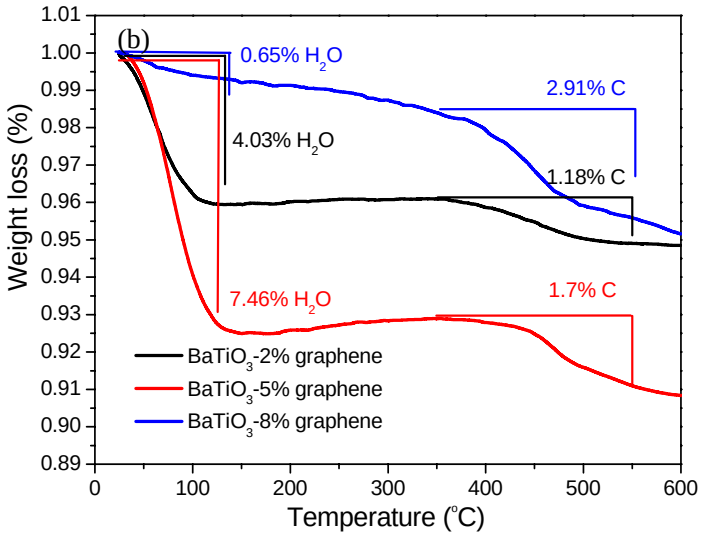

Fig. S2 TGA curves of $BaTiO_3$/2 wt% graphene, $BaTiO_3$/5 wt% graphene, $BaTiO_3$/8 wt% graphene in air atmosphere.

Fig. S2 shows the thermogravimetric analysis (TGA) of $BaTiO_3$/2 wt% graphene, $BaTiO_3$/5 wt% graphene, $BaTiO_3$/8 wt% graphene in air atmosphere. The TGA curves of $BaTiO_3$/graphene samples show gradual mass loss till 150 °C due to the removal of water in the sample. The weight loss of $BaTiO_3$/graphene in the temperature range 400-500 °C is attributed to the oxidation of carbon from the $BaTiO_3$/graphene. Above

525 °C all graphene is completely burned to CO_2 and only residual $BaTiO_3$ is left within the samples. Based on above analysis, the actual graphene contents are 1.18%, 1.70% and 2.91% for $BaTiO_3$/2 wt% graphene, $BaTiO_3$/5 wt% graphene and $BaTiO_3$/8 wt% graphene, respectively. It is worth noting that sample $BaTiO_3$/8 wt% graphene shows the lowest water content due to the hydrophobic nature of graphene. Moreover, sample $BaTiO_3$/5 wt% graphene shows the highest water content, which is beneficial for dye molecule adsorption in aqueous solution, and thus displays the highest photocatalytic activity among three samples.

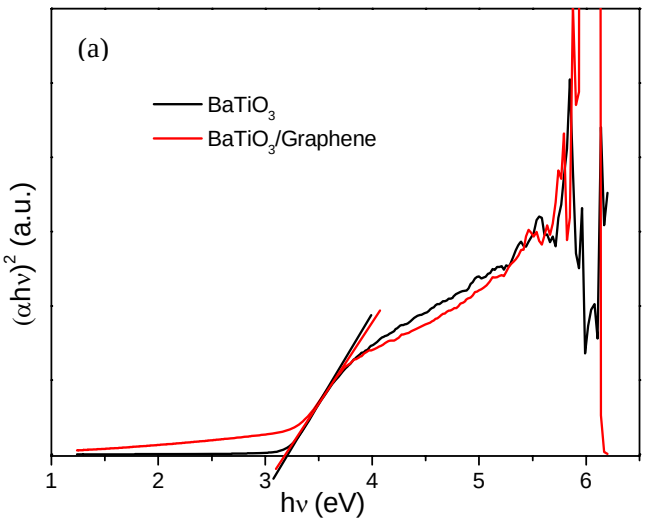

Fig. S3 Curves of the Kubelka–Munk function plotted against the photon energy for the $BaTiO_3$/5 wt% graphene.

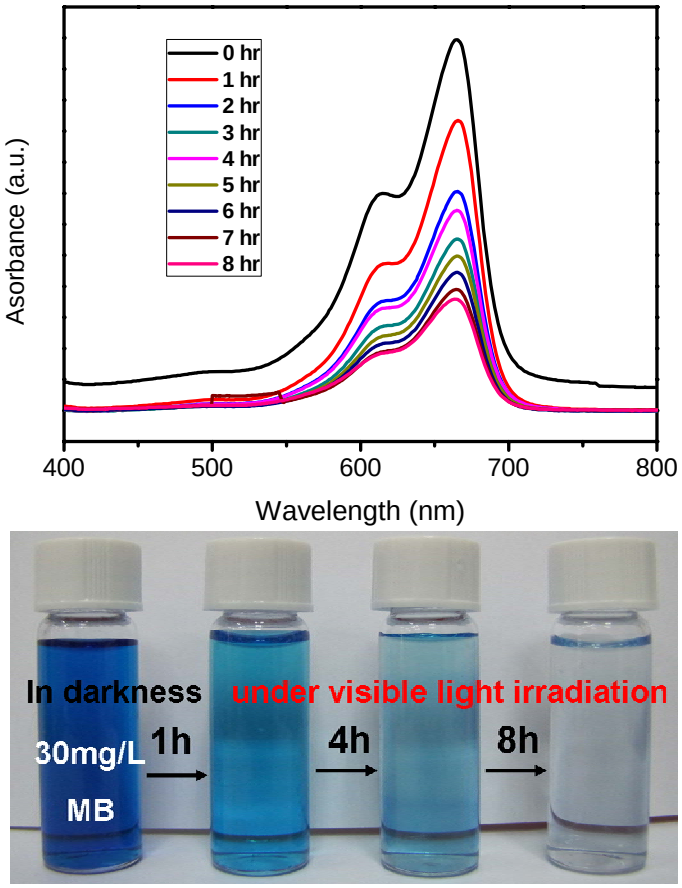

Fig. S4 Photocatalytic degradation of MB by $BaTiO_3$/5% graphene nanocomposite at different time.

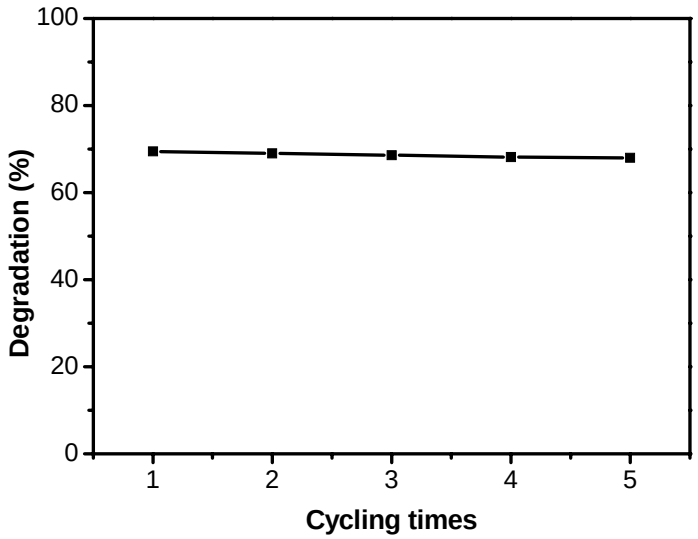

Fig. S5 The cycling degradation efficiency for MB of $BaTiO_3$/5% graphene nanocomposites under visible-light irradiation.

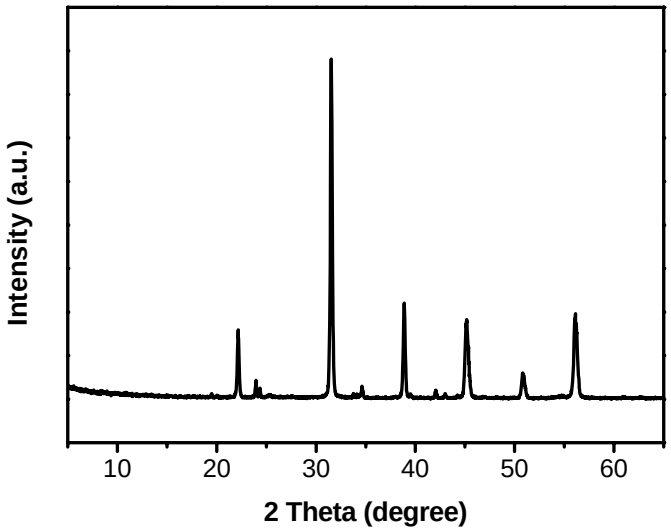

Fig. S6 XRD pattern of $BaTiO_3$/5% graphene nanocomposites after photocatalytic degradation of MB.

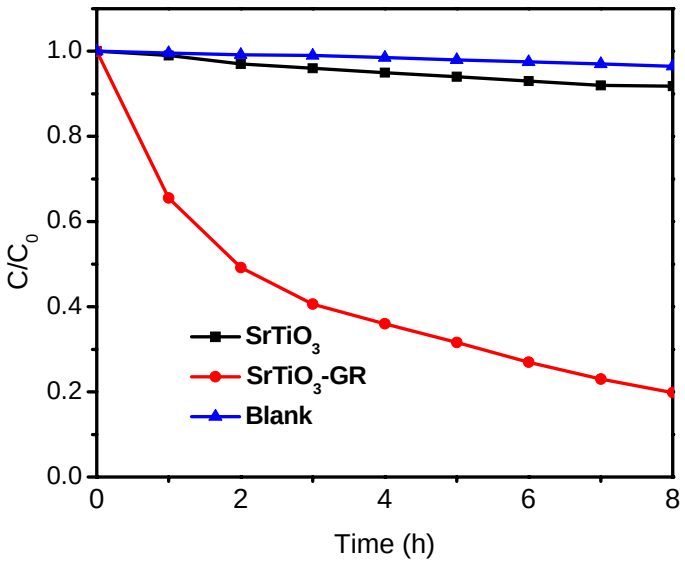

Fig. S7 Visible light photocatalytic degradation of MB over pure $SrTiO_3$, $SrTiO_3$/5 wt% graphene nanocomposites, and no photocatalyst.