

## Supporting information

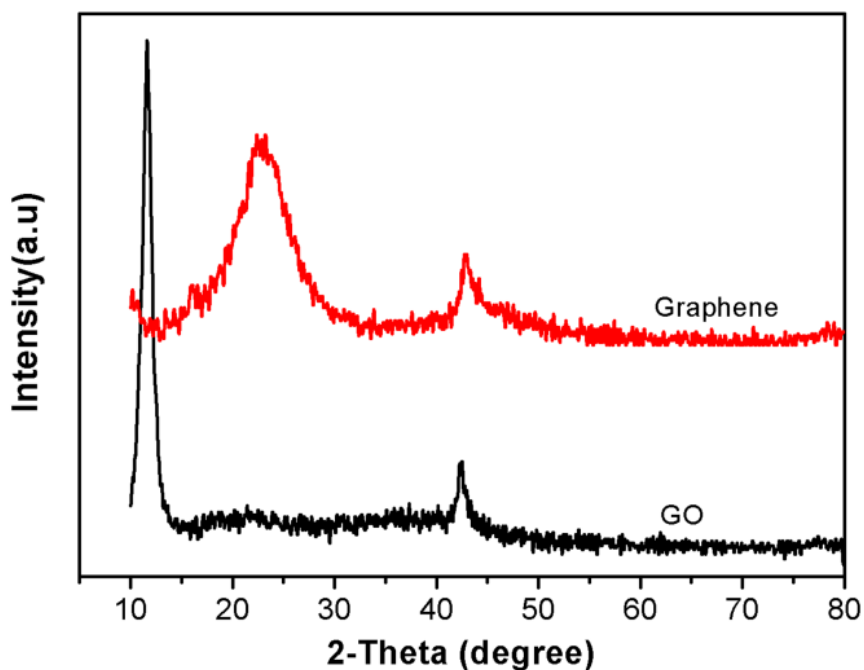


Fig.S1 XRD patterns of GO and Graphene.

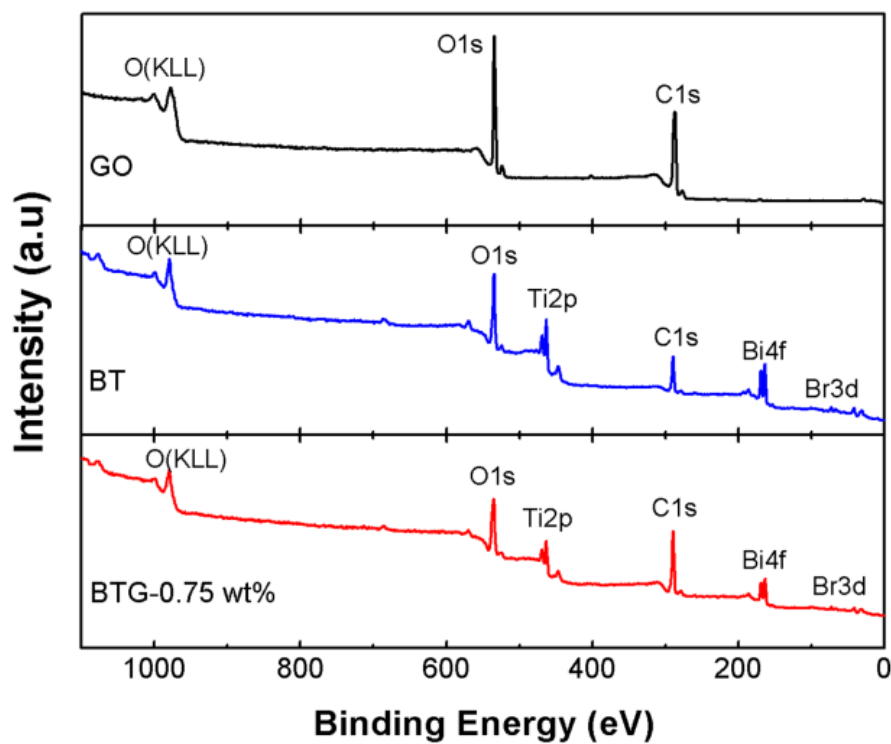


Fig.S2 XPS survey spectra of GO, BT and BTG-0.75 wt%.

Table S1 The element content from the XPS and ICP analysis.

Sample	XPS			ICP		
	Bi (at %)	Ti (at %)	n (Ti/Bi)	Bi (wt %)	Ti (wt %)	n (Ti/Bi)
BT	3.78	17.82	4.71	29.45	31.66	4.69
BTG-0.75 wt%	2.48	10.10	4.07	27.44	31.14	4.95

Table S2 The elemental analysis of C, H, O in the sample BT and BTG-0.75 wt%.

sample	C (wt%)	O (wt%)	H (wt%)
BT	8.55	6.275	2.091
BTG-0.75 wt%	10.5	5.269	2.342

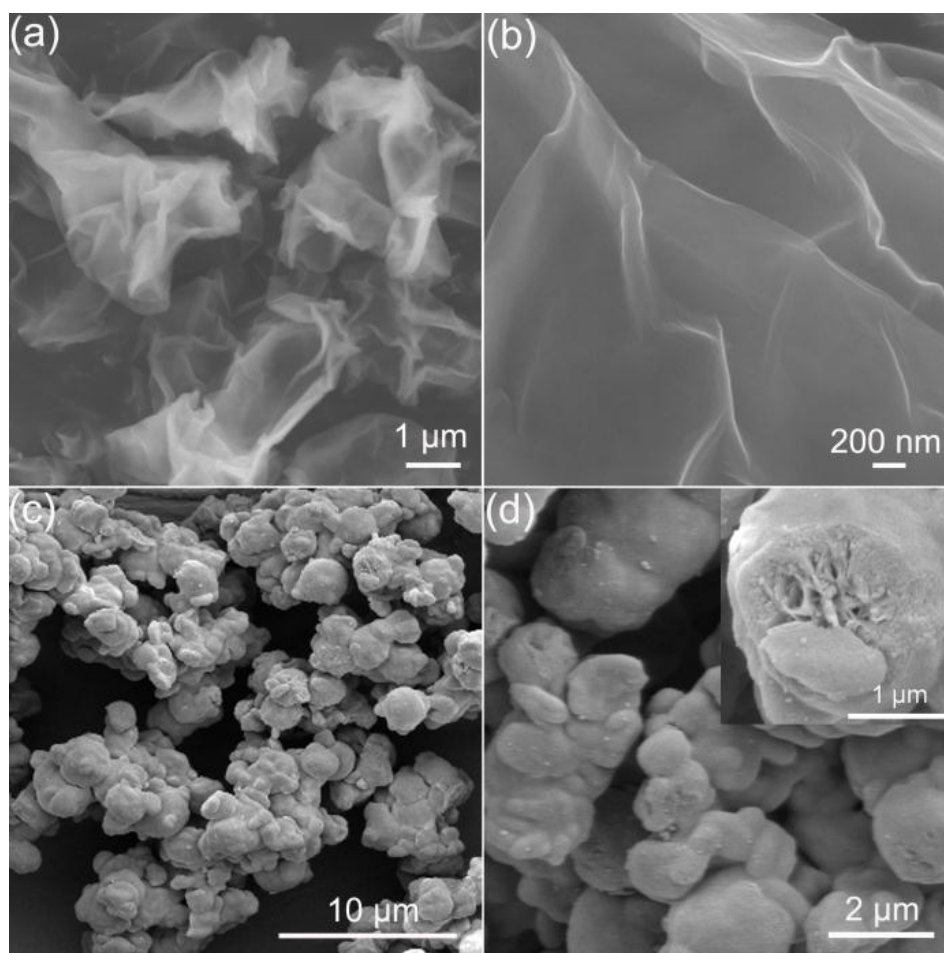


Fig.S3 SEM of GO (a), GO after solvothermal treatment (b), BT (c) and (d).

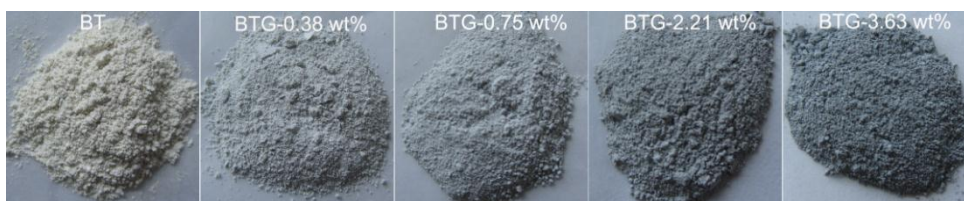


Fig.S4 Photograph of the BT and BTG-X

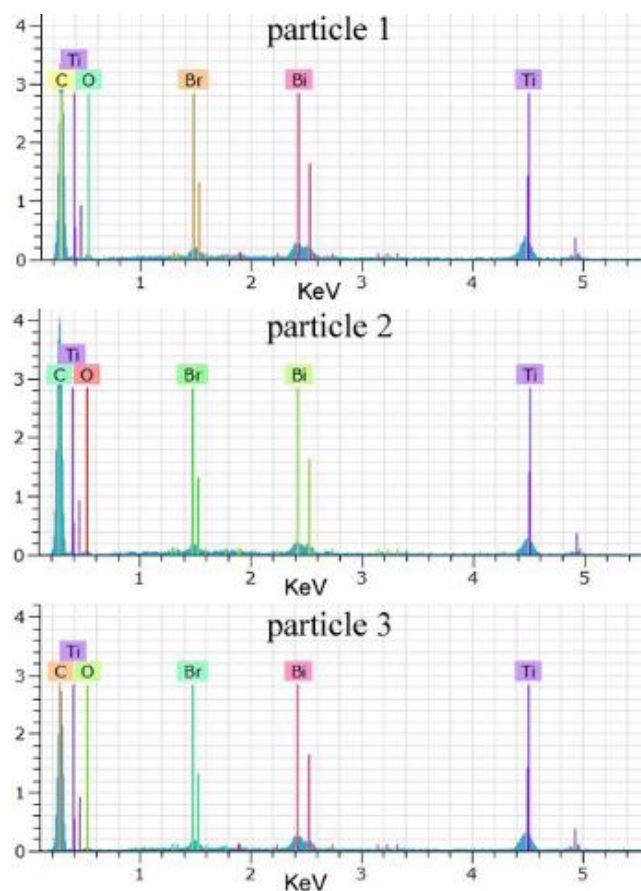


Fig.S5 EDS analysis of different particles in BTG-0.75 wt%.

Table S3 The elemental composition from EDS result.

BTG-0.75 wt%	Elements (at%)					Ti:Bi:Br
	Bi	Ti	C	Br	O	
Particle 1	0.99	6.26	88.68	0.65	3.42	6.32/1/0.66
Particle 2	0.68	4.21	91.68	0.49	2.95	6.19/1/0.72
Particle 3	0.98	6.59	88.96	0.7	2.76	6.72/1/0.71

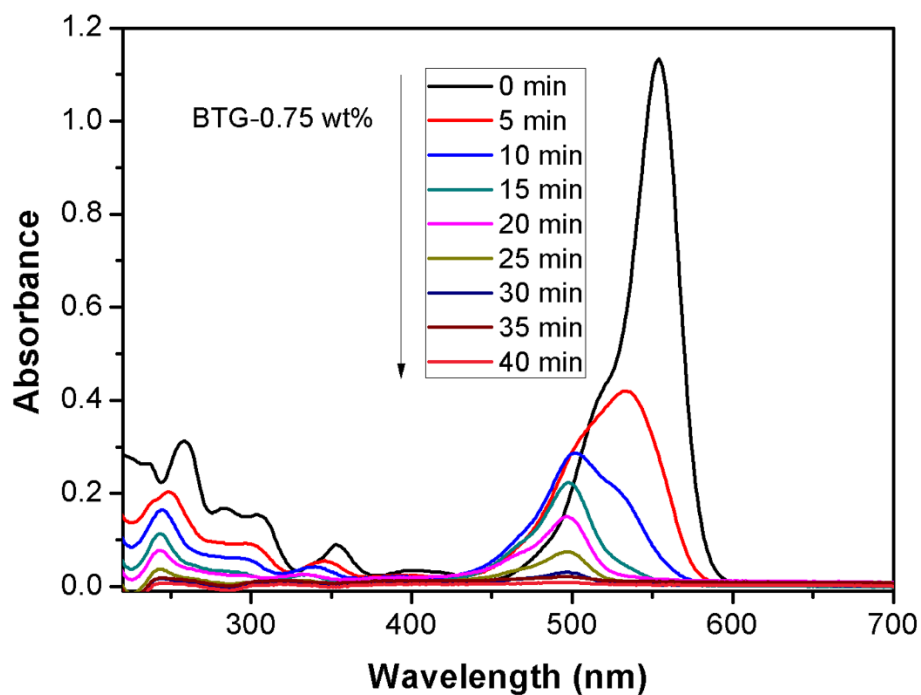


Fig.S6 Time profile of RhB absorbance spectrum observed during photodegradation with BTG-0.75 wt% under visible light irradiation.

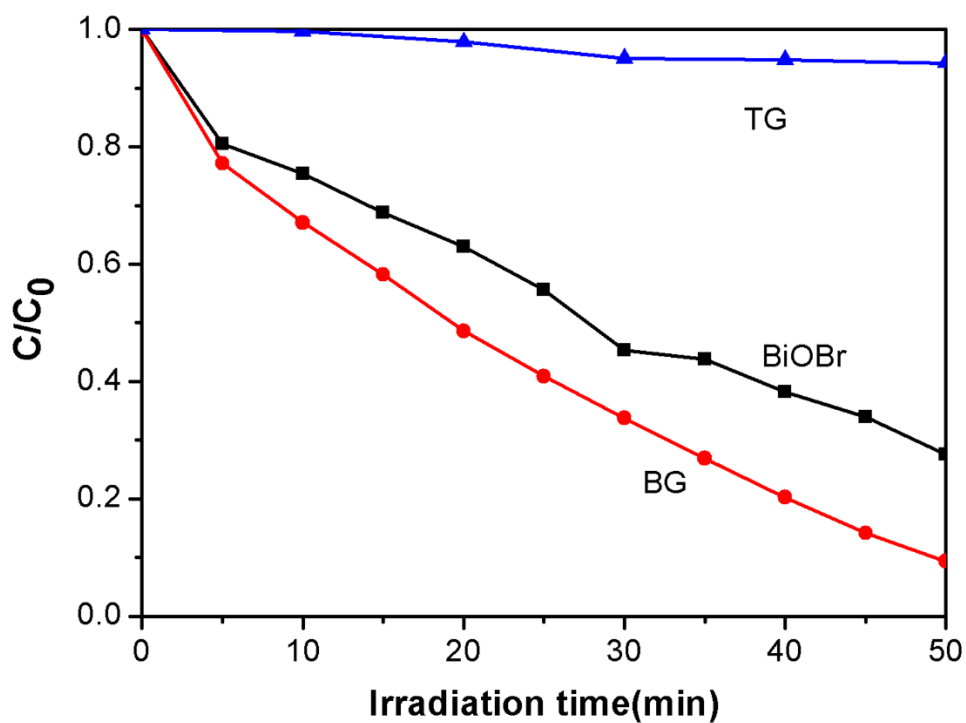


Fig. S7 Variation of RhB concentration against irradiation time using control sample under visible light irradiation ( $\lambda \geq 400\text{nm}$ ).

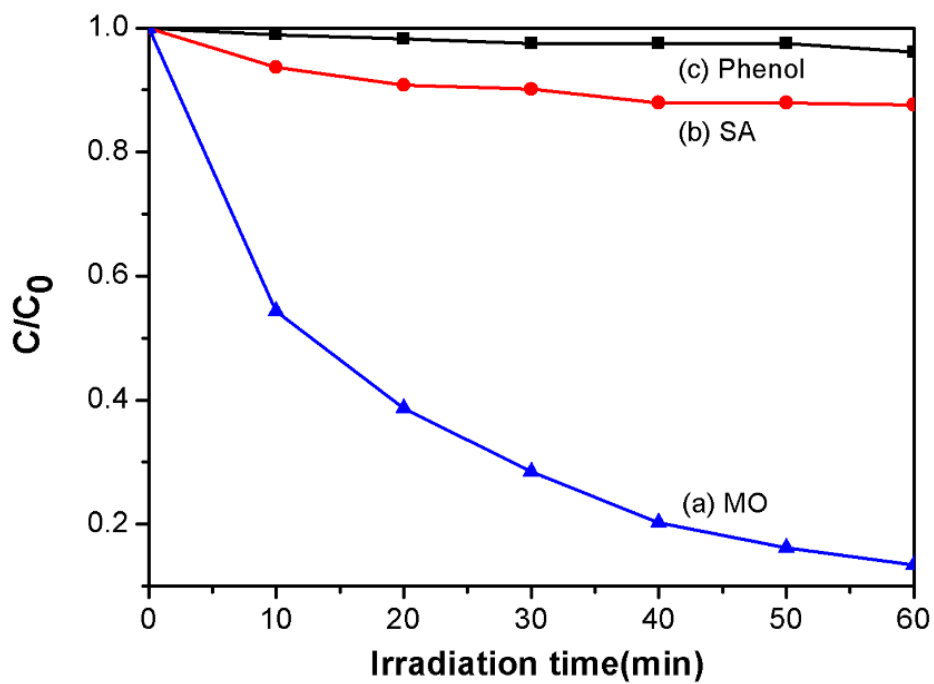


Fig.S8 Reaction process on 25 mg BTG-0.75 wt% with different pollutant  
(a) MO, (b) SA, (c) phenol under visible light irradiation.