

## 纳米片自组装的 $(\text{BiO})_2\text{CO}_3$ 单分散微米绒球的绿色可控合成 及其光催化性能

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### Facile Green Synthesis of Highly Monodisperse Bismuth Subcarbonate Micropompons Self-assembled by Nanosheets: Improved Photocatalytic Performance

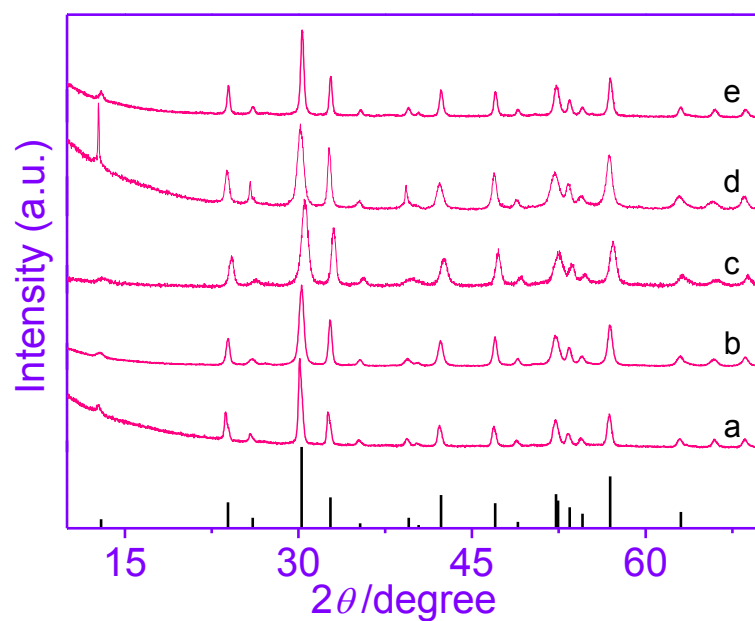
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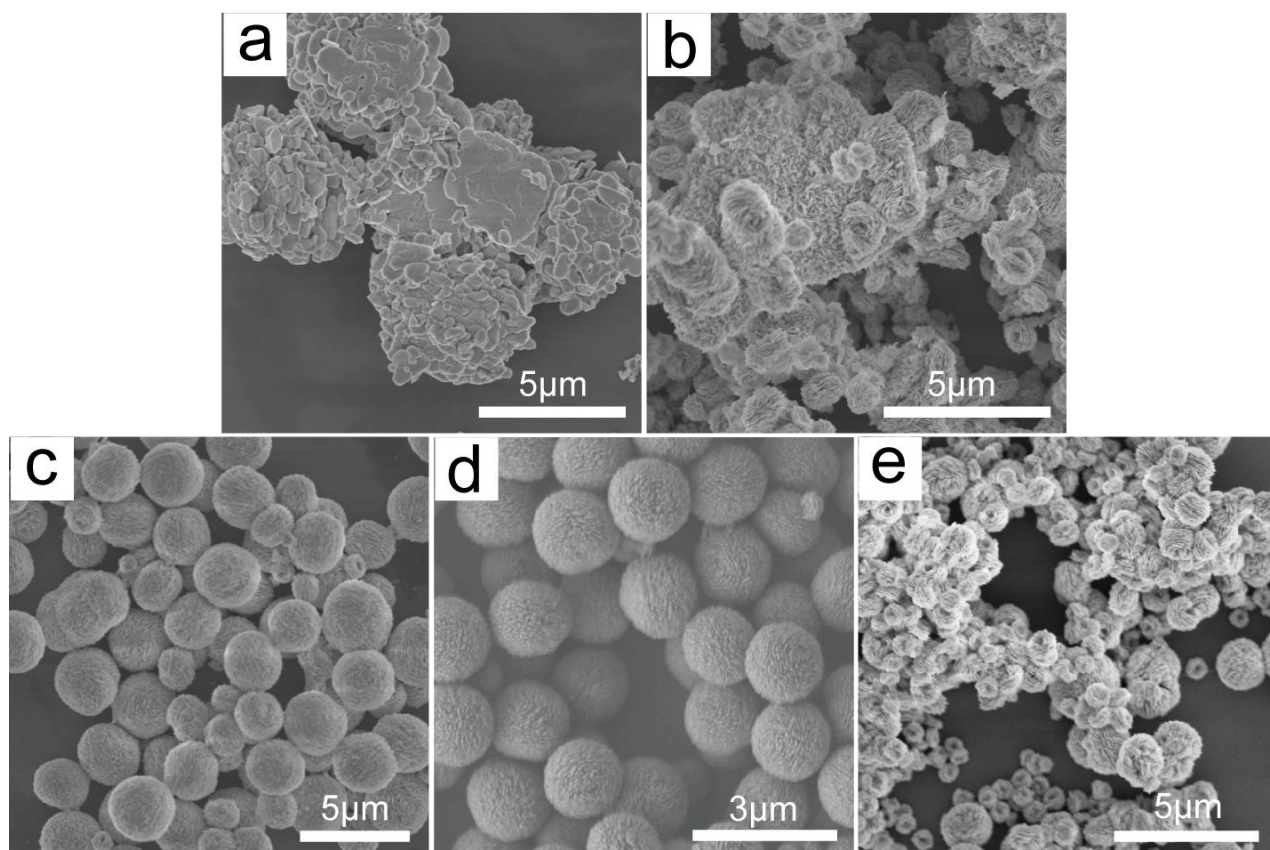
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**Fig.S1** XRD patterns of the BS materials obtained at different TCD to BNP molar ratio of 0 (a), 1 : 1 (b), 2 : 1 (c), 3 : 1 (d) and 5 : 1 (e)



**Fig.S2** FE-SEM images of the BS obtained at different TCD to BNP molar ratio of 0 (a), 1 : 1 (b), 2 : 1 (c), 3 : 1 (d) and 5 : 1 (e)

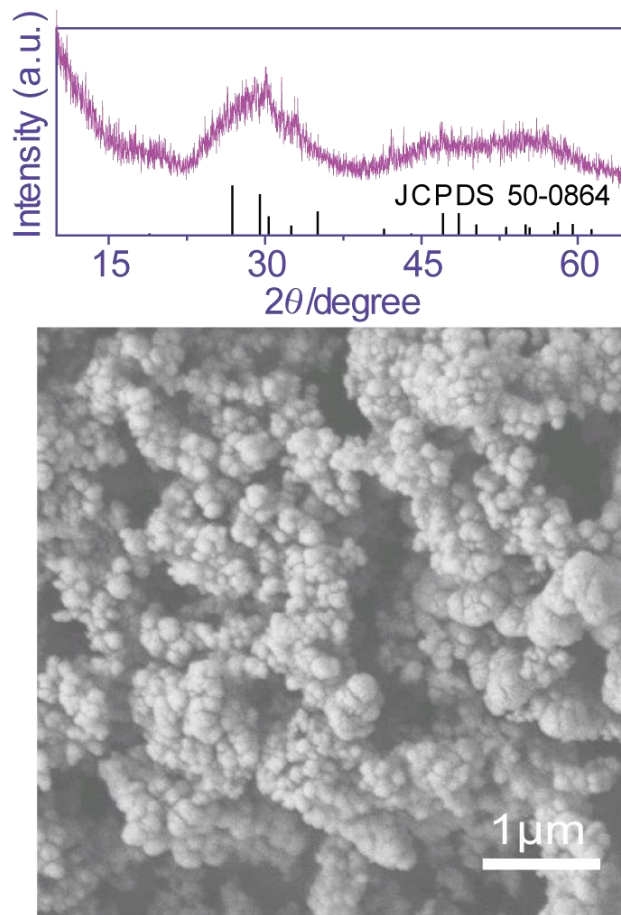


Fig.S3 XRD pattern and FE-SEM image of the BS-6

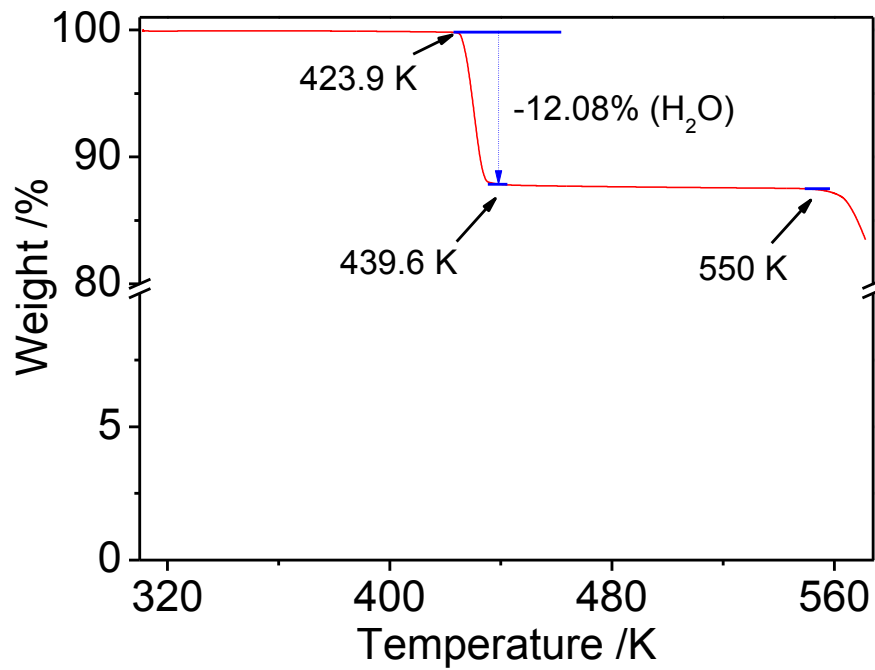
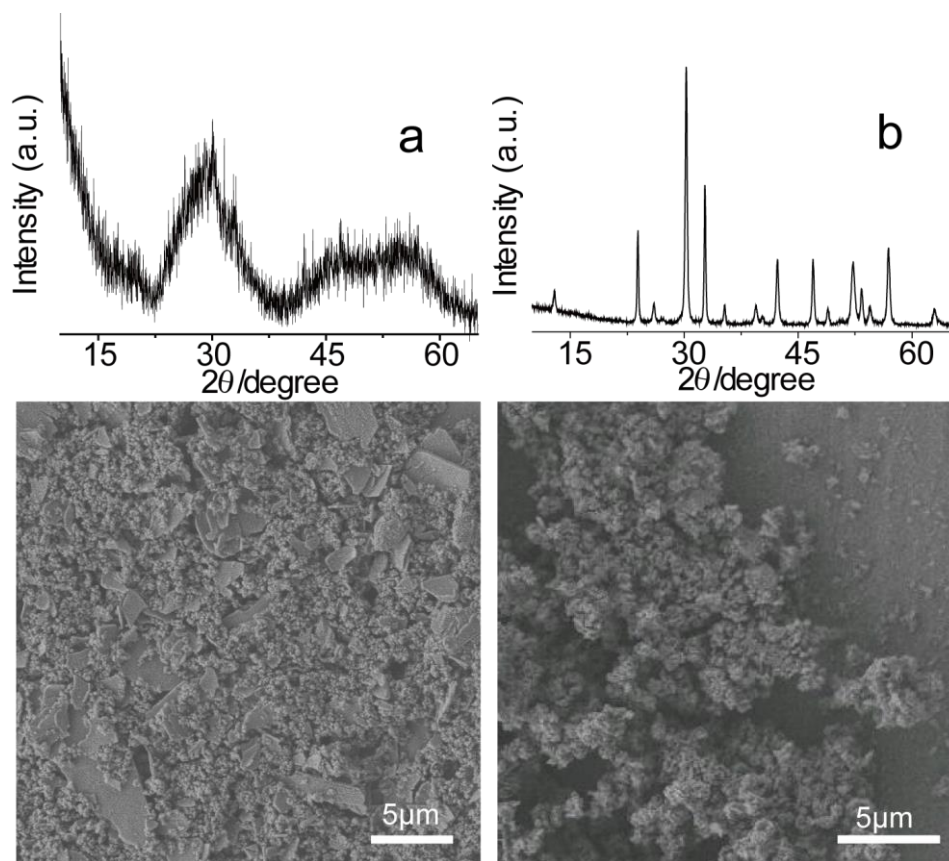
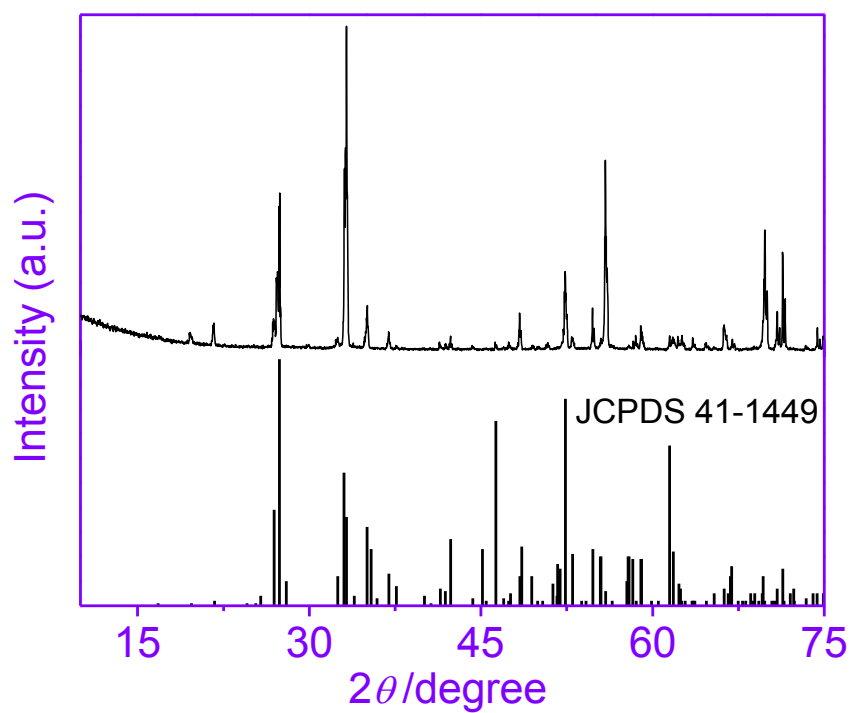


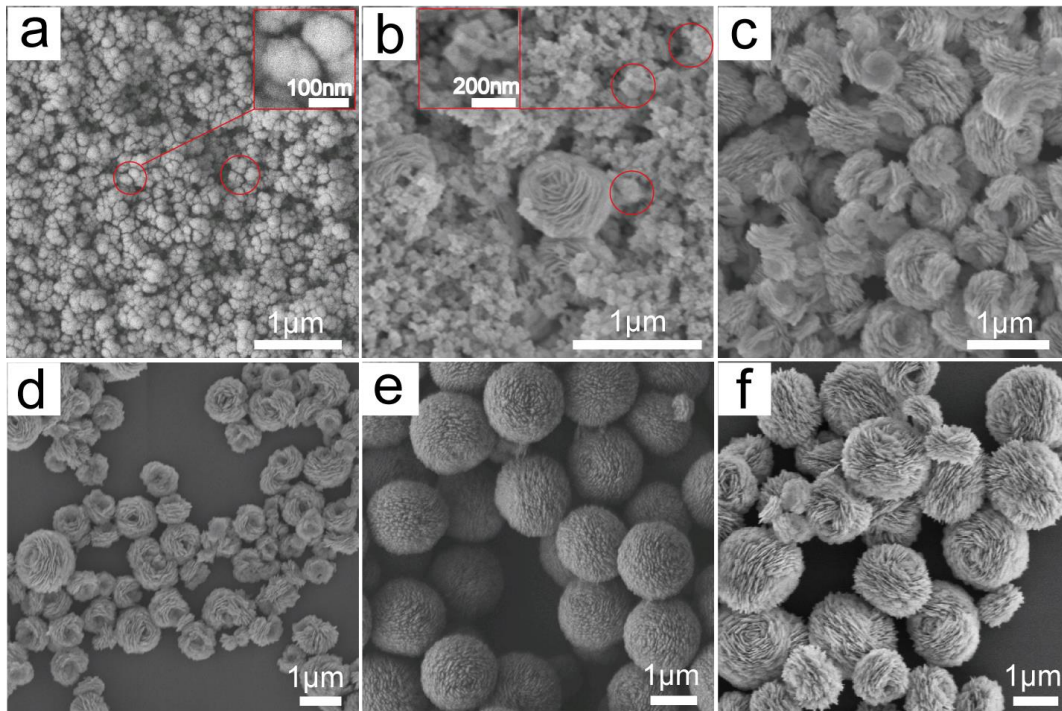
Fig.S4 TG curve of TCD



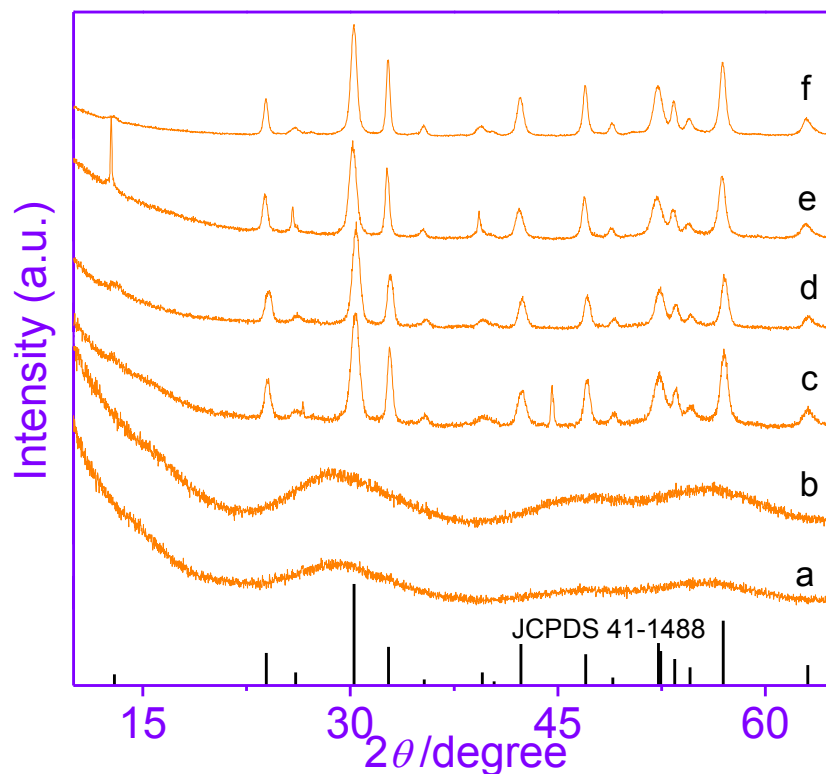
**Fig.S5** XRD patterns and FE-SEM images of the BS materials obtained by replacing  $\text{Na}_3\text{Cit} \cdot 2\text{H}_2\text{O}$  with citric acid (a) and sodium tartrate (b)



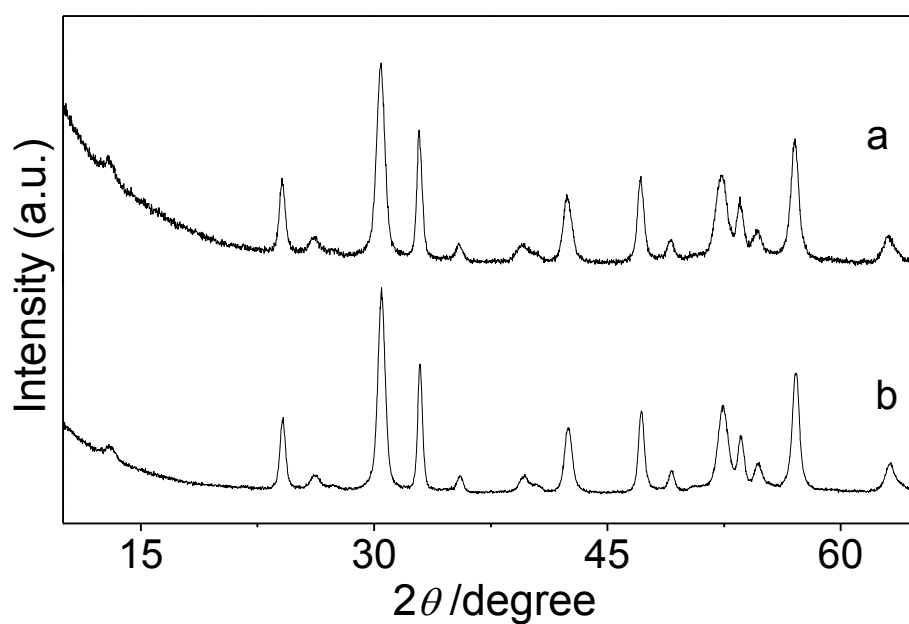
**Fig.S6** XRD pattern of  $\text{Bi}_2\text{O}_3$  obtained by replacing urea with  $\text{NaOH}$



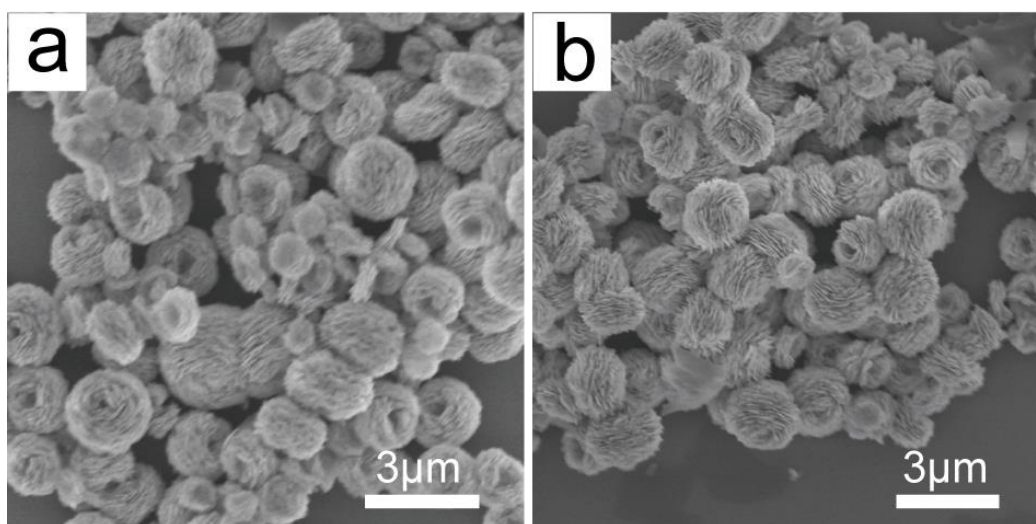
**Fig.S7** FE-SEM images of the  $(\text{BiO})_2\text{CO}_3$  obtained at 2 (a), 4 (b), 6 (c), 8 (d), 10 (e) and 12 h (f)



**Fig.S8** XRD patterns of the  $(\text{BiO})_2\text{CO}_3$  obtained at 2 (a), 4 (b), 6 (c), 8 (d), 10 (e) and 12 h (f)



**Fig.S9** XRD patterns of the BS materials obtained at different temperatures: 393 K (a) and 433 K (b)



**Fig.S10** FE-SEM images of the BS obtained at different temperatures: 393 K (a) and 433 K (b)

**Table S1 Representative synthesis process of BS materials**

Materials	Bi source	Organic solvents	Surfactant/polymer	Reaction temperature/time	Reference
BS-1	Bi(NO <sub>3</sub> ) <sub>3</sub> · 5H <sub>2</sub> O	—	—	413 K/10 h	The present work
(BiO) <sub>2</sub> CO <sub>3</sub> nanotubes	Bi(NO <sub>3</sub> ) <sub>3</sub> · 5H <sub>2</sub> O	ethylene glycol	—	423 K/12 h	1
(BiO) <sub>2</sub> CO <sub>3</sub> nanotubes	bismuth citrate	ethylene glycol	cetyltrimethylammonium bromide	473 K/1 h	2
Rose-like (BiO) <sub>2</sub> CO <sub>3</sub>	ammonia bismuth citrate	—	—	453 K/12 h	3
Persimmon-like (BiO) <sub>2</sub> CO <sub>3</sub>	Bi(NO <sub>3</sub> ) <sub>3</sub> · 9H <sub>2</sub> O	—	polyacrylamide	453 K/12 h	4
Sponge-like (BiO) <sub>2</sub> CO <sub>3</sub>	Bi(NO <sub>3</sub> ) <sub>3</sub> · H <sub>2</sub> O	—	—	453 K/24 h	5
(BiO) <sub>2</sub> CO <sub>3</sub> nanostructures	bismuth citrate	mannitol solution	—	423 K/12 h	6
cube-like (BiO) <sub>2</sub> CO <sub>3</sub>	Bi(NO <sub>3</sub> ) <sub>3</sub> · 5H <sub>2</sub> O	mannitol solution	—	423 K/12 h	7
(BiO) <sub>2</sub> CO <sub>3</sub> microspheres	ammonia bismuth citrate	—	polyvinylpyrrolidone	453 K/12 h	8

## References

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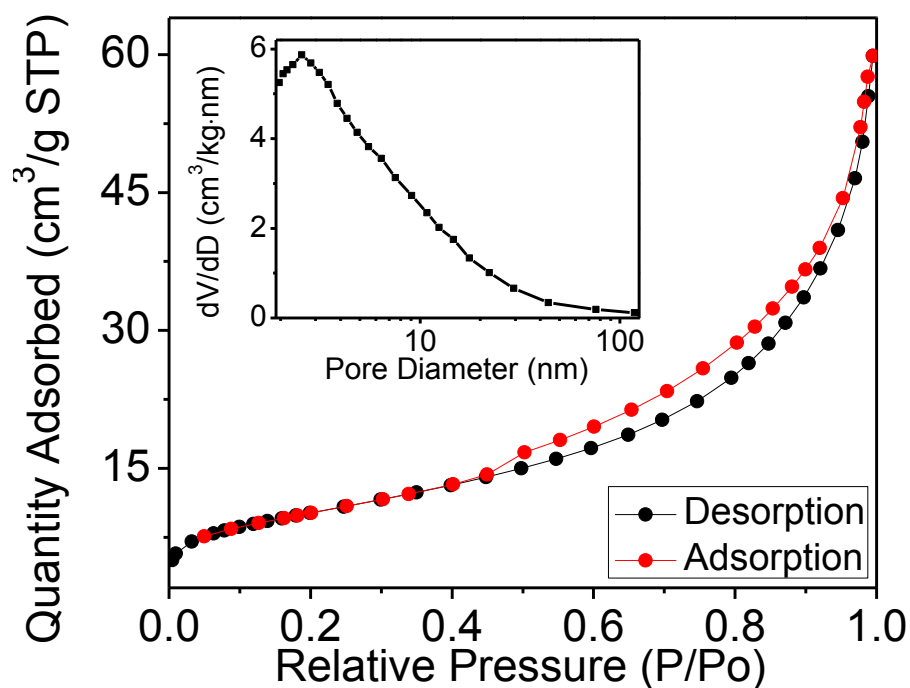


Fig.S11 N<sub>2</sub> adsorption-desorption isotherm and pore size distribution (inset) of the BS-1

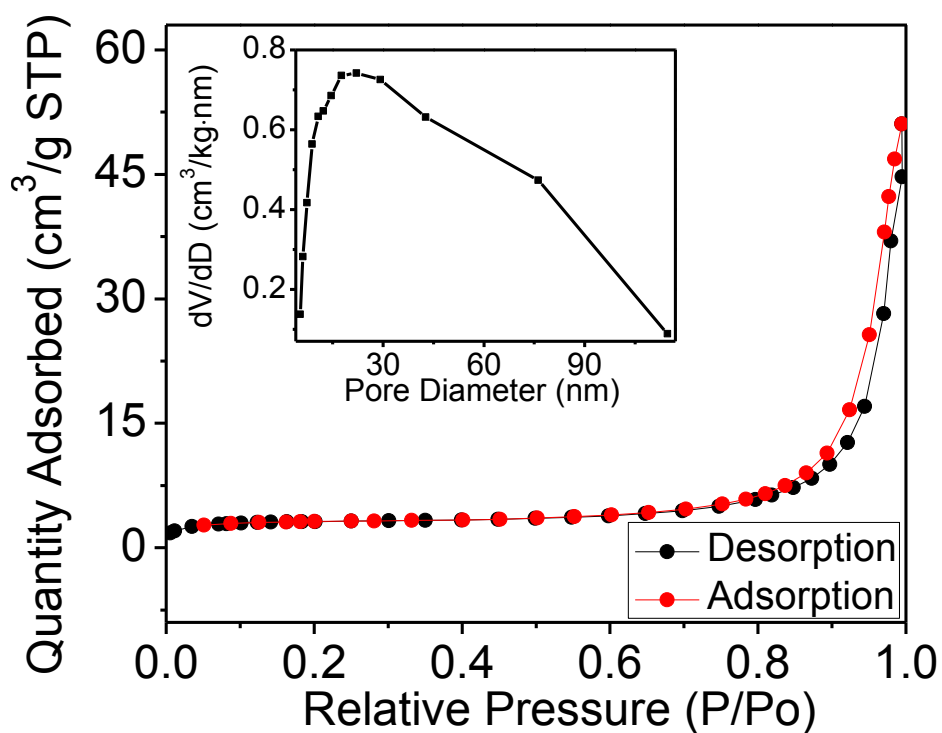


Fig.S12 N<sub>2</sub> adsorption-desorption isotherm and pore size distribution (inset) of the BS-2

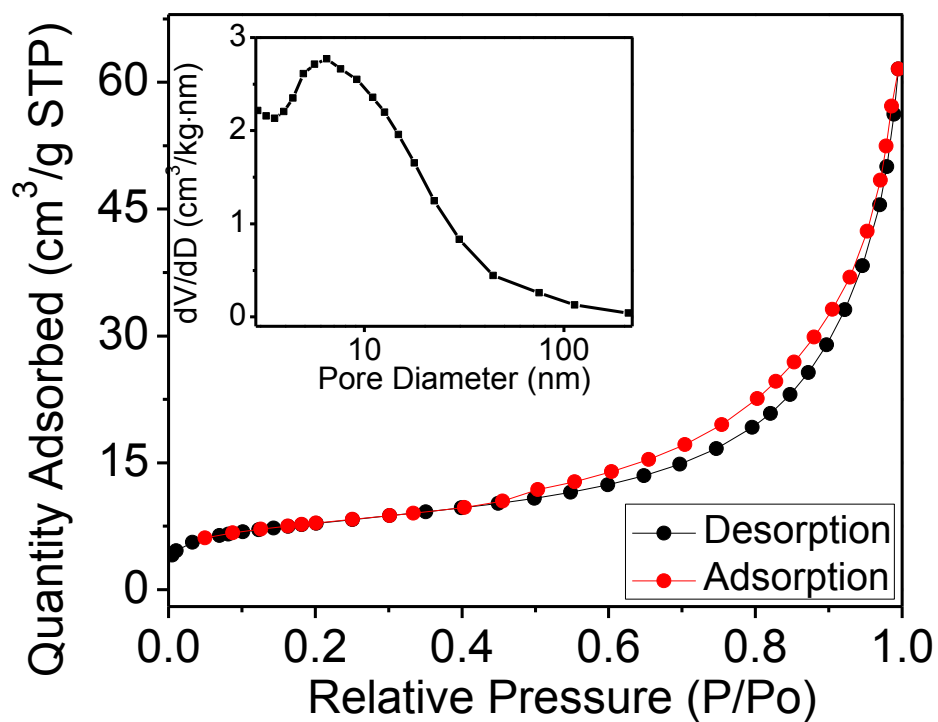


Fig.S13 N<sub>2</sub> adsorption-desorption isotherm and pore size distribution (inset) of the BS-3

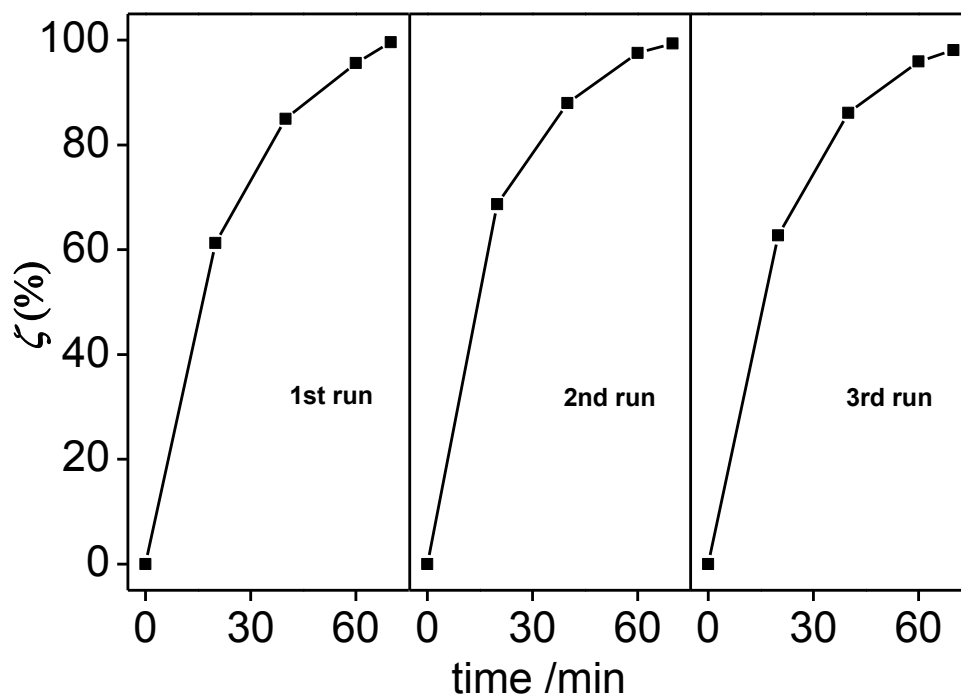
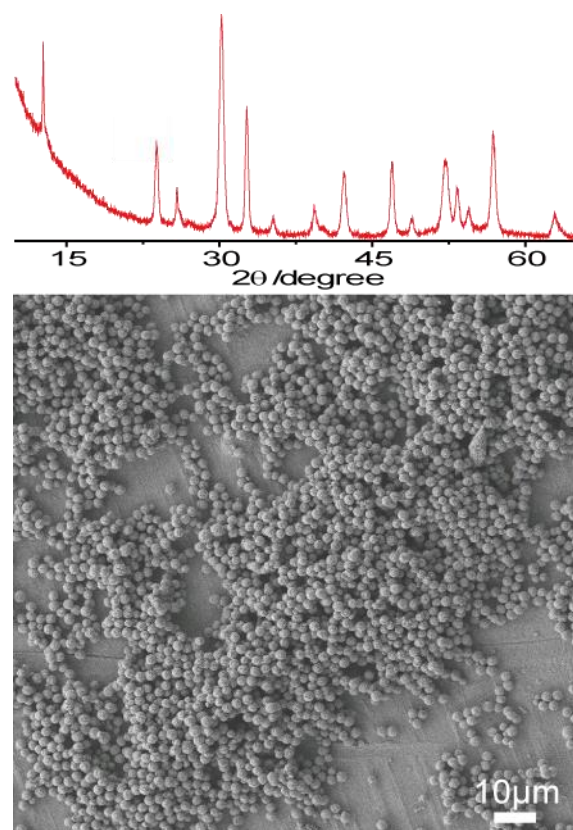


Fig.S14 Photodegradation degree of RhB in the first three cycles



**Fig.S15 XRD pattern and FE-SEM image of the BS-1 after three cycles of photodegradation of RhB**

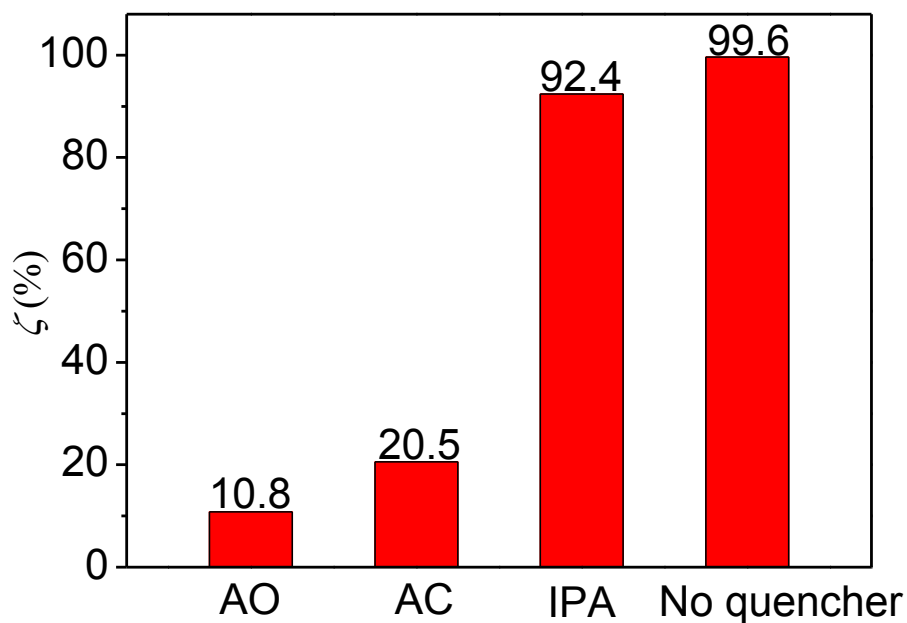
**Table S2 Superiority of the BS-1 in degradation of RhB compared to other Bi-based materials**

Materials	catalyst/dye concentration/(g mol <sup>-1</sup> )	Photodegradation degree/time	Light intensity (W)	Reference
BS-1	$2.39 \times 10^4$	99.6%/70 min	150	the present work
BS nanotubes	$5.00 \times 10^4$	84.0%/150 min	500	1
Persimmon-like BS	$1.00 \times 10^5$	—/120 min	500	4
BS microspheres	$1.00 \times 10^5$	95.0%/90 min	350	8
BS nanosheets	$1.00 \times 10^5$	94.0%/120 min	350	9
BS nanosheets	$2.39 \times 10^4$	97.0%/100 min	300	10
BS microflowers	$8.00 \times 10^4$	—/50 min	1000	11

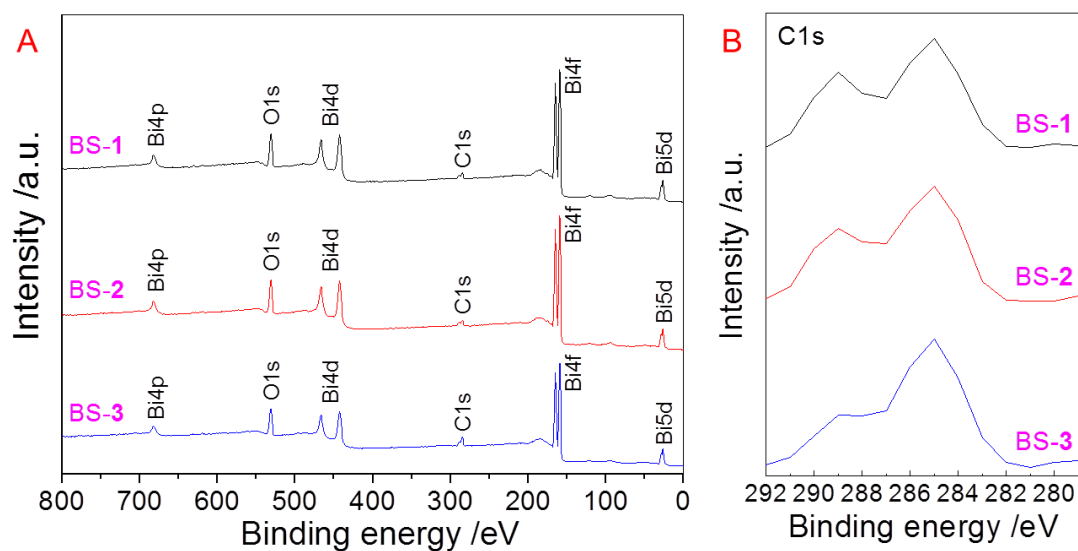
BS microspheres	$8.00 \times 10^4$	—/10 min	300	5
Flower-like BS	$2.39 \times 10^4$	—/30 min	250	12
BiOCl Single Crystals	$1.00 \times 10^5$	78%/120 min	400	13
BiOBr/BiOI heterojunctions	$3.33 \times 10^4$	—/120 min	500	14

## References

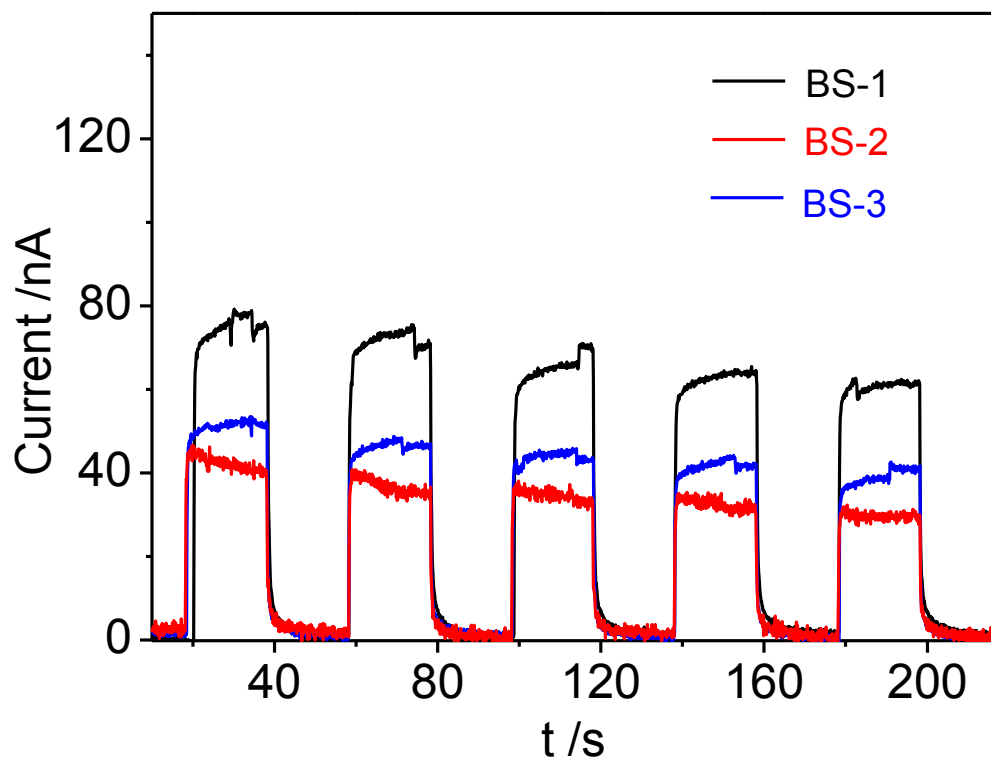
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**Fig.S16** Degradation degree ( $\zeta$ ) of RhB on the BS-1 in the presence of different quenchers [ammonium oxalate (AO) to  $\text{h}^+$ , ascorbic acid (AC) to  $\text{O}_2^-$ , and isopropyl alcohol (IPA) to  $\text{OH}$ ]



**Fig.S17** XPS survey spectra (A) and XPS spectra of C1s peaks of BS-1, -2 and -3 (B)



**Fig.S18** A plot of current response *vs* time for the BS-1, -2 and -3 under visible light irradiation