Supporting Information

Tunable Thickness and Band Structure of SnO Sheets for Improved Photocatalytic Activity

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Table S1. PEG conditions of SnO samples preparation.

sample	PEG	Hydrothermal condition
SnO-PEG-4	0.1695 g PEG-400	120 °C for 12 h
SnO-PEG-5	0.1695 g PEG-600	120 °C for 12 h
SnO-PEG-6	0.1695 g PEG-1540	120 °C for 12 h
SnO-PEG-7	0.1695 g PEG-4000	120 °C for 12 h
SnO-PEG-8	0.1695 g PEG-10000	120 °C for 12 h

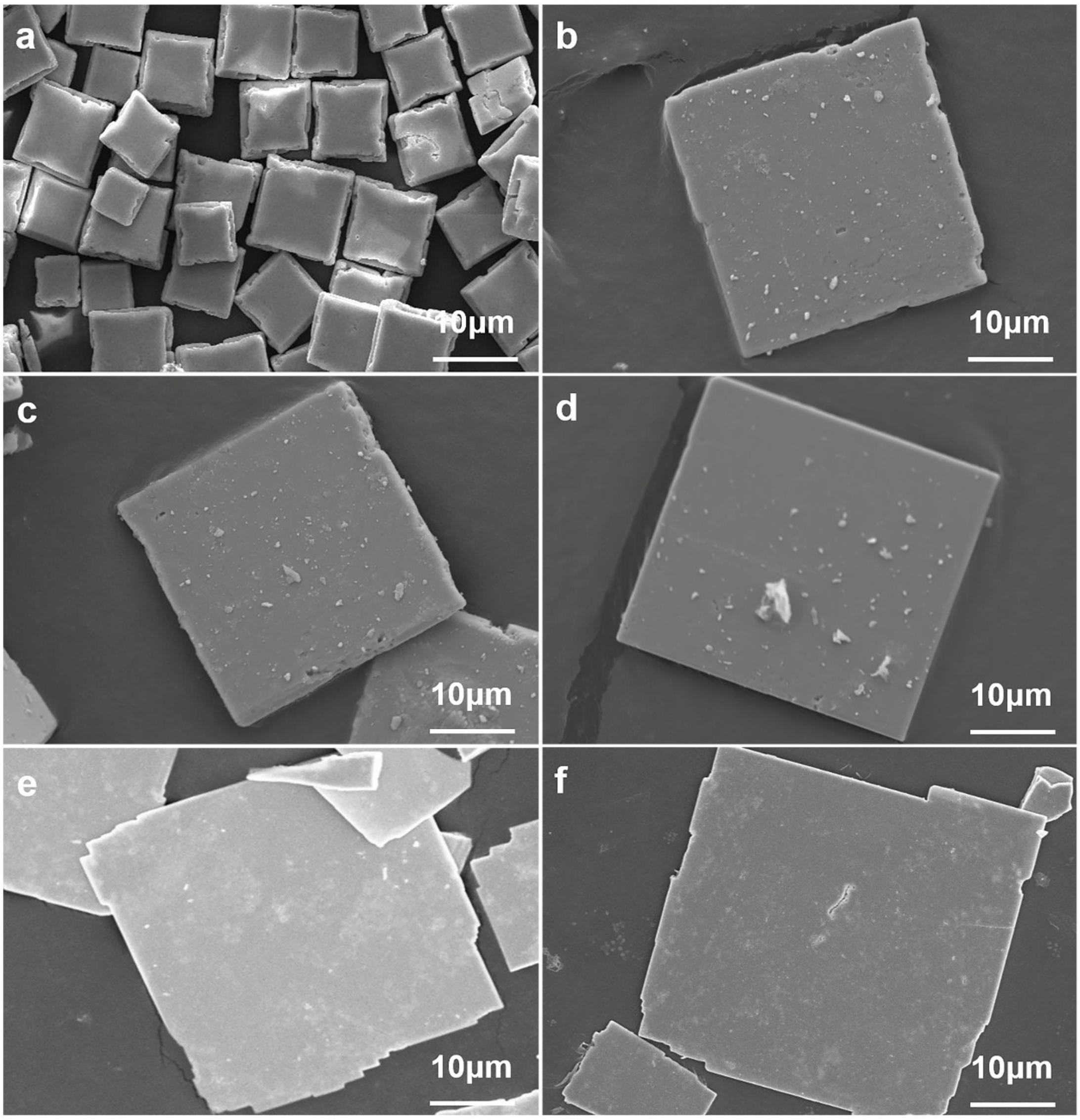


Fig. S1. SEM images of SnO samples prepared with different PEG. (a) Without PEG, (b) 5% PEG-400, (c) 5% PEG-600, (d) 5% PEG-1540, (e) 5% PEG-4000, (f) 5% PEG-10000.

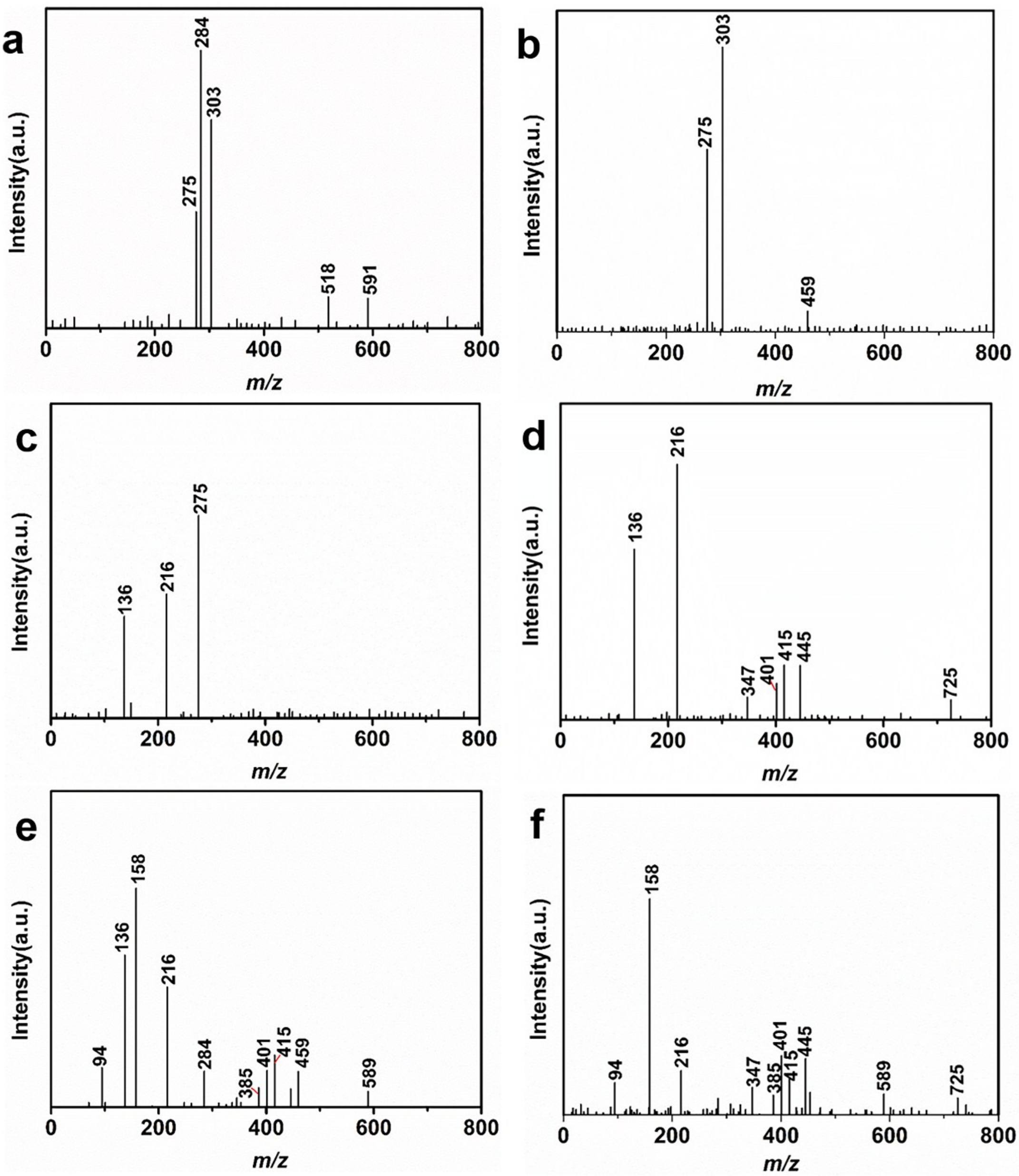
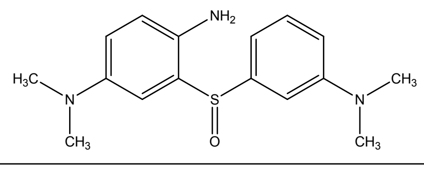
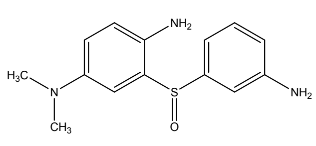
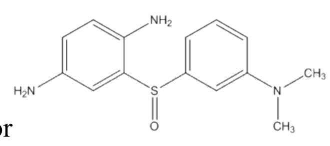
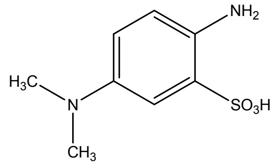
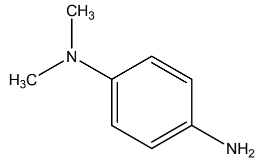
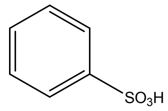
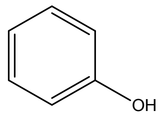


Fig. S2. MS spectra of degradation intermediates from MB by SnO sheets.

Table S2. The identified possible photocatalytic degradation intermediates of MB.

m/z	Proposed structure
303	
275	 or 

216	
136	
158	
94	

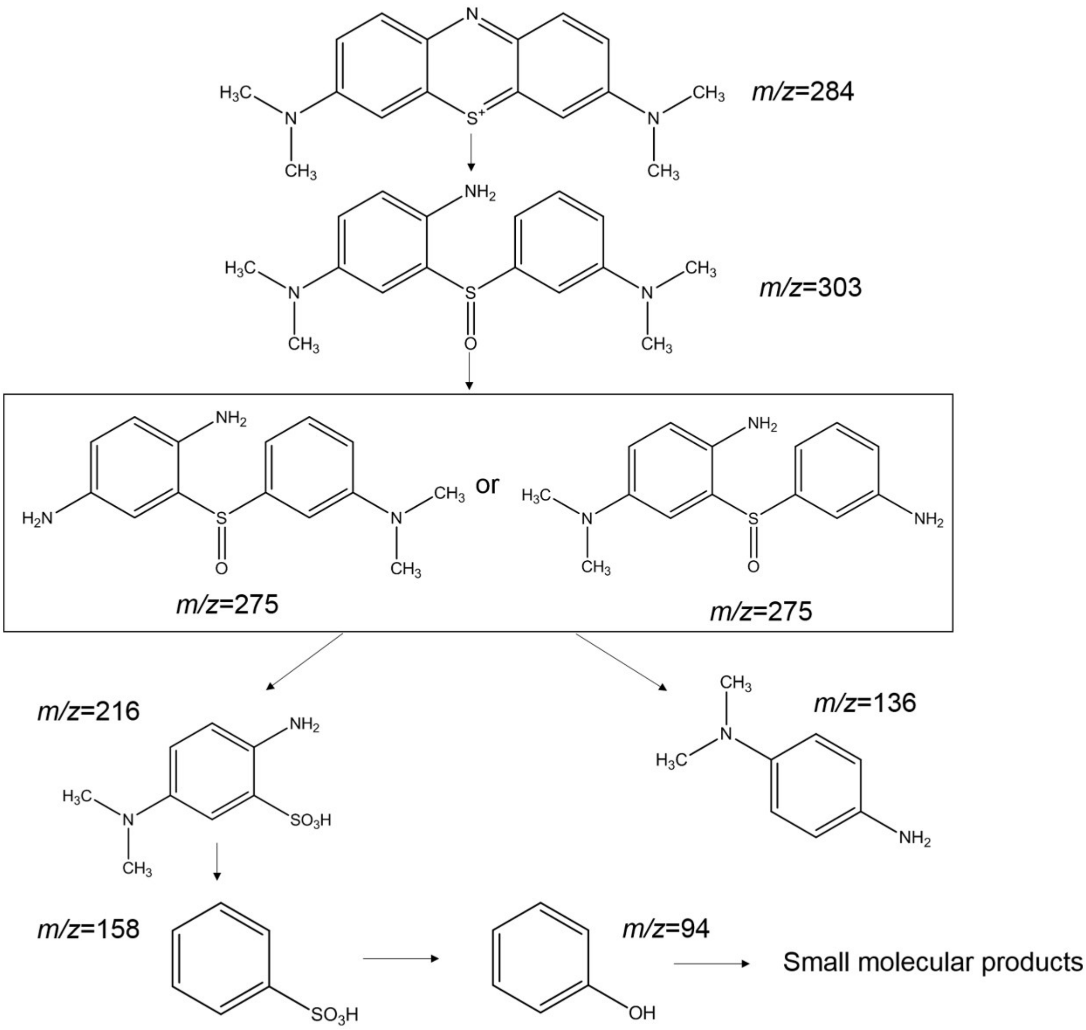


Fig. S3. Proposed photodegradation pathway of MB by SnO sheets.

Liquid chromatography-mass spectrometry (LC-MS) was employed to further determine the degradation intermediates during MB degradation process. Based on the LC-MS analysis (Fig. S2), 6 main intermediates were detected as shown in Table S2.

The intermediates were derived from ring sulfur atoms oxidation induced ring opening, demethylation and cleavage of C-N bond, which is similar with the result reported by Houas et al. [1] The possible photodegradation pathway of MB was proposed in Fig. S3. Specifically, Zhang et al.[2, 3] have investigated photocatalytic degradation process of MB in aqueous solution and suggested that the intermediates induced absorption peak blue-shifts were mainly produced through the demethylation reactions. Hence, before ring opening, the partial demethylation of MB also could be occurred.

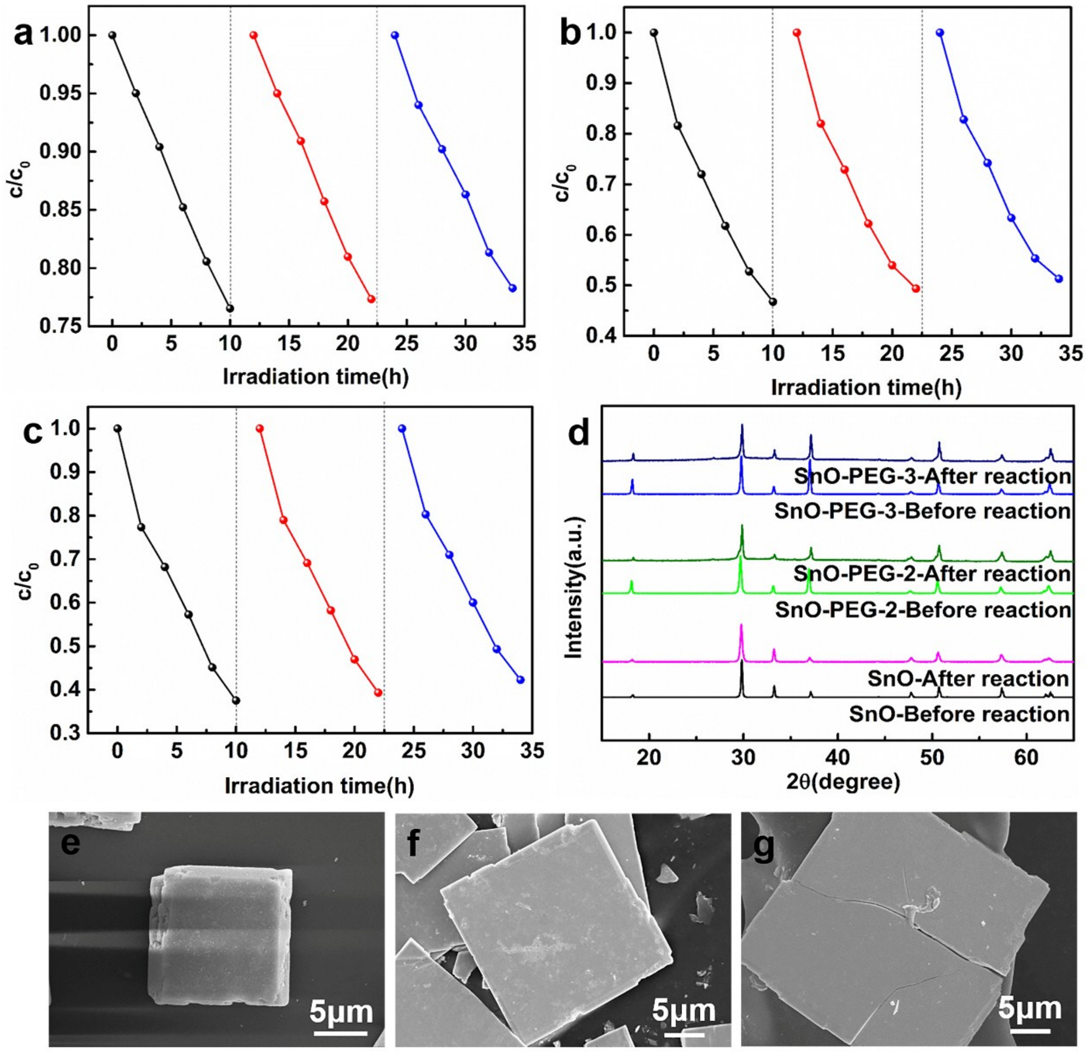


Fig. S4. Cycling test of photodegradation of MB in the present of (a) SnO, (b) SnO-PEG-2 and (c) SnO-PEG-3. (d) XRD patterns of SnO, SnO-PEG-2 and SnO-PEG-3 before and after cycling test. SEM images of (e) SnO, (f) SnO-PEG-2 and (g) SnO-PEG-3 after cycling test.

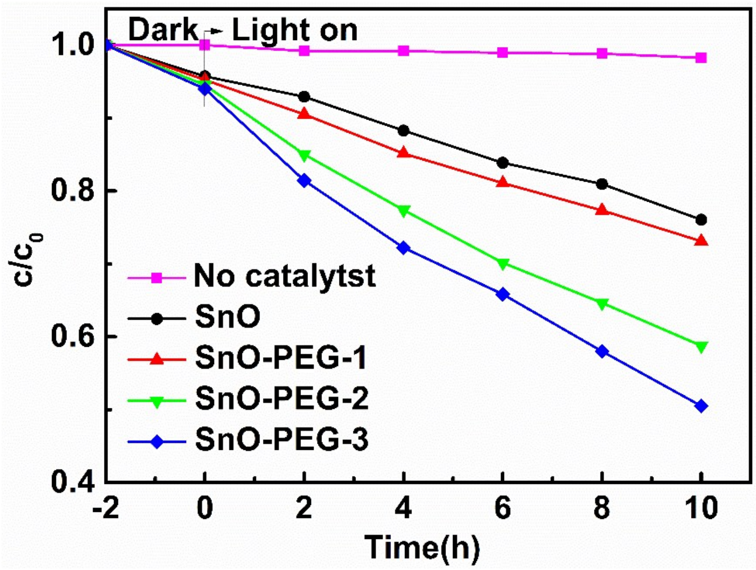


Fig. S5. Degradation curves of MO over different SnO sheets as photocatalysts.

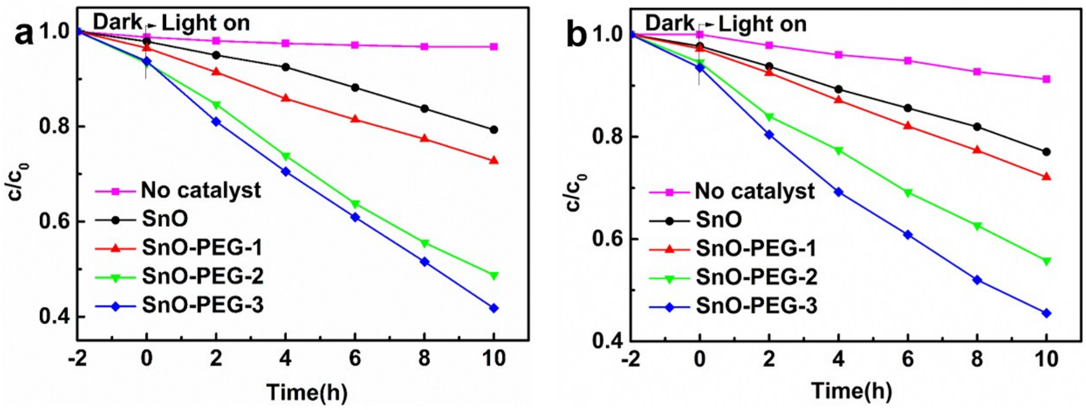


Fig. S6. Degradation curves of (a) TBO and (b) RhB over different SnO sheets as photocatalysts.

Table S3. Photocatalytic efficiency of SnO photocatalysts in previous reports.

Photocatalysts	Light source	Photocatalytic efficiency	Ref.
SnO	200W tungsten lamp	50%, 12h for MB	4
SnO	15W Hg lamp	82%, 10h for MB	5
SnO	250W Hg lamp	100%, 4h for MO	6
SnO	500W halogen lamp	5%, 2h for MB	7
This work	15W fluorescent lamp	70%, 10h for MB	

References

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