

Supplementary Information

The fast and reversible intrinsic photochromic response of hydrated tungsten oxide nanosheets

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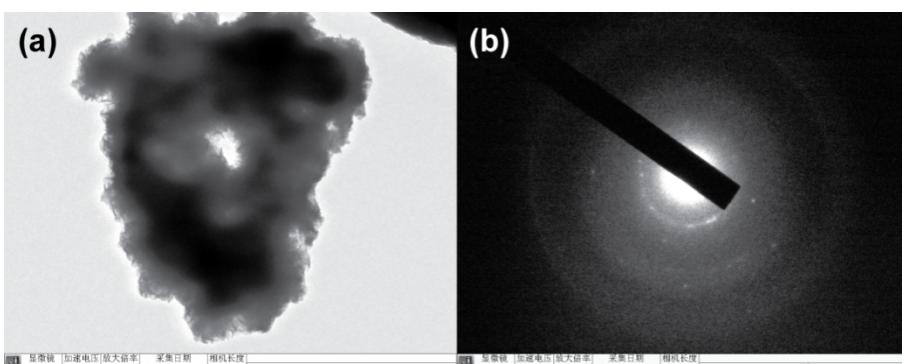


Fig. S1 TEM micrograph and the corresponding electron diffraction pattern of the agglomerate of the clustered WO_3 nanosheets.

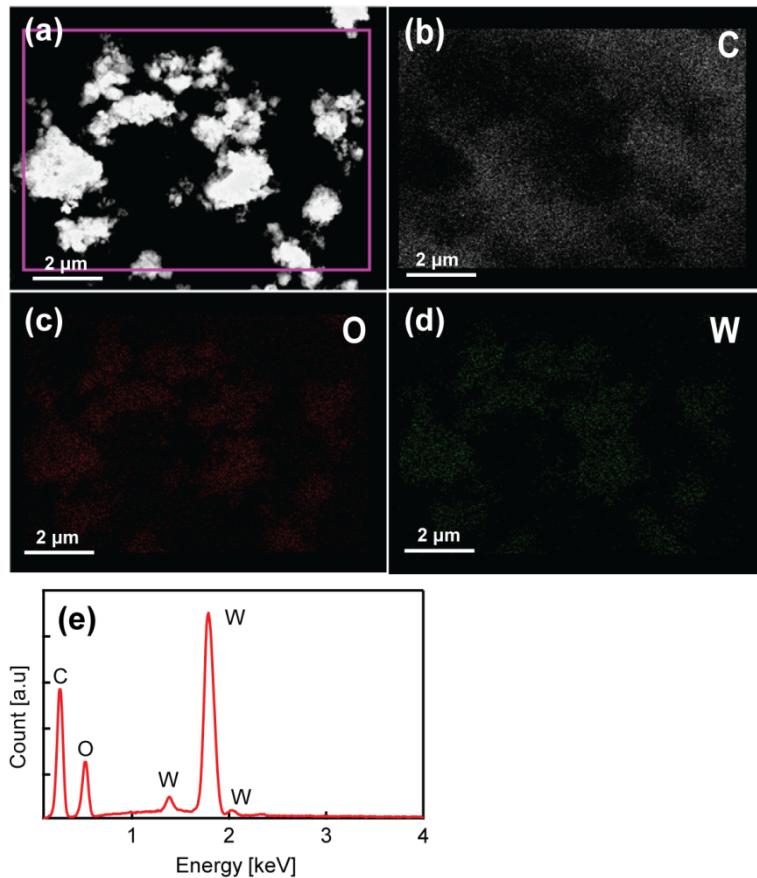


Fig. S2 SEM image (a) and the corresponding selected area elemental distribution of C (white), O (red), and W (green) (b-d). As shown in (a), the area with large amount of assembled nanosheet aggregates was used for the elemental mapping for a better signal resolution. (e) Energy dispersive spectroscopy (EDS) spectrum of the as-prepared WO_3 nanosheet assemblies.

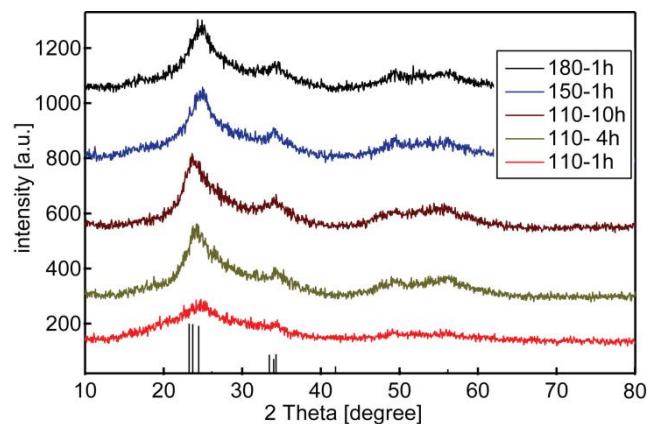


Fig. S3 XRD patterns for different hydrothermal conditions. The patterns from bottom to top are 110 °C for 1 h, 110 °C 4 for hours, 110 °C for 10 hours, 150 °C for 1 and 180 °C for 1 h. The vertical lines refers to standard monoclinic WO_3 (JCPDS No. 75-2072).

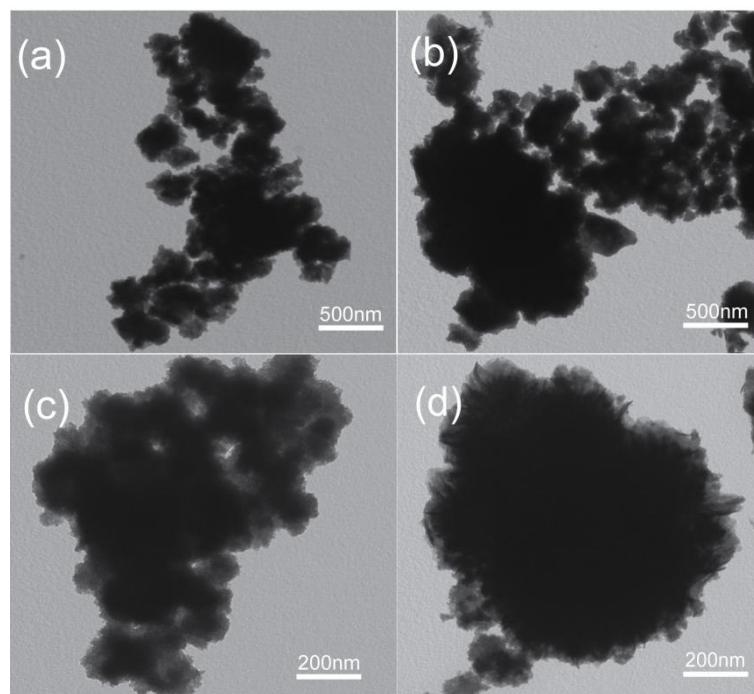


Fig. S4 TEM images of different hydrothermal conditions (a) 110 °C for 4 hours (b) 110 °C for 10 hours (c) 150 °C for 1 h (d) 180 °C for 1 h.

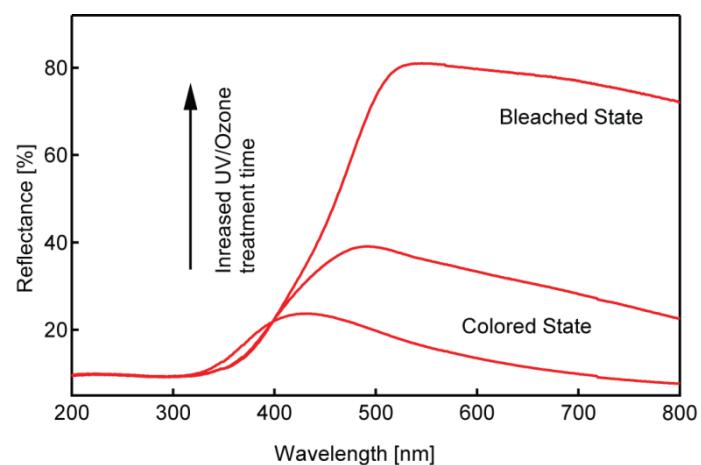


Fig. S5 UV-vis diffuse reflectance spectra of the nanosheets upon UV/ozone treatment for treated time as 0 min, 3 min and 7 min.

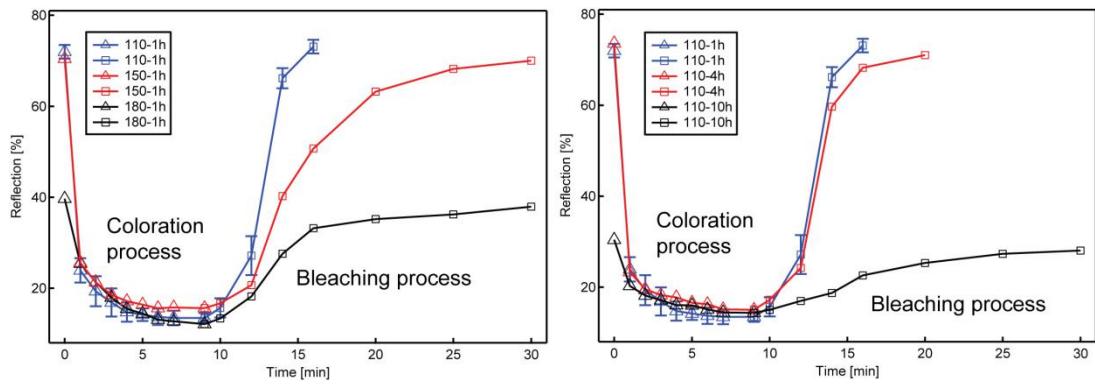


Fig. S6 The comparison of reflectance intensity of the nanosheets synthesized with different hydrothermal conditions at 800 nm evolutionally monitored for one coloration-bleaching cycle.

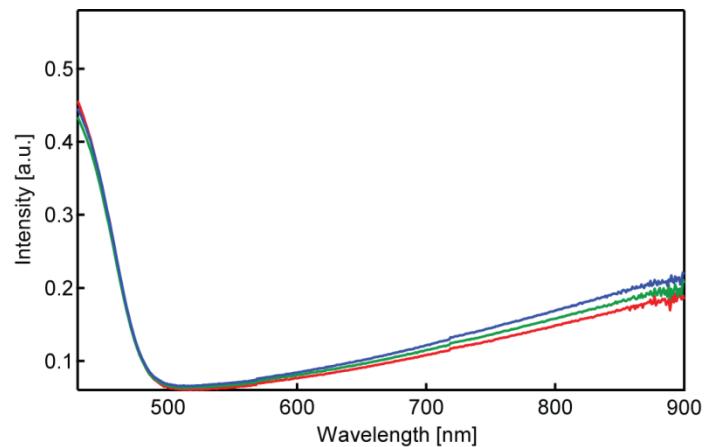


Fig. S7 The absorbance spectra for the commercial WO_3 powder examined under UV irradiation with irradiation time 0, 40 and 120 min (the initial curve as the red line, 40 min as the green line and the irradiation for 120 min as the blue line).

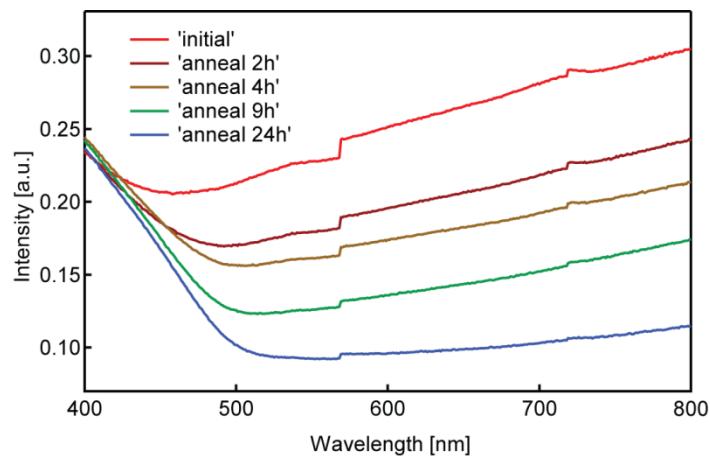


Fig. S8 The absorbance spectra for thermally treated nanosheets in the oven at 80 °C in air with prolonged annealing time from 2 h to 24 h.

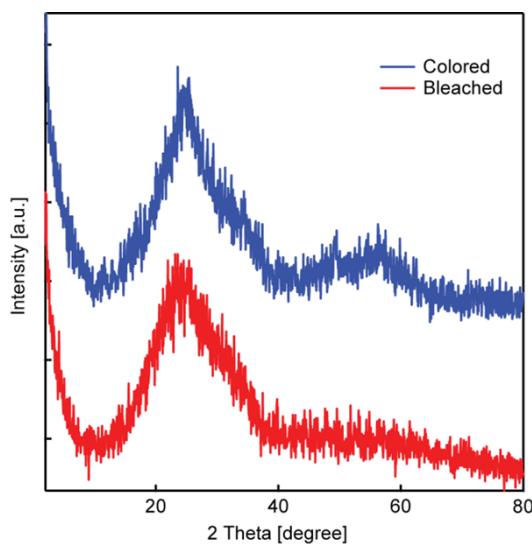


Fig. S9 The XRD patterns for the sample in the colored and the bleached states

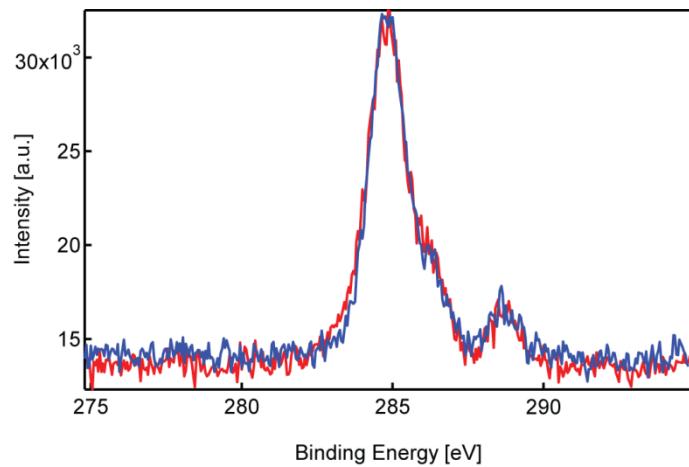


Fig. S10 C1s XPS for colored (blue) and bleached (red) states respectively.

Table S1 The zeta potential for nanosheet solution with different UV irradiation time.

Sample	irradiation time (min)	zeta potential (mV)
Bleached	----	5.04
1	3	-5.1
2	5	-14.39
3	8	-24.56
4	10	-36.74
5	20	-48.32