Supplemental Information

Exposed Facets and Crystal Phases Tuning of Tungsten Oxide Hierarchical Nanostructures and Their Enhanced Visible-Light-Driven Photocatalytic Performance

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Figure S1a shows that adding a little more (4 mg) urea induces a phase transition from o-$WO_3 \cdot 0.33H_2O$ to h-WO_3, suggesting that it may exist a critical concentration of urea for phase transition. Besides, the morphology of the sample undergoes a dramatic change after phase transition. As seen in Figure S1b and S1c, the sample with o-$WO_3 \cdot 0.33H_2O$ phase appears with thick nanoflakes, while when the sample transforms to h-WO_3, it is assembled with much thinner nanowires.

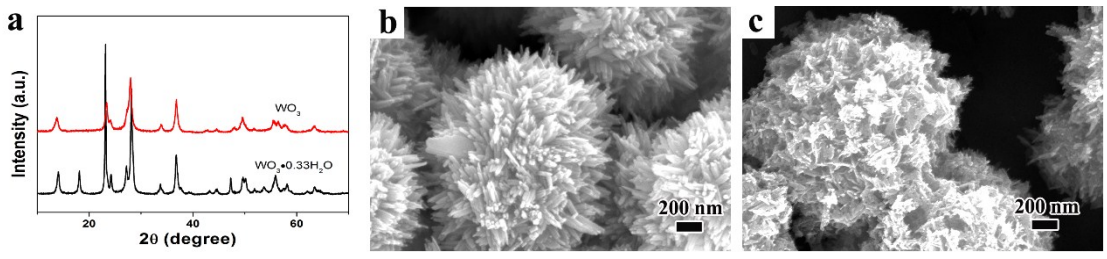

Fig. S1 (a) XRD patterns of the samples prepared by adding 0.162 g (o-$WO_3 \cdot 0.33H_2O$) or 0.166 g (h-WO_3) urea and their corresponding SEM images (b) 0.162 g; (c) 0.166 g.

Figure S2 is the SEM images of sample WU0 after reaction for 20 and 60 min and the samples WU2 and WU4 after reaction for 60 min. It is observed that the product appears with some little particles and without obvious exfoliated nanosheets after hydrothermal reaction for 20 min, suggesting that the nanosheets are exfoliated incompletely without urea. Besides, compared with WU0, no obvious products appear until 45 min for sample WU4, indicating that the existence of urea would delay the nucleation, thus ensuring enough time to complete intercalation. From Figures S2b-S2d, it shows that the products of all the three samples after reaction 1 h exhibit similar morphology with the final products (after 12 h), confirming that morphology of the products are decided in the original 1 h of the hydrothermal reaction.

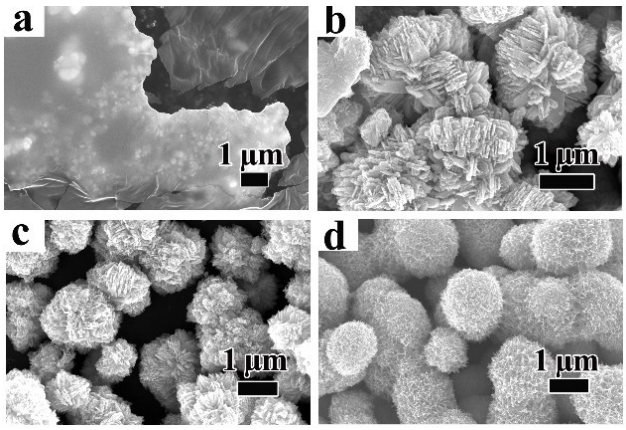

Fig. S2 WU0 after reaction (a) 20 min; (b) 60 min; (c) WU2 after reaction 60 min; (d) WU4 after reaction 60 min.

Table S1 pH values of WU0, WU2 and WU4 at different reaction times

t (min)	WU0	WU2	WU4
0	0.70	0.70	0.70
20	0.66	0.73	0.78
30	0.76	0.80	0.80
35	0.68	0.79	0.79
40	0.68	0.85	1.50
50	0.66	0.96	4.61
60	0.76	1.00	6.77
12 h	0.74	1.08	6.80