

## Electronic Supplementary Information (ESI):

# Formation of Hydroperoxo (-OOH) Species on the Surface of Self-Doped $\text{Bi}_{2.15}\text{WO}_6$ : Reactivity toward As(III) Oxidation

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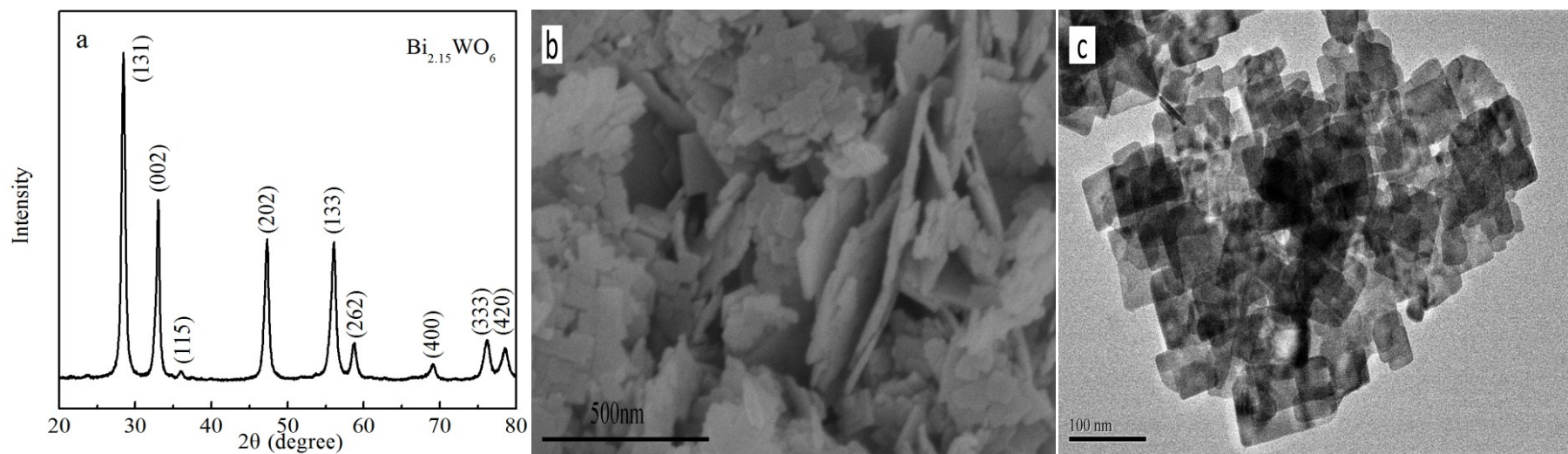
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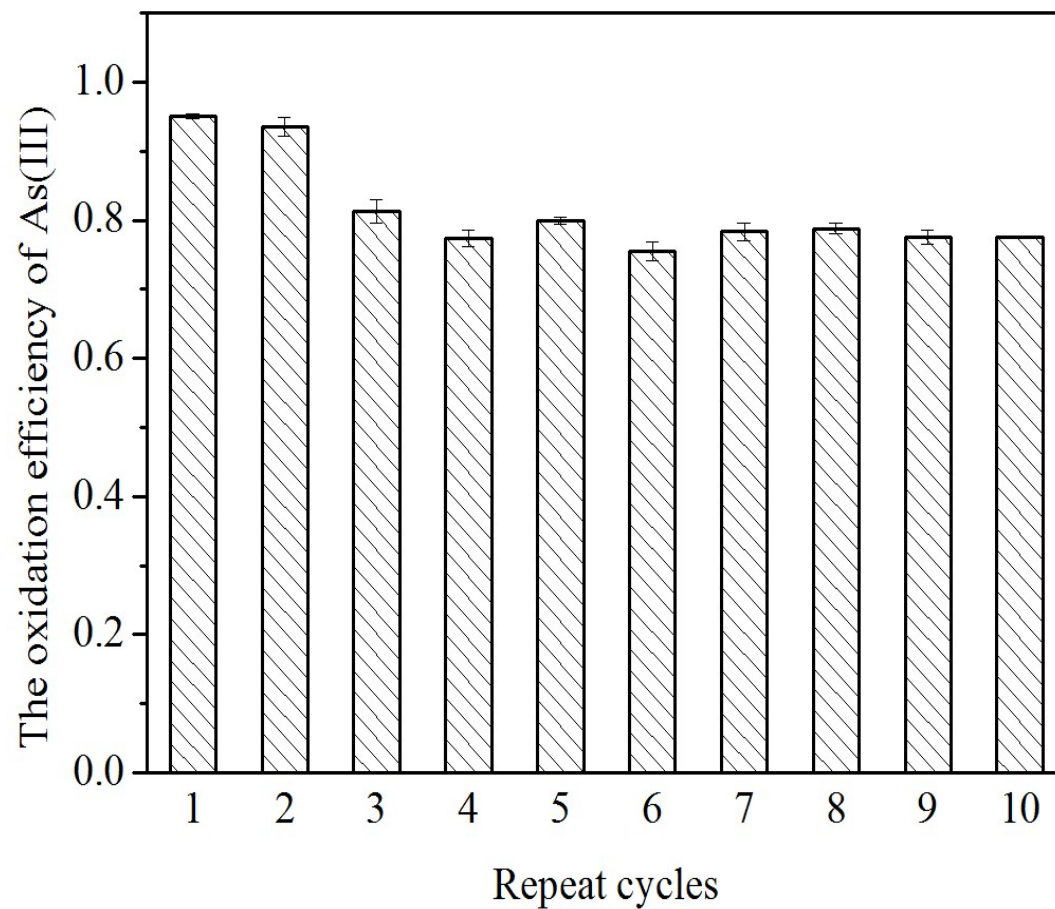
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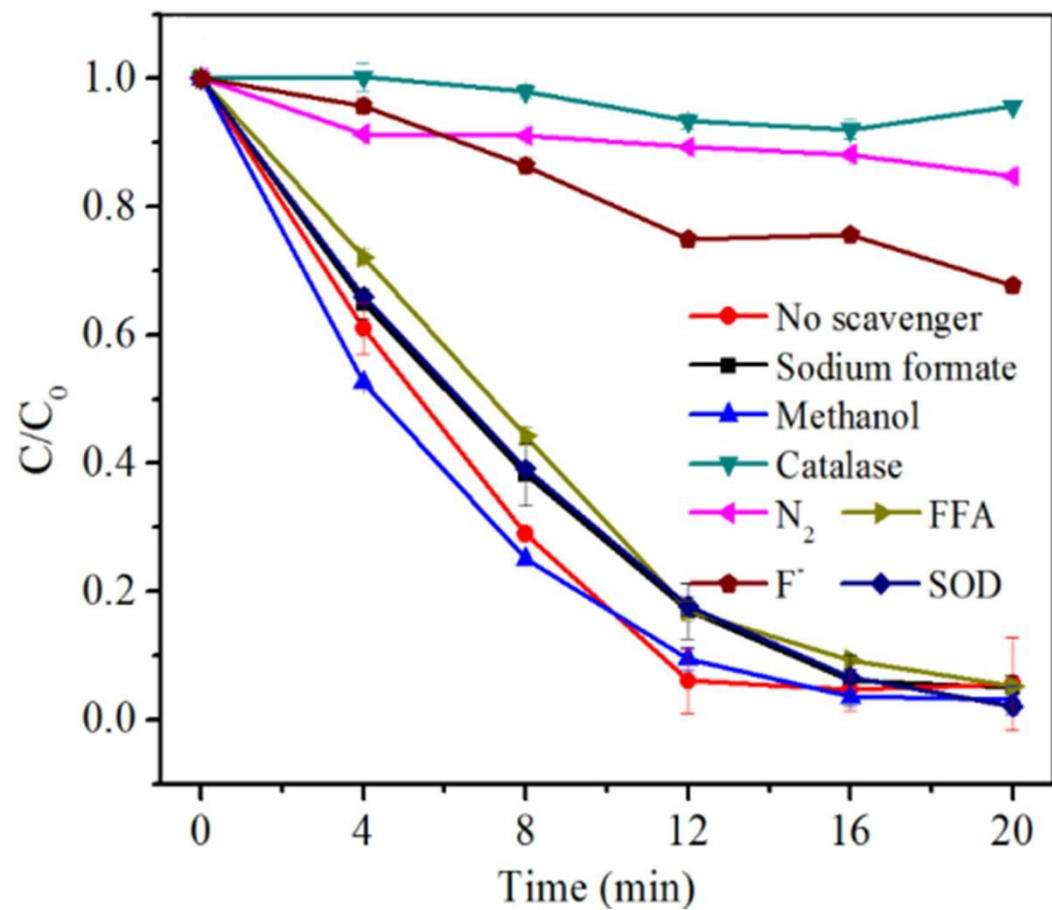




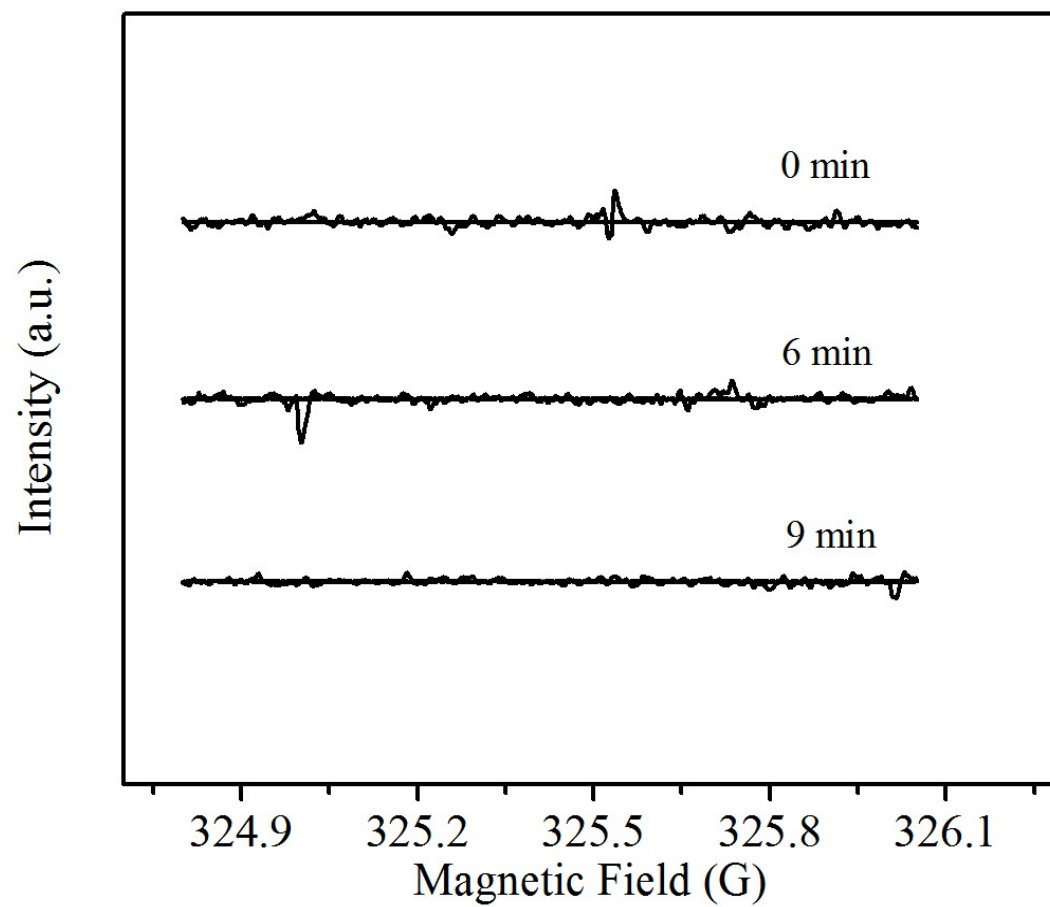
**Fig. S1** (a) XRD pattern, (b) SEM image and (c) TEM image of  $\text{Bi}_{2.15}\text{WO}_6$ .



**Fig. S2** Recycling runs in the photocatalytic oxidation of As(III) over the  $\text{Bi}_{2.15}\text{WO}_6$  system under visible light at pH 11.6. Conditions:  $0.4 \text{ g L}^{-1}$   $\text{Bi}_{2.15}\text{WO}_6$  at pH 11.6



**Fig. S3** Quenching experiments in the oxidation of As(III) by  $\text{Bi}_{2.15}\text{WO}_6$  under visible light. Conditions:  $0.4 \text{ g L}^{-1}$   $\text{Bi}_{2.15}\text{WO}_6$  and  $20 \text{ mg L}^{-1}$  As(III) at pH 11.6.



**Fig. S4** ESR spectra for  $\text{Bi}_{2.15}\text{WO}_6$  at pH 11.6 under visible light in 1.0 M methanol solution.