Supporting Information

Metal-free catalytic oxidation of benzylic alcohols for benzaldehyde

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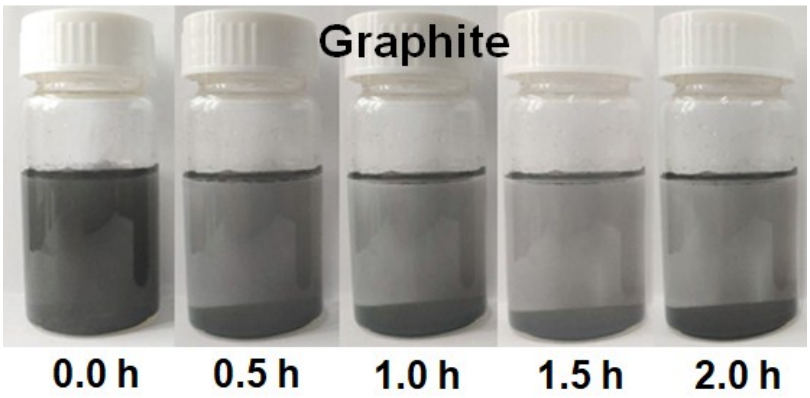


Fig. S1 Digital photos of graphite dispersion with different durations. (The dispersions are 1 mg/mL in DI water, ultrasonic treatment for 30 min)

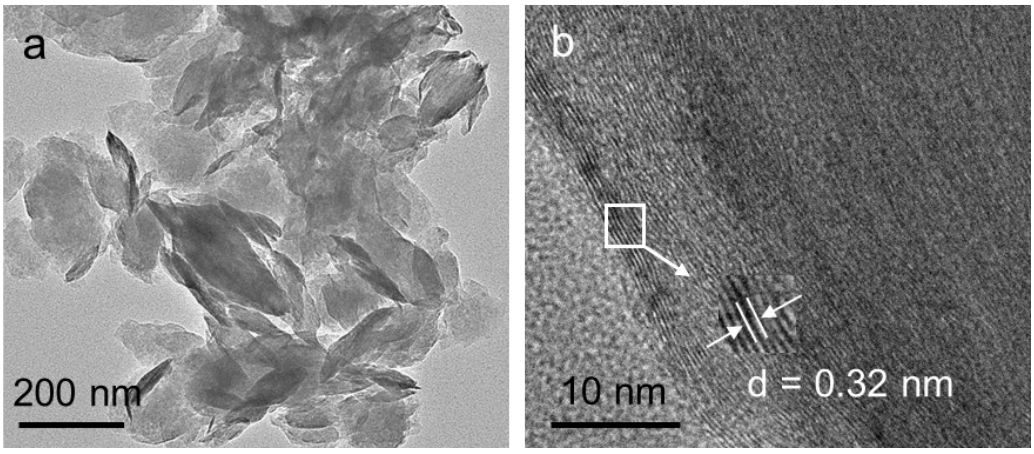


Fig. S2 (a) TEM image, and (b) HRTEM image of SG

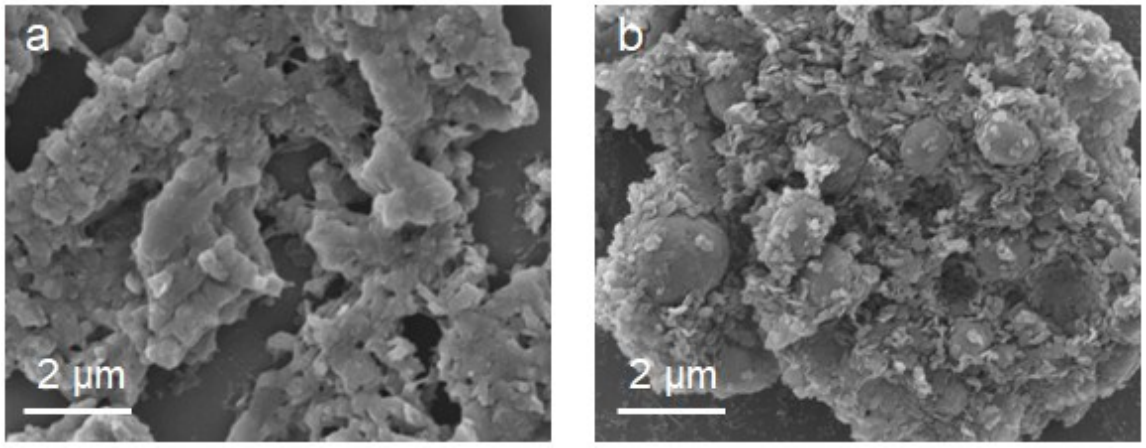


Fig. S3 SEM images of (a) pristine graphite, and (b) SG.

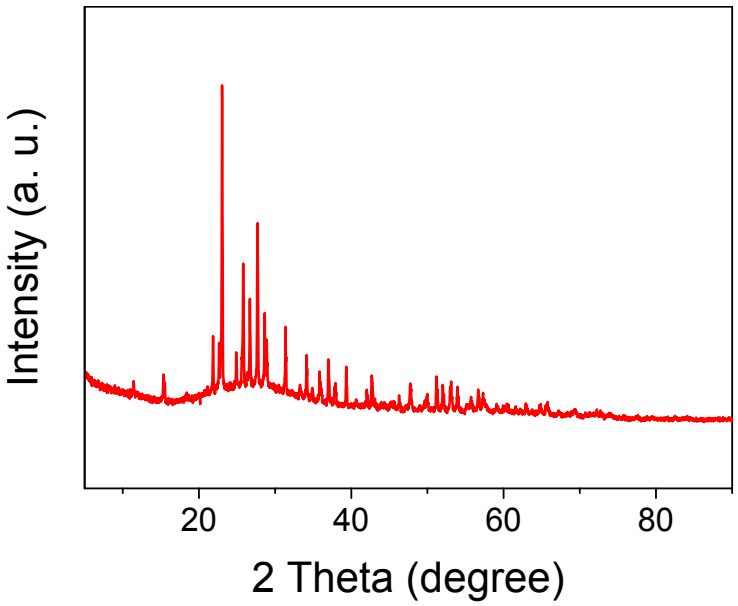


Fig. S4 XRD patterns of sulfur powder.

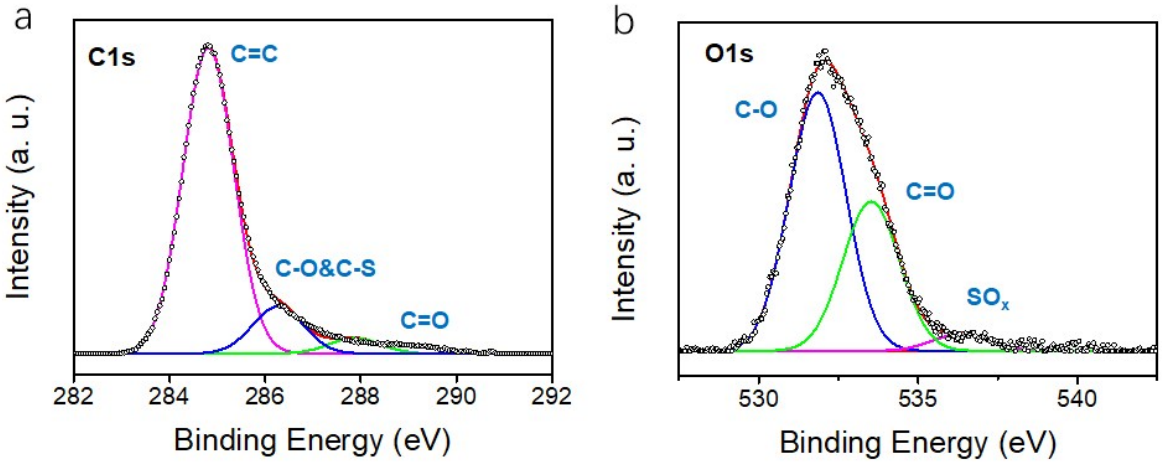


Fig. S5 High XPS resolution (a) C1 s peak, and (b) O1 s of SG.

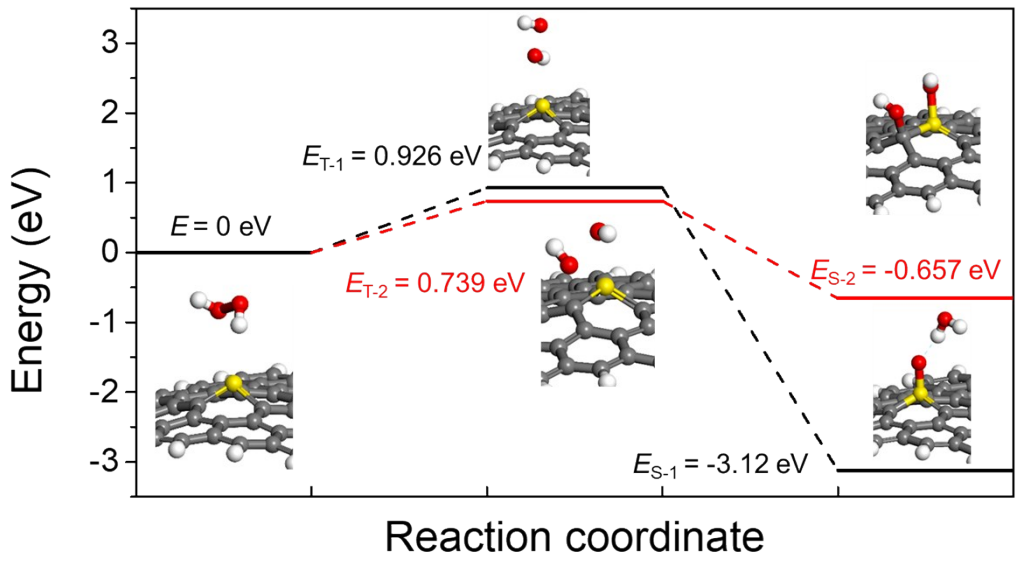
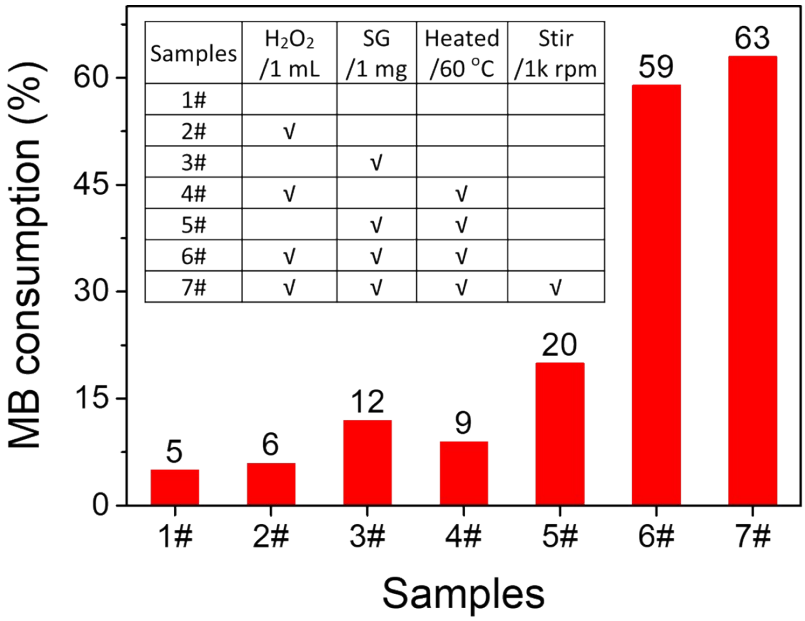


Fig. S6 Reaction energy profile at different coordinates of the hydroxyl radical (·OH) absorbed by SG on different active sites. (Black line represents two ·OHs are both absorbed on S atom, red line represents two ·OHs are absorbed on S atom and adjacent C atom, respectively.)



Samples	H_2O_2 /1 mL	SG /1 mg	Heated /60 °C	Stir /1k rpm
1#				
2#	√			
3#		√		
4#	√		√	
5#		√	√	
6#	√	√	√	
7#	√	√	√	√

Fig. S7 MB consumption at different reaction conditions.

Table S1. Catalytic oxidation of BzOH to BzH with different catalysts

Residence time (min)	Peak area percentage (%)	Molecular formula	Name
4.82	25.7	C_7H_6O	Benzaldehyde
5.60	72.2	C_7H_8O	Benzyl alcohol
12.10	2.1	$C_{16}H_{22}O_4$	Benzenedicarboxylic acid

Table S2. Catalytic oxidation of BzOH to BzH at different stirring speed

Entry	Stirring speed (rpm)	Conversion (%)	Selectivity (%)	Yield (%)
1	0	7.10	96.06	6.82
2	500	6.14	90.86	5.58
3	750	15.79	91.52	14.45
4	1000	19.22	91.92	17.66
5	1500	17.98	91.82	16.51