

## Electronic Supplementary Information

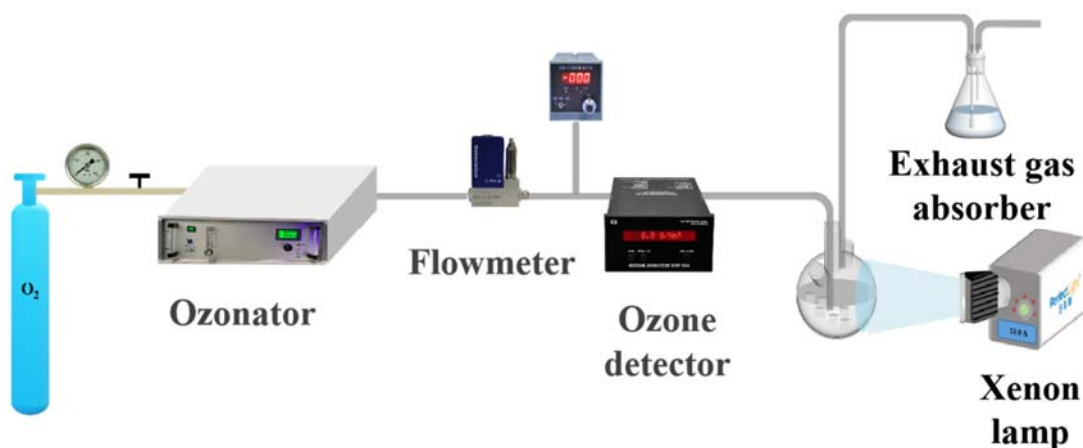
### Synergistic effect of exposed facet and surface defect of ZnO nanomaterials for photocatalytic ozonation of organic pollutants

Yang Yang<sup>a</sup>, Junmin Peng<sup>a</sup>, Huilin Tao<sup>a, b</sup>, Zhou Yang<sup>a</sup>, Yidong Hou<sup>a\*</sup>, Wei Lin<sup>a\*</sup>, Jinshui Zhang<sup>a\*</sup>

**Table S1** Physicochemical properties of ZnO nanomaterials

Material	Dominant exposed facet	S <sub>BET</sub> (m <sup>2</sup> /g)	O 1s (at%)		
			O <sub>I</sub>	O <sub>II</sub>	O <sub>III</sub>
ZnO-rod	{10 $\bar{1}$ 0}	0.7	0.65	0.13	0.22
ZnO-disk	{0001}	0.4	0.61	0.21	0.18

The specific surface area was measured by using Brunauer-Emmett-Teller (BET) method. Surface O composition was based on the fitted data from X-ray photoelectron spectroscopy.



**Fig. S1** Schematic diagram of photocatalytic ozonation reaction equipment.

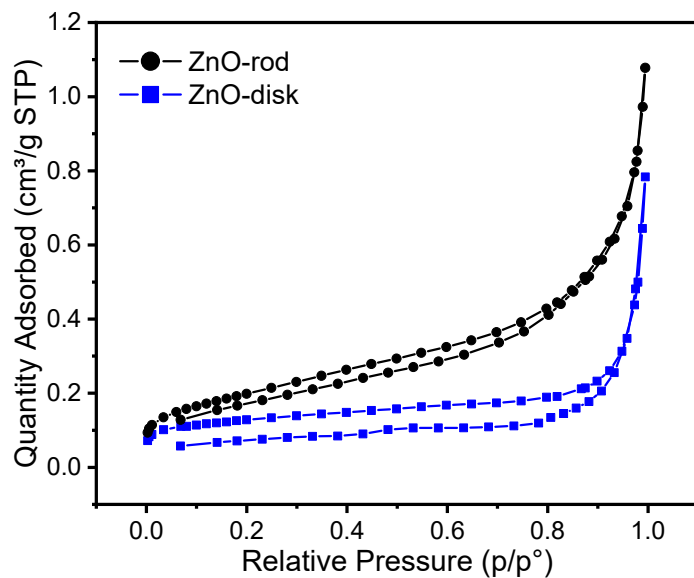


Fig. S2 N<sub>2</sub> adsorption-desorption isotherms of ZnO-rod and ZnO-disk

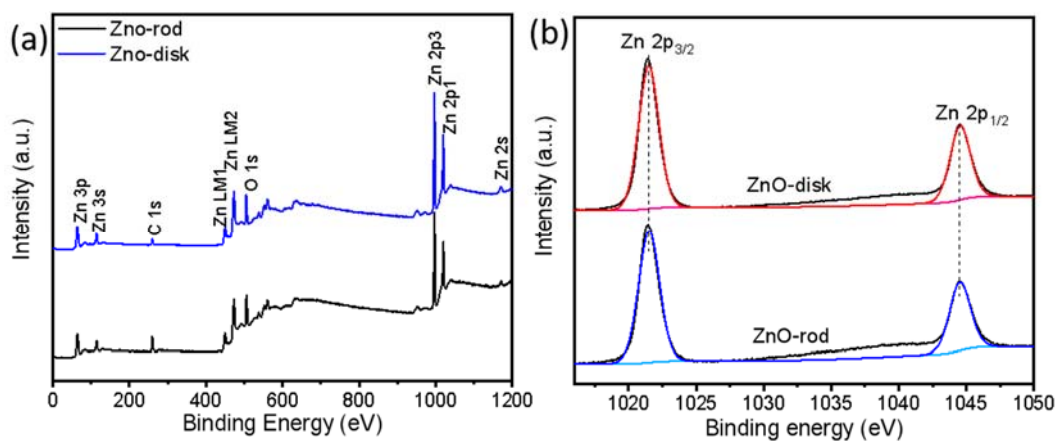
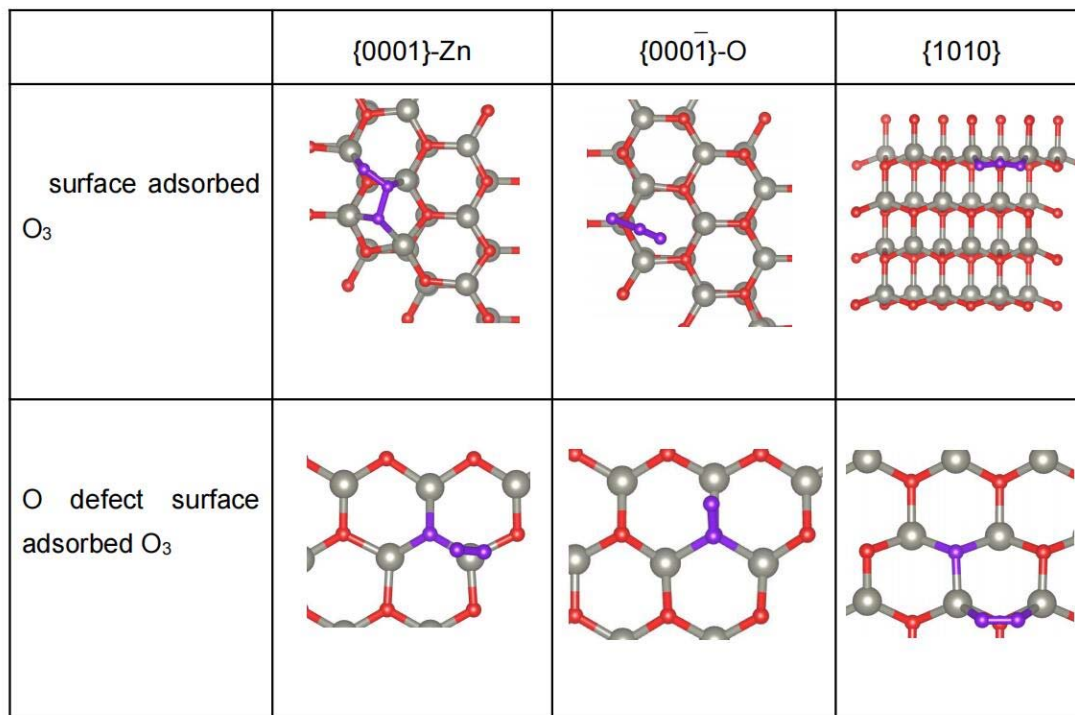
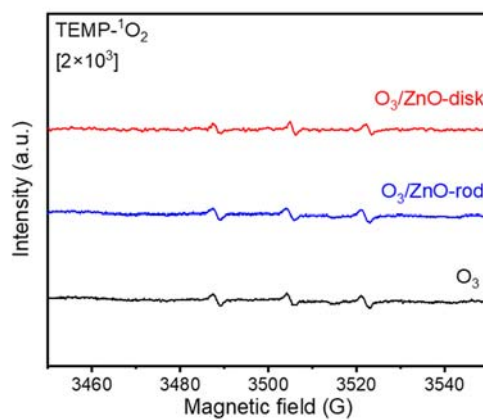


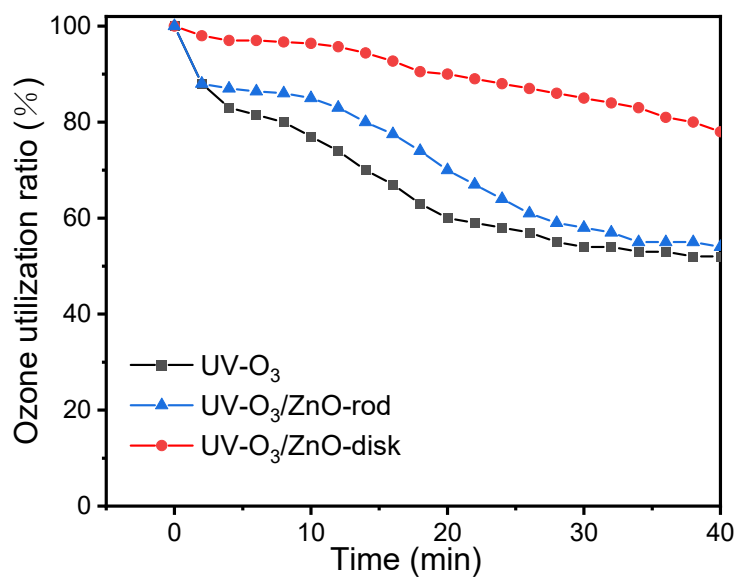
Fig. S3 XPS spectra for ZnO-rod and ZnO-disk, (a) survey spectrum, (b) Zn 2p



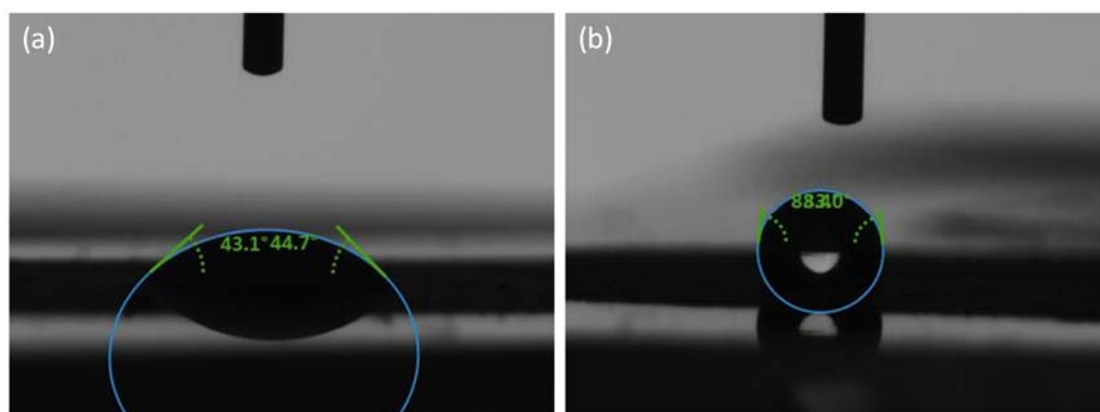
**Fig. S4** Side views of the optimized adsorption geometries and corresponding adsorption energies of  $O_3$  on different crystal facets of ZnO



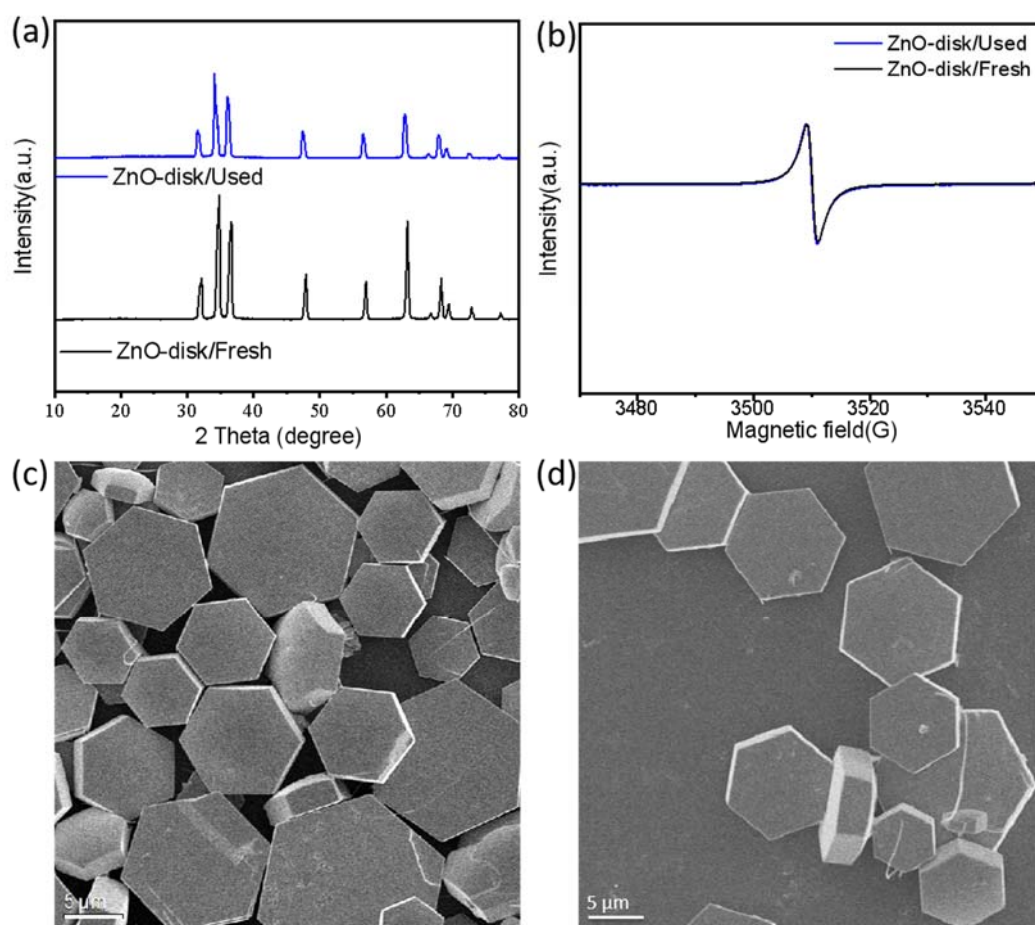
**Fig. S5** EPR spectra of TEMP- $^1O_2$  in different processes



**Fig. S6** Ozone utilization ratio against with the reaction time in the different processes for phenol degradation



**Fig. S7** Water contact angles for ZnO-disk and ZnO-rod



**Fig. S8** (a) XRD patterns, (b) EPR signals and (c-d) SEM images for fresh and used ZnO-disk