Supporting Information

Defects-related photoluminescence and photocatalytic properties of porous ZnO nanosheet

*Di Liu, Yanhui Lv, Mo Zhang, Yanfang Liu, Yanyan Zhu, Ruilong Zong and Yongfa Zhu**

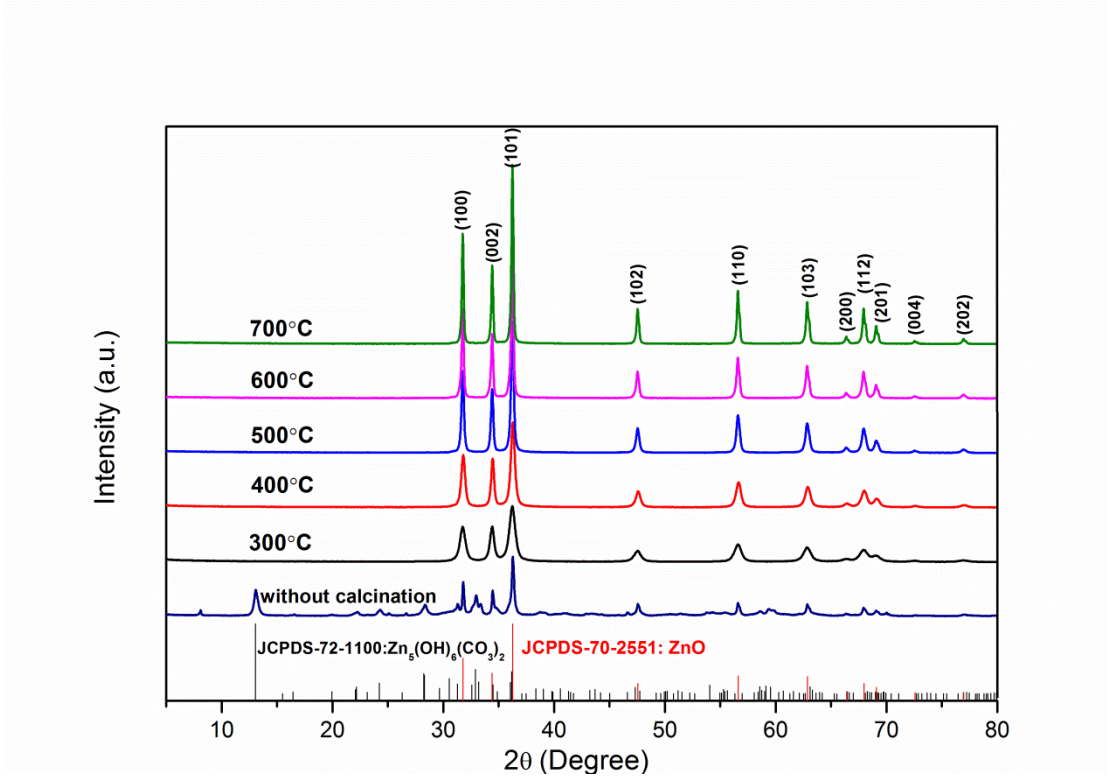

Fig. S1. XRD patterns of the samples synthesized under different annealing temperatures.

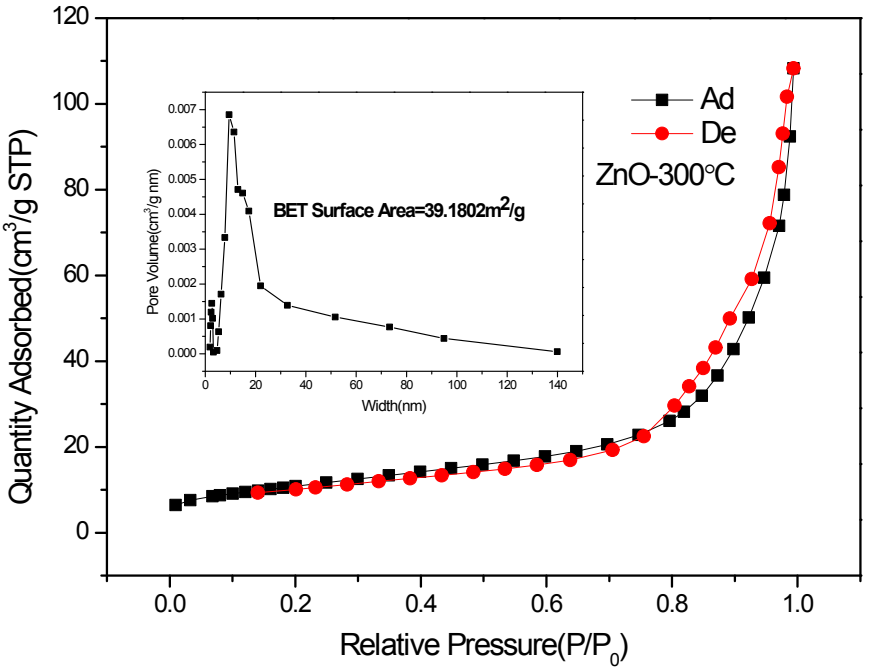

Fig. S2. Nitrogen adsorption/desorption isotherm and Barrett Joyner Halenda (BJH) pore size distribution plot (inset) of ZnO-300℃.

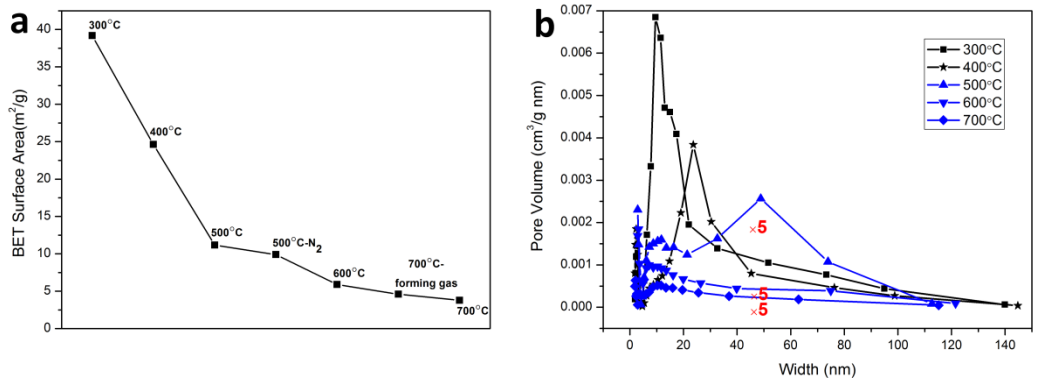

Fig. S3. (a) BET surface area and (b) pore size distribution of the as-synthesized ZnO samples.

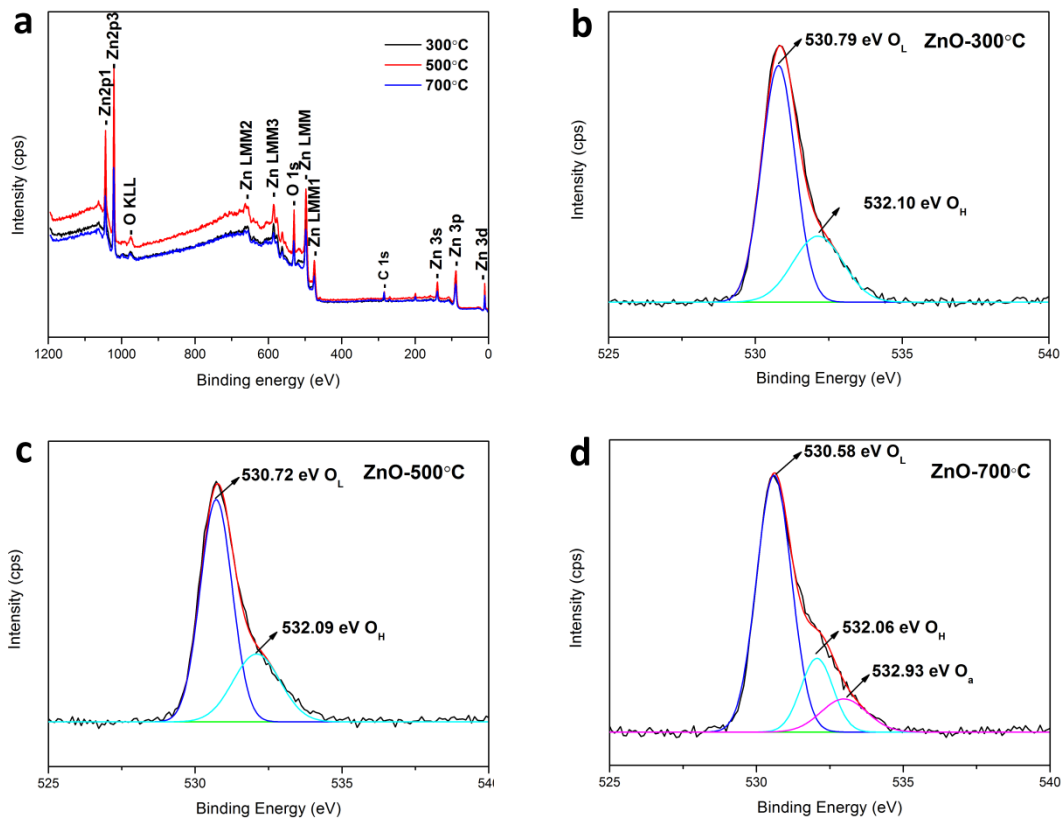

Fig. S4. (a) Survey XPS spectra of ZnO-300℃, ZnO-500℃ and ZnO-700℃, high-resolution XPS spectra of O1s of (b) ZnO-300℃, (c) ZnO-500℃ and (d) ZnO-700℃. The binding energies are calibrated using that of C 1s (284.8 eV).

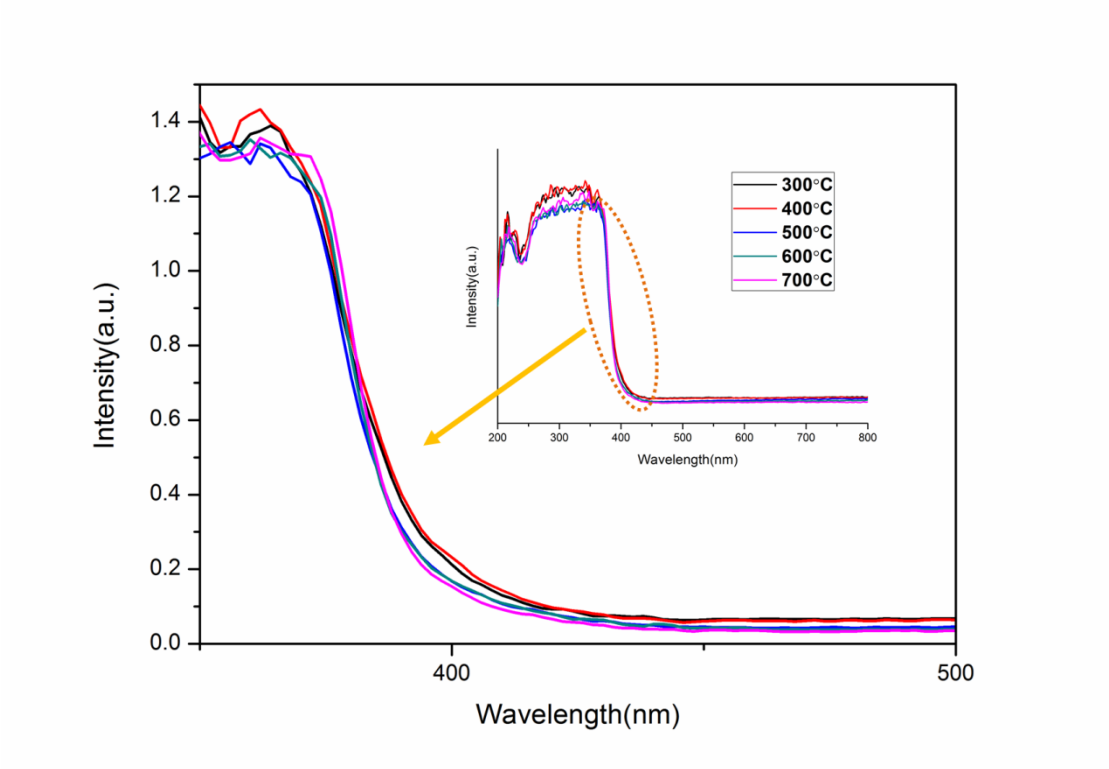

Fig. S5. Local field scan (λ = 350–500 nm) of the diffuse reflectance spectra of the as-synthesized ZnO samples (inset).

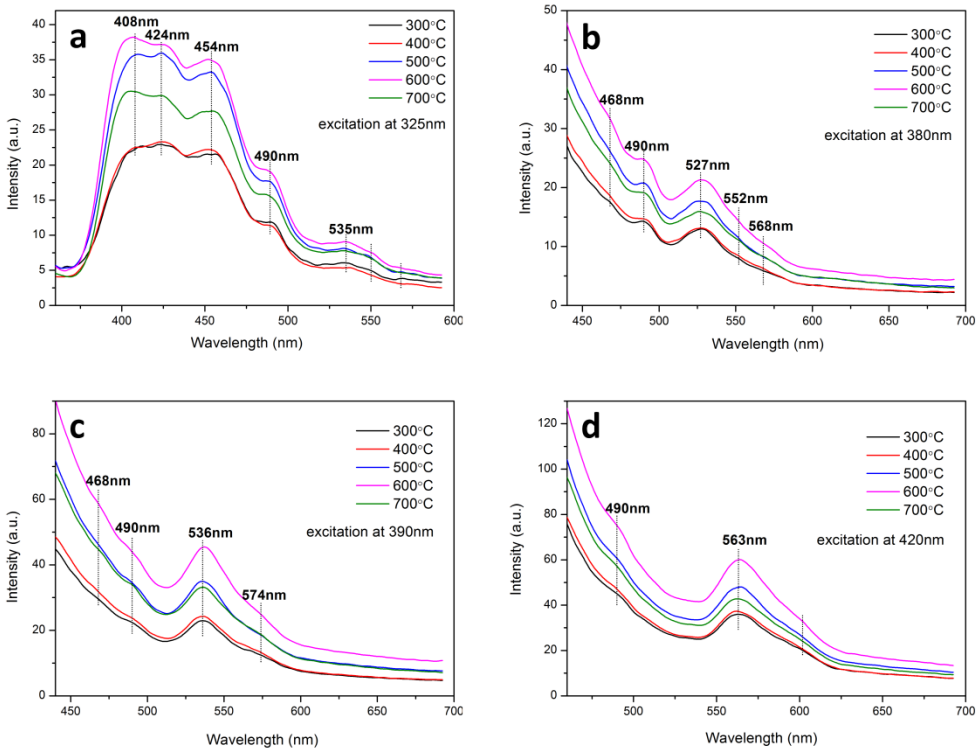

Fig. S6. PL spectra of the as-synthesized ZnO samples by using different excitation wavelengths.

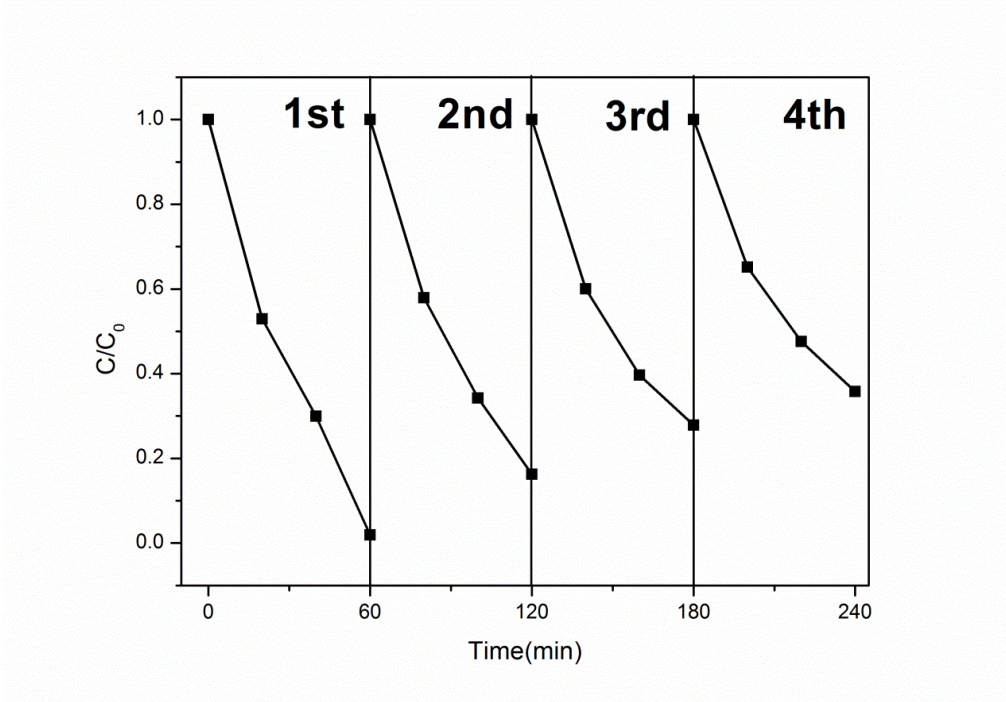

Fig. S7. Cycling runs in the photocatalytic degradation of phenol in the presence of ZnO-500℃.

Table S1. Zeta potentials of the as-prepared ZnO samples.

Sample	**300℃**	**400℃**	**500℃-N_2**	**500℃**	**600℃**	**700℃**	**700℃-R**
	pH=6.89	pH=6.92	pH=6.90	pH=6.94	pH=6.92	pH=6.91	pH=6.89
Zeta potential/mV	**45.6**	**48.5**	**44.6**	**44.0**	**41.5**	**35.8**	**15.5**

Notes: The testing conditions for Zeta-potential measurements were as follows: the sample (10mg) was dispersed separately in 5 mL distilled water and treated under an ultrasonic water bath for 30 min. Then, every measurement for one sample was conducted five times in parallel, and the average value of this above five results was chosen as the final result of Zeta potential.

Table S2. B.E. of three peaks for O1s XPS spectra

	Lattice oxygen(O_L)	Hydroxy oxygen(O_H)	Adsorbed oxygen(O_a)
B.E./eV	530.8 eV	532.1 eV	532.9eV

B.E., Binding energy.

Table S3. Results calculated from O 1s XPS spectra of the ZnO samples

Sample	O1s Ri%	Zn2p3 Ri%	O_L/O1s	O_H/O1s	O_L/Zn
ZnO-300℃	37.62%	48.88%	78.44%	21.56%	0.60
ZnO-500℃	43.04%	42.15%	76.63%	23.37%	0.78
ZnO-700℃	44.73%	32.33%	70.61%	20.27%	0.98

Ri, The percentage of surface atomic (O or Zn) in ZnO samples