

Supplementary Information for

Carbon nanodots in ZIF-8: synthesis, tunable luminescence and temperature sensing

*Yufei Wang, Bolun Wang, Huaizhong Shi, Chenghui Zhang, Chunyao Tao and Jiyang Li**

State Key Laboratory of Inorganic Synthesis and Preparative Chemistry, College of Chemistry, Jilin University, Changchun 130012, P. R. China. E-mail:

lijiyang@jlu.edu.cn; Fax: +86-431-8516-8608; Tel: +86-431-8516-8608

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Table S1. Elemental analyses for ZIF-8, CNDs@ZIF-8-1, CNDs@ZIF-8-2, CNDs@ZIF-8-3 and CNDs@ZIF-8-4.

Samples	C	H	N	C/N ratio	C/H ratio
ZIF-8	24.55	42.22	4.49	1.72	9.40
CNDs@ZIF-8-1	24.97	42.76	4.59	1.71	9.31
CNDs@ZIF-8-2	24.81	43.49	4.54	1.71	9.34
CNDs@ZIF-8-3	24.61	41.86	4.51	1.70	9.27
CNDs@ZIF-8-4	24.45	41.54	4.27	1.70	9.72

Table S2. Surface area and gas sorption data for the as-synthesized ZIF-8, CNDs@ZIF-8-1, CNDs@ZIF-8-2, CNDs@ZIF-8-3 and CNDs@ZIF-8-4.

Samples	BET Surface Area (mg g ⁻¹)	Microspore Pore Volume (cm ³ g ⁻¹)	Pore Size (nm)
ZIF-8	1199.56	0.52	0.31
CNDs@ZIF-8-1	1274.83	0.53	0.32
CNDs@ZIF-8-2	1335.39	0.59	0.42
CNDs@ZIF-8-3	1302.32	0.55	0.43
CNDs@ZIF-8-4	1415.53	0.61	0.43

Table S3. Results of fitting parameters of the PL lifetime decay measured for the Hmin calcined at 1h, 3h, 5h, and 7h at 450 nm ($\lambda_{\text{ex}} = 360$ nm).

Samples	τ_1 / ns	B_1 / %	τ_2 / ns	B_2 / %	τ_{avg} / ns
1h	0.35	82.94%	2.31	17.06%	0.69
3h	0.61	77.15%	3.13	22.85%	1.19
5h	0,42	74.40%	2.78	25.60%	1.02
7h	0.45	70.68%	2.81	29.32%	1.14

Table S4. Results of fitting parameters of the PL lifetime decay measured for the as-synthesized ZIF-8, CNDs@ZIF-8-1, CNDs@ZIF-8-2, CNDs@ZIF-8-3 and CNDs@ZIF-8-4 at 450 nm ($\lambda_{\text{ex}} = 360$ nm).

Samples	τ_1 / ns	B_1 / %	τ_2 / ns	B_2 / %	τ_3 / ns	B_3 / %	τ_{avg} / ns
ZIF-8	1.24	43.37%	3.58	48.74%	1.34	7.88	2.39
CNDs@ZIF-8-1	1.43	52.43%	3.75	47.57%			2.53
CNDs@ZIF-8-2	9.25	66.24%	3.05	33.76%			7.15
CNDs@ZIF-8-3	9.44	69.96%	3.28	30.04%			7.59
CNDs@ZIF-8-4	9.71	64.43%	3.06	35.57%			7.34

Table S5. Results of fitting parameters of the PL lifetime decay measured for the as-synthesized ZIF-8, CNDs@ZIF-8-1, CNDs@ZIF-8-2, CNDs@ZIF-8-3 and

CNDs@ZIF-8-4 at 550 nm ($\lambda_{\text{ex}} = 360$ nm).

Samples	τ_1 / ns	B_1 / %	τ_2 / ns	B_2 / %	τ_{avg} / ns
ZIF-8					
CNDs@ZIF-8-1					
CNDs@ZIF-8-2	1.87	54.14%	5.13	45.86%	3.36
CNDs@ZIF-8-3	1.97	60.20%	5.46	39.80%	3.35
CNDs@ZIF-8-4	2.18	55.21%	5.40	44.79%	3.62

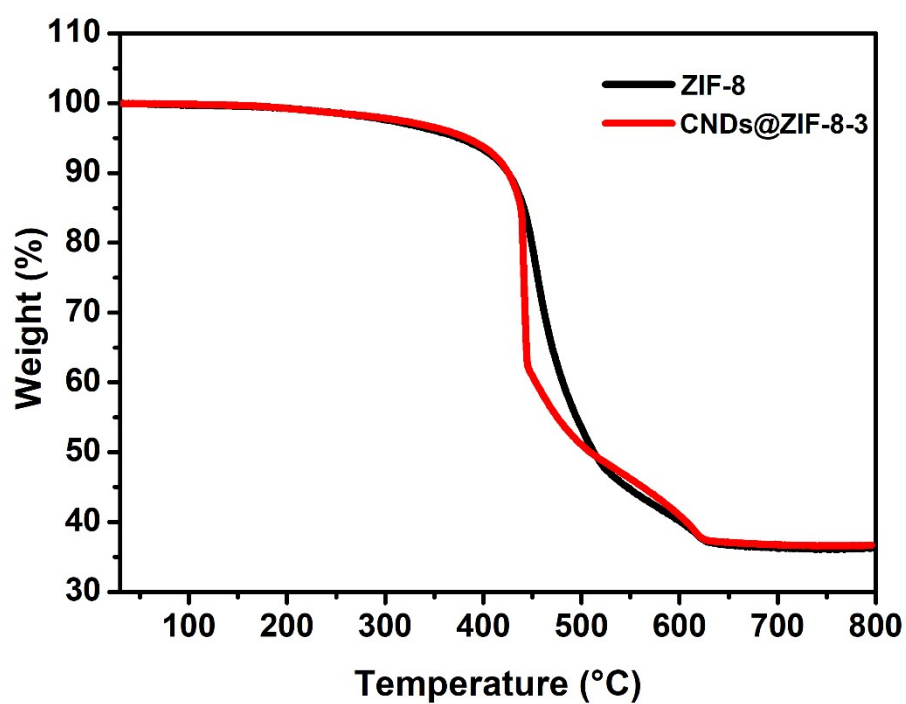


Figure S1. Thermogravimetric analysis (TGA) curves of the as-synthesized ZIF-8 and CNDs@ZIF-8-3.

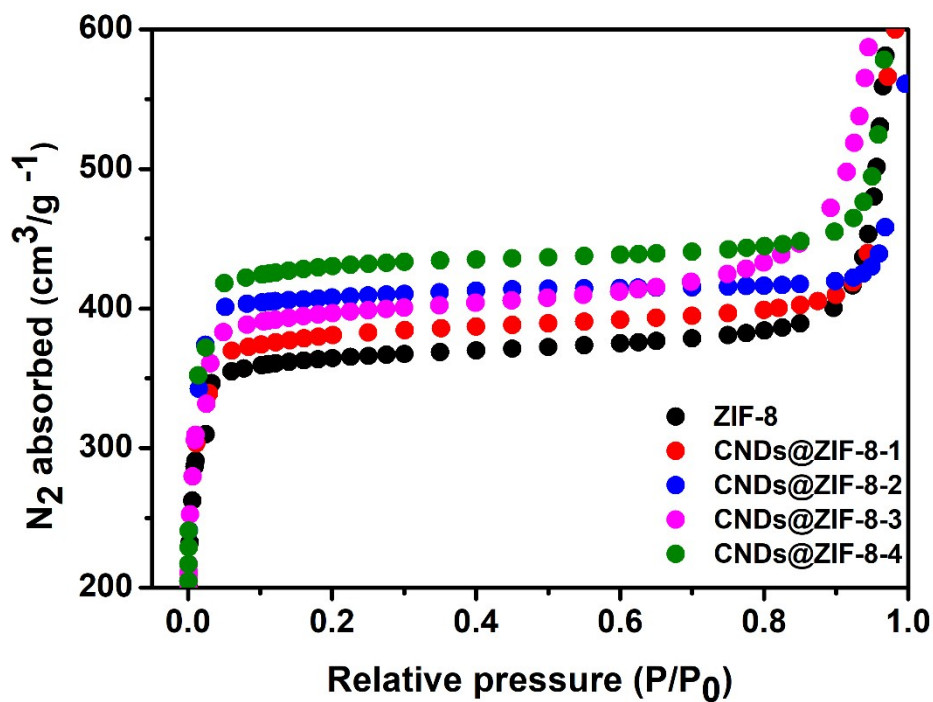


Figure S2. N₂ adsorption isotherms of the as-synthesized ZIF-8, CNDs@ZIF-8-1, CNDs@ZIF-8-2, CNDs@ZIF-8-3 and CNDs@ZIF-8-4 at 77K up to 1 bar. Compared to ZIF-8, the adsorption value gradually increases with the calcination time.

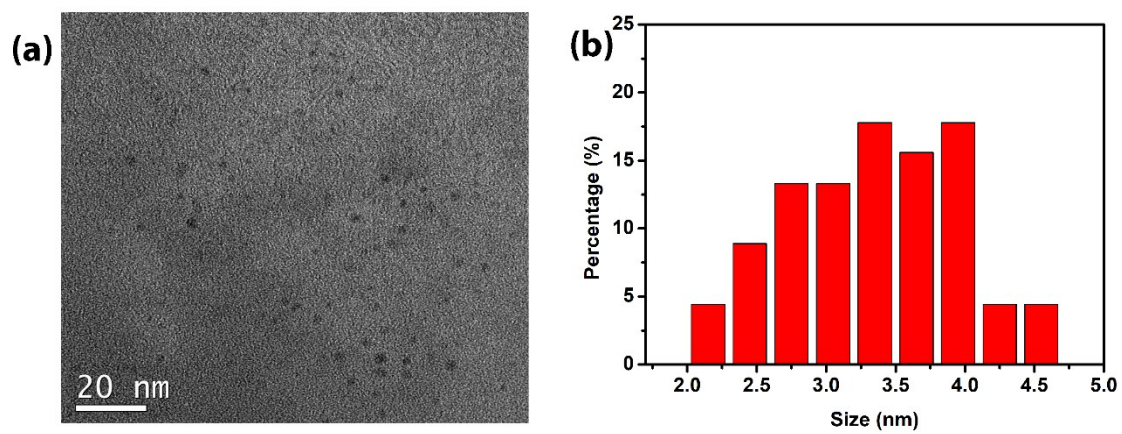


Figure S3. TEM image (a) and size histograms (b) of Hmin calcined at 5h (counting about 50 particles).

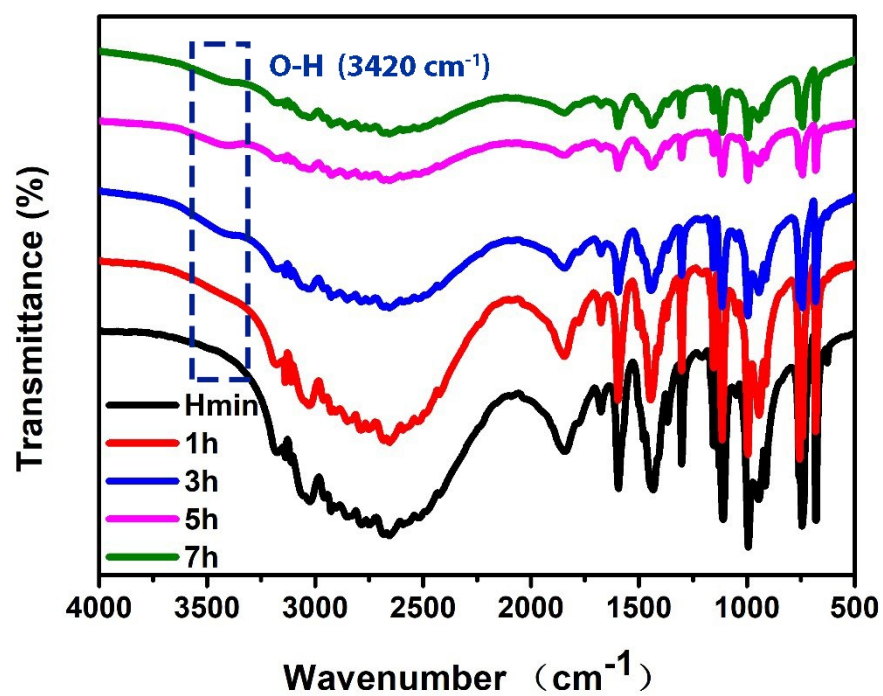


Figure S4. FTIR spectra and of pure Hmin and Hmin calcined at 1h, 3h, 5h and 7h.

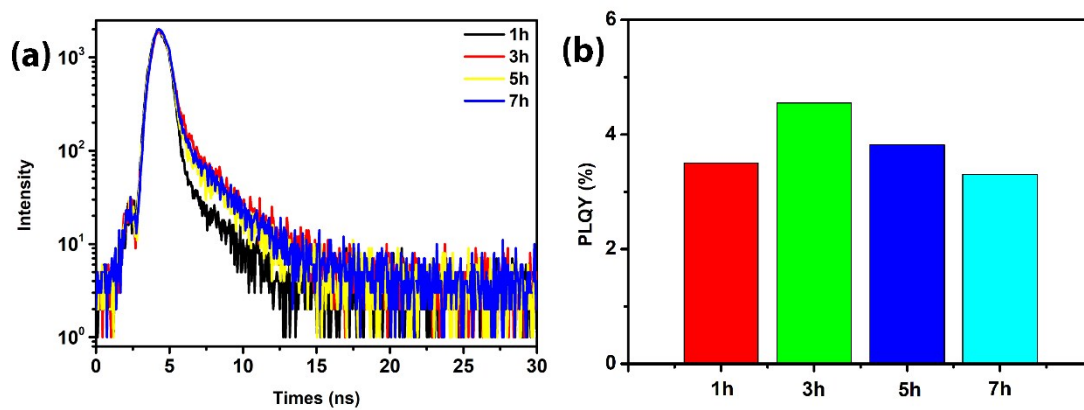


Figure S5. (a) PL Lifetime decay curves for the calcined Hmin at 450 nm ($\lambda_{\text{ex}} = 360$ nm); (b) PLQY scheme for the calcined Hmin (Relative to Quinine sulfate, 3.50%, 4.55%, 3.82%, and 3.30%, respectively)

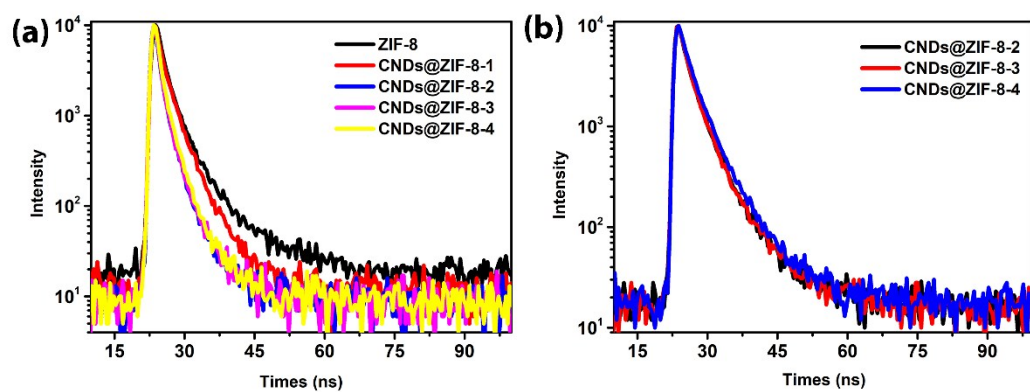


Figure S6. PL Lifetime decay curves for the as-synthesized ZIF-8, CNDs@ZIF-8-1, CNDs@ZIF-8-2, CNDs@ZIF-8-3 and CNDs@ZIF-8-4 at 450 nm (a) and 550 nm (b). ($\lambda_{\text{ex}} = 360$ nm)

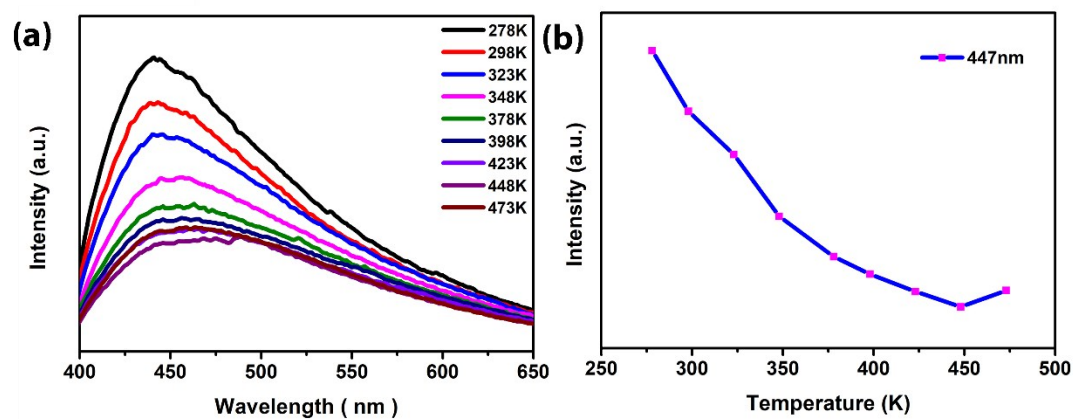


Figure S7. (a) Temperature-responsive photoluminescence spectra of as-synthesized ZIF-8; (b) The linear correlation of fluorescence intensity and the temperature with the emission of 447nm for ZIF-8.