

Supporting Information

Formation and Origin of Multicenter Photoluminescence in Zeolite-based Carbogenic Nanodots

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Table S1. The analysis results of HRLC-MS spectra.

Name	MW	Chemical formula	Possible structure ^a
FLUO-208	208	C ₁₁ H ₁₄ NO ₃ ⁺	2*NMD+27/4O ₂ -CO ₂ -NO ₂ -13/2H ₂ O+H ⁺
FLUO-267	267	C ₁₁ H ₁₉ N ₆ O ₂ ⁺	6*NMD+41O ₂ -25CO ₂ -30H ₂ O+H ⁺
FLUO-274	274	C ₁₂ H ₃₂ N ₇ ⁺	7*NMD+45O ₂ -30CO ₂ -30H ₂ O+H ⁺
FLUO-281	281	C ₁₁ H ₂₅ N ₂ O ₆ ⁺	2*NMD+9/2O ₂ -CO ₂ -H ₂ O+H ⁺
FLUO-318	318	C ₁₄ H ₃₆ N ₇ O ⁺	7*NMD+85/2O ₂ -28CO ₂ -28H ₂ O+H ⁺
FLUO-546	546	C ₂₃ H ₄₄ N ₇ O ₈ ⁺	7*NMD+35O ₂ -19CO ₂ -24H ₂ O+H ⁺

^a. Possible oxidation process for NMD in air when calcined at 450 °C.

Table S2. Results of a biexponential fit to the lifetime PL decay measured for CNDs excited at 360 nm.

	CND-1	CND-2	CND-3
t₁	2.79	2.69	2.87
B₁/[B₁+B₂]	89.73%	39.72%	27.41%
t₂	11.17	11.88	14.05
B₂/[B₁+B₂]	10.27%	60.28%	72.59%
T	3.65	8.23	10.98

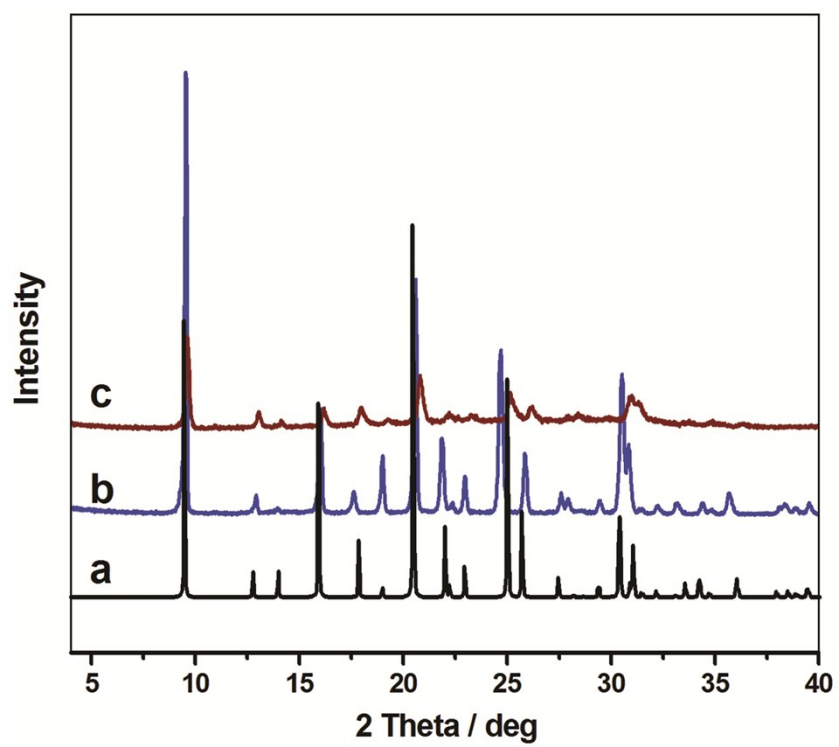


Fig. S1 Powder X-ray diffraction patterns of (a) simulated **CHA** zeolite and experimental (b) MgAPO-44 and (c) CNDs@MgAPO-44.

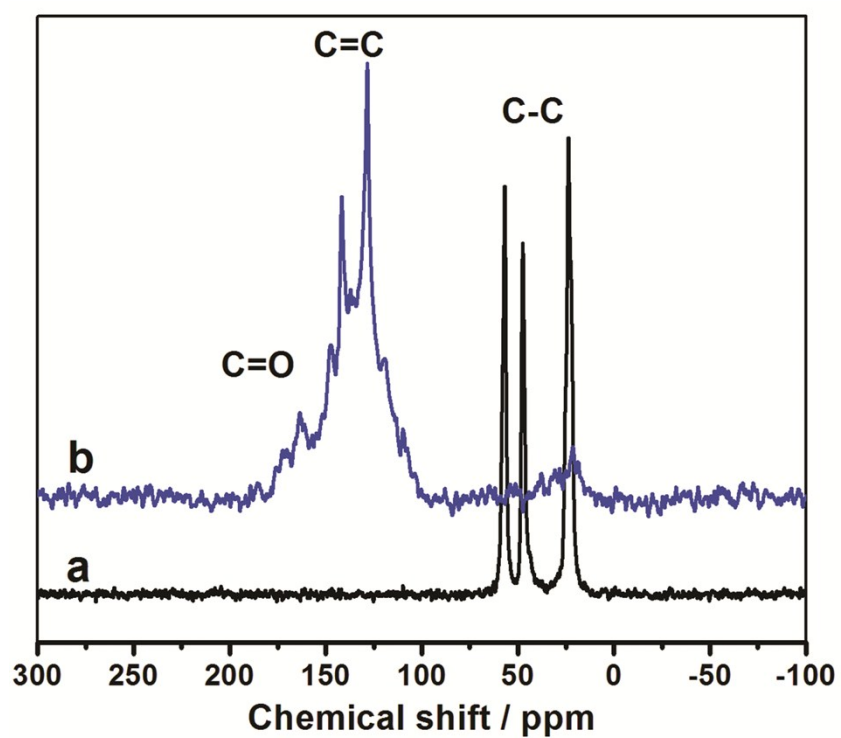


Fig. S2 ^{13}C MAS NMR spectra of (a) MgAPO-44 and (b) CNDs@MgAPO-44.

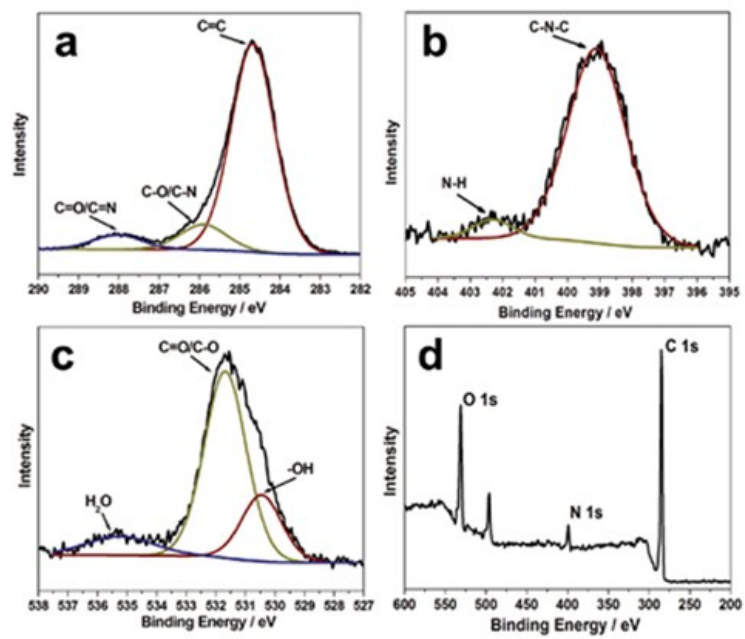


Fig. S3 a-c) C 1s, N 1s, O 1s high-resolution and d) the survey XPS spectra of as-prepared CNs.

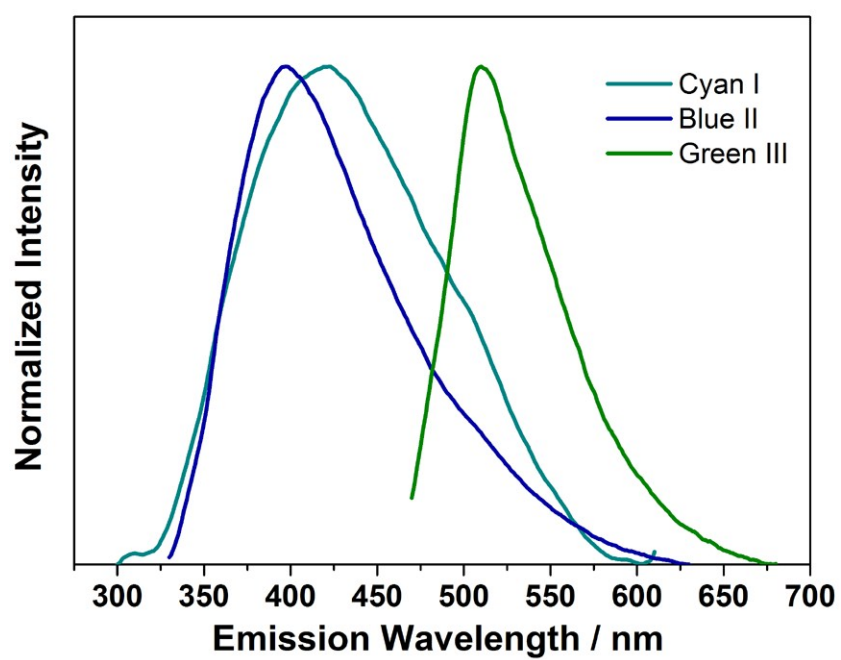


Fig. S4 Normalized PL emissions of three batches of CNDs excited at 250 (cyan), 320 (blue) and 460 (green) nm, respectively.

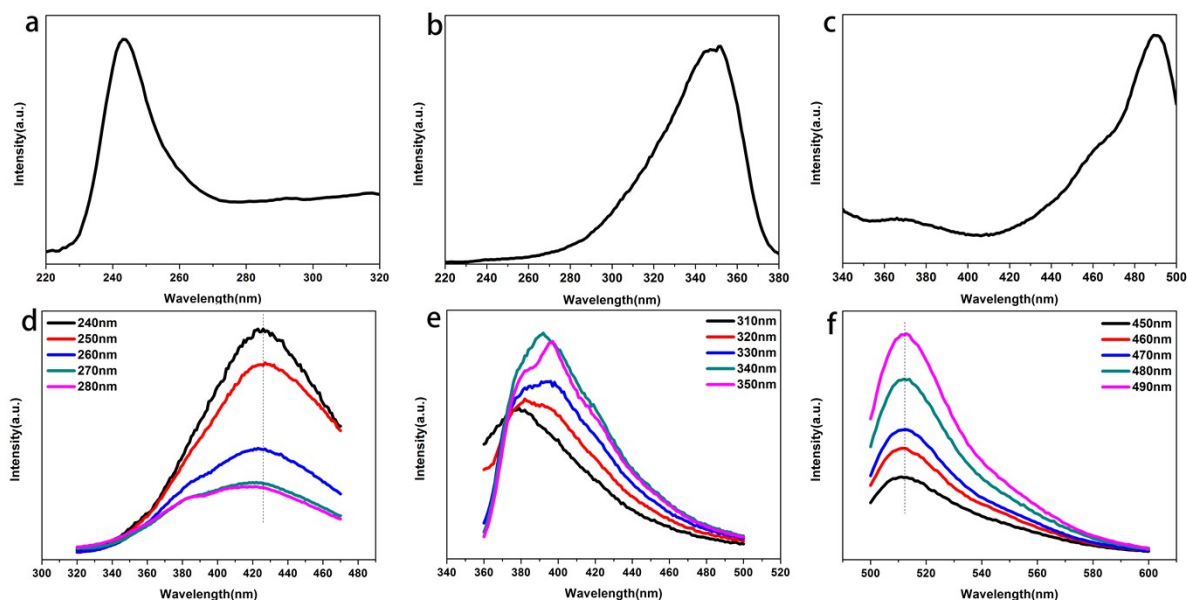


Fig. S5 a-c) PL excitation spectra of CND-1, CND-2 and CND-3 taken at 420, 400, and 515 nm; d-f) PL emissions of CND-1, CND-2 and CND-3 under various excitation wavelengths, respectively.

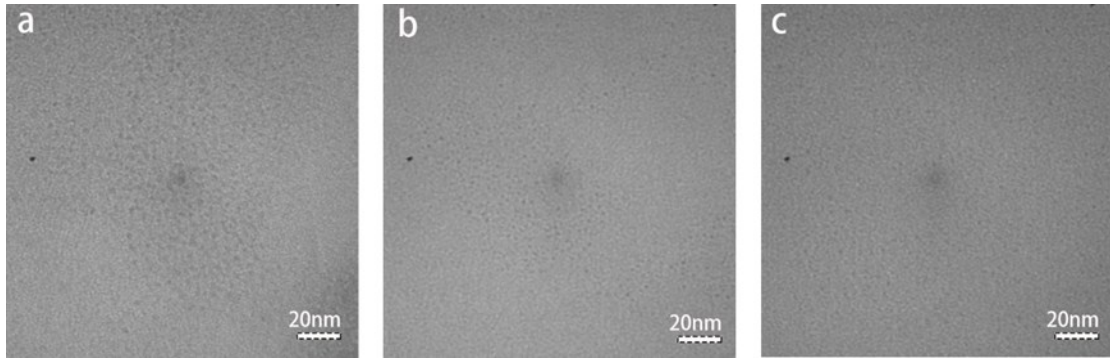


Fig. S6 a-c) TEM images of CND-1, CND-2 and CND-3.

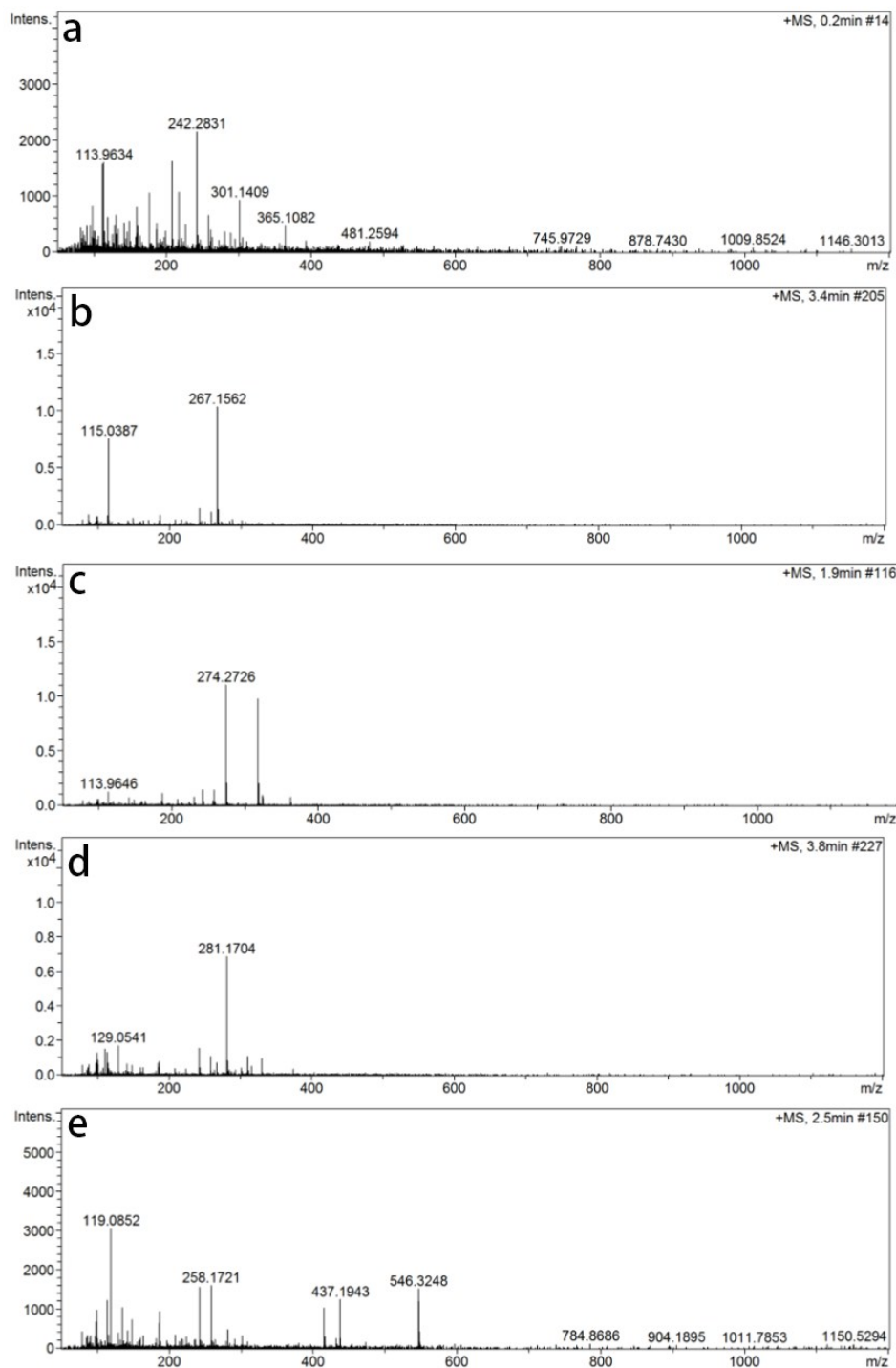


Fig. S7 High resolution mass spectra of CNDs of different retention time; a) FLUO-208; b) FLUO-267; c) FLUO-274 and FLUO-318; d) FLUO-281; e) FLUO-546.

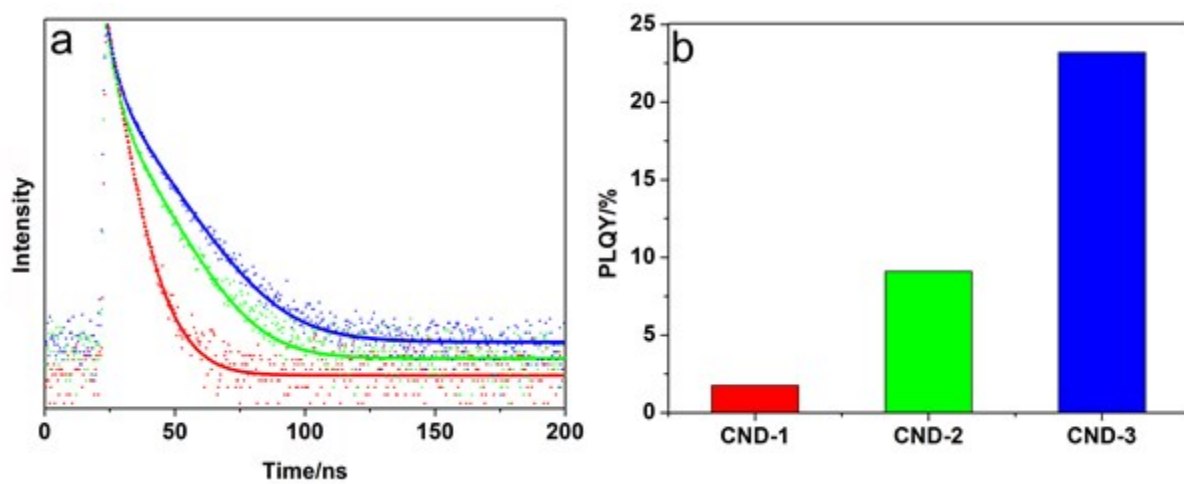


Fig. S8 a) Lifetime luminescence curves for CND-1 (red), CND-2 (green) and CND-3 (blue); b) PLQY scheme for CND-1, CND-2 and CND-3.