Electronic Supplementary Information

One-Step Solvothermal Synthesis of High-Emissive Amphiphilic Carbon Dots via Rigidity Derivation

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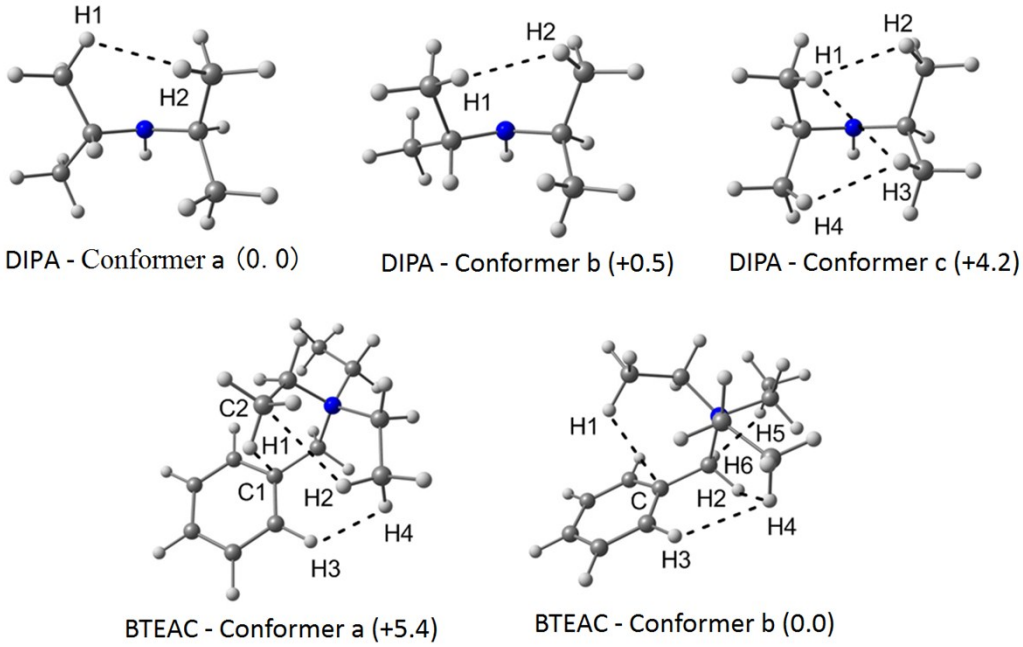


Figure S1. Optimized structure for the global and local energy minima of compounds DIPA and BTEAC obtained by B3LYP/6-311++G (d, p) calculations in a gas phase approximation (relative total energies are presented in parentheses in kcal/mole). Dashed lines indicate the non-covalence interactions detected by AIM analysis of electronic density distribution function.

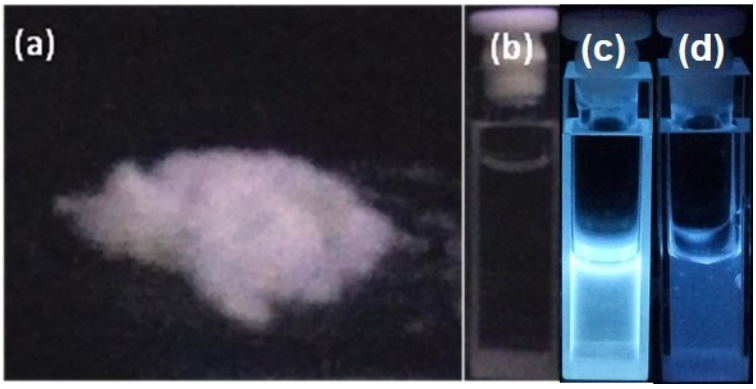


Figure S2. Photograph under a 365-nm UV lamp of (a) a HATU solid sample, (b) HATU solution, (c) ACD-HATU solution in toluene and (d) ACD-HATU solution in water.

Table S1. Calculated frequencies of first normal vibrational mode of the precursor compounds.

	ω_1(HATU), cm^{-1}	ω_1 (DIPA) , cm^{-1}	ω_1 (BTEAC) , cm^{-1}	ω_1 (BI) , cm^{-1}
Conformer a	53.51	45.57	37.3	21.68
Conformer b		45.65	40.87	
Conformer c		57.82		

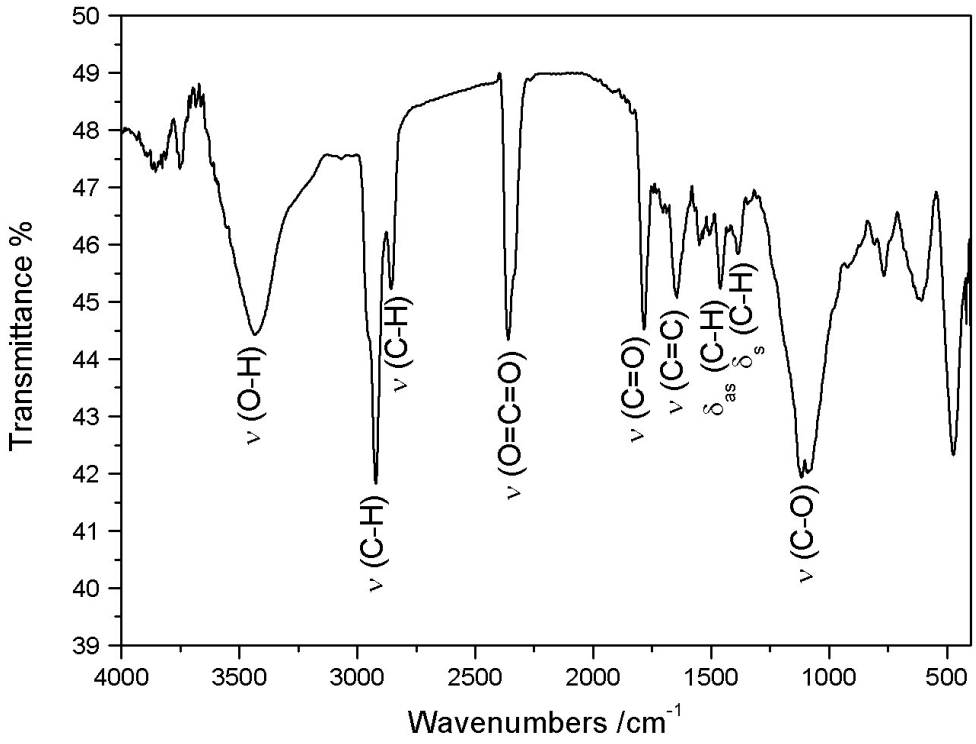


Figure S3. Fourier transformed infrared (FTIR) spectroscopy of ACD-HATU.

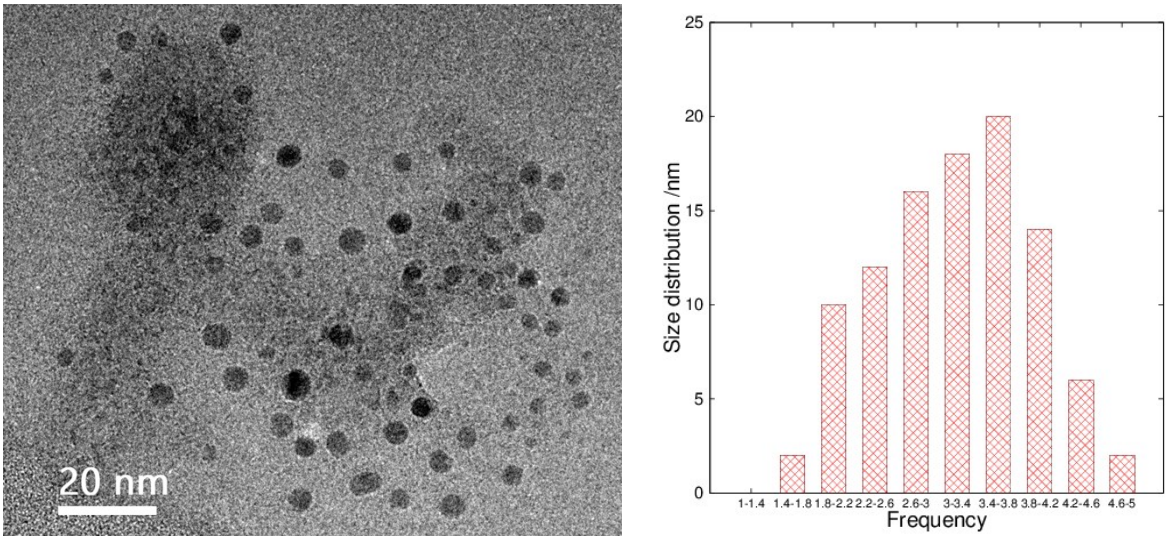


Figure S4. Transmission electron microscopy (TEM) image (left) and the size distribution calculation (right) based on fifty dots of ACD-HATU in ethanol as an example.

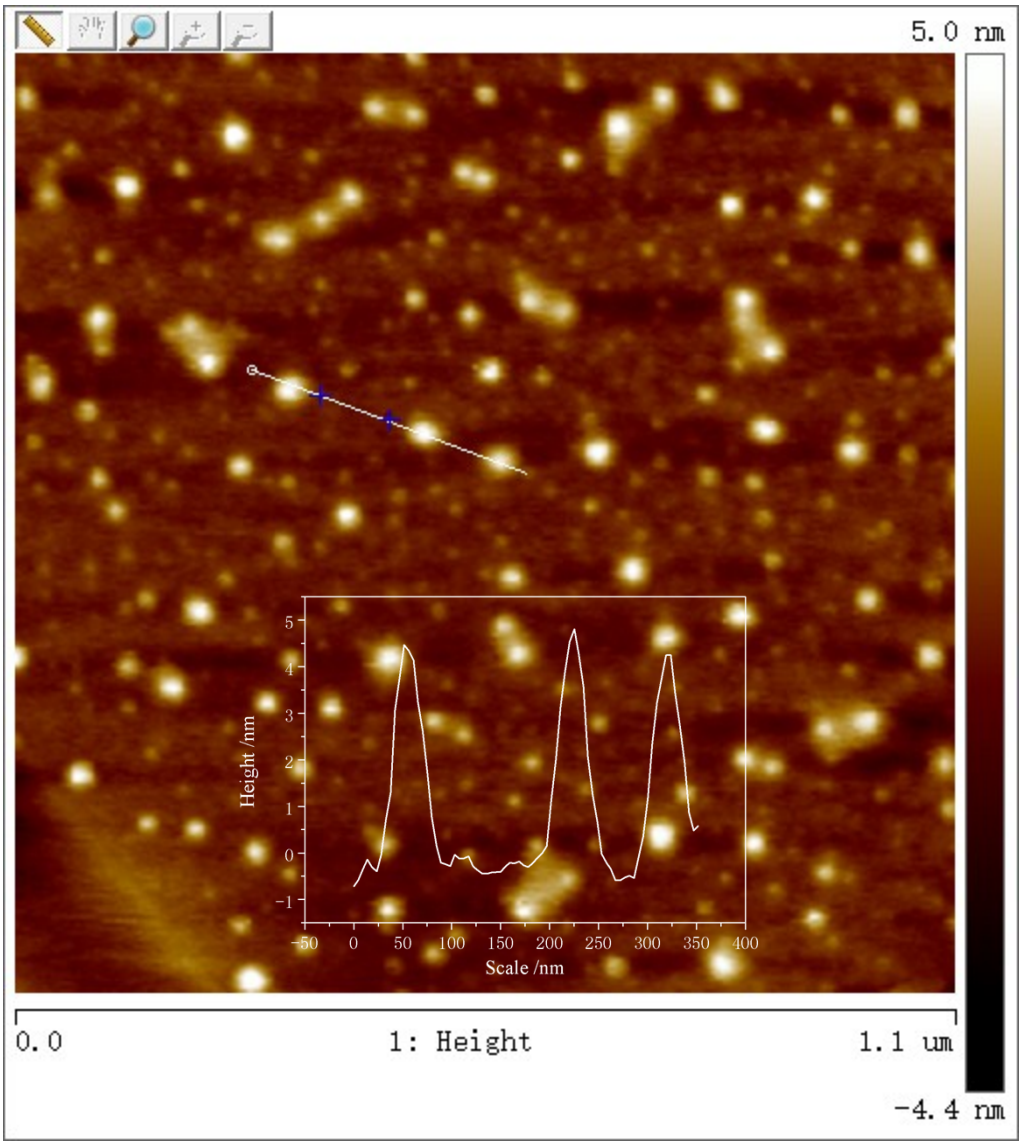


Figure S5. Atomic force microscope (AFM) image and the height profile along the line (inset) of ACD-HATU.

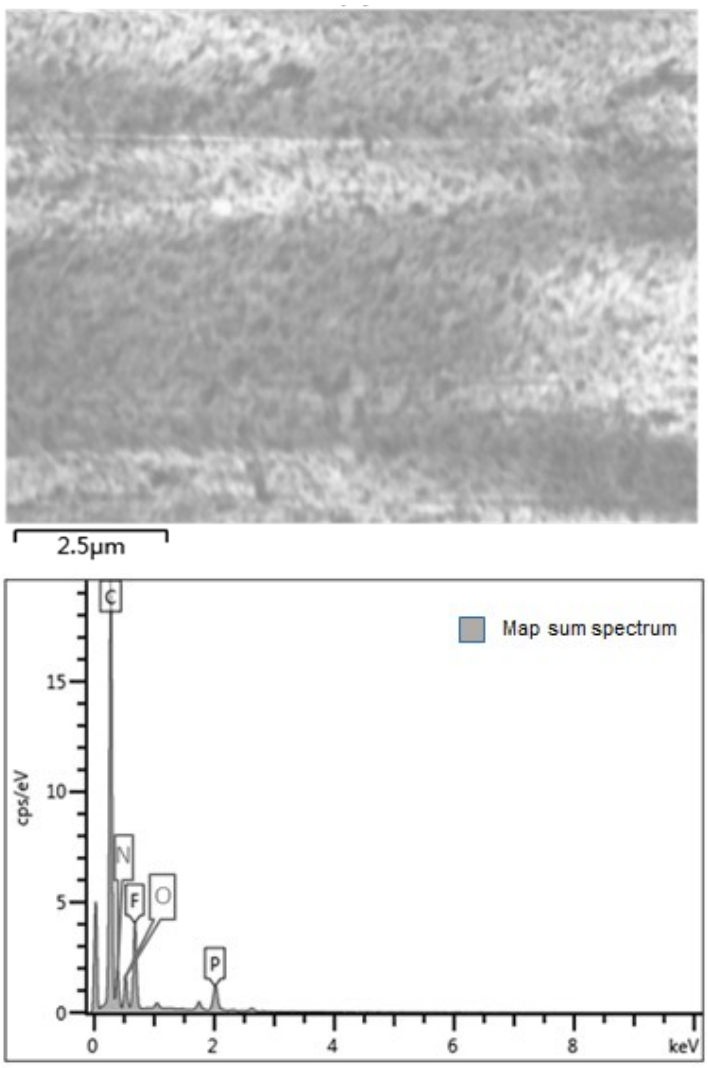


Figure S6. Energy Dispersive X-ray spectroscopy (EDS) image and elemental figure of ACDs.

Table S2. Energy Dispersive X-ray spectroscopy (EDS) elemental analysis results.

Elements	Line type	k ratio	weight%	weight% error	Atom%	standards
C	K line	0.45553	76.64	0.24	84.98	C Vit
F	K line	0.08072	18.37	0.22	12.88	CaF2
P	K line	0.03766	5.00	0.12	2.15	GaP
Total:			100.00		100.00	

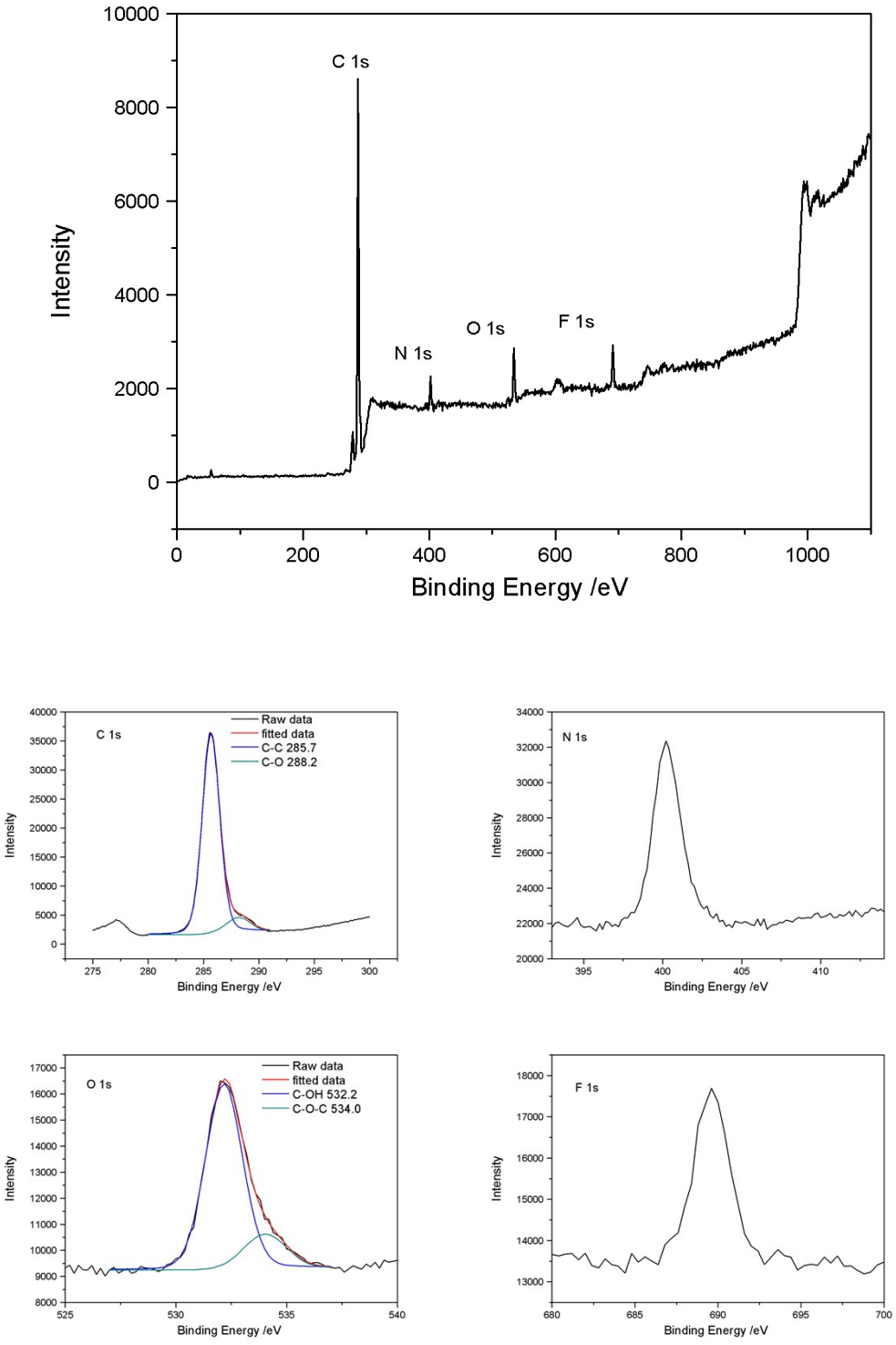


Figure S7. The X-ray photoelectron spectroscopy (XPS) and C 1s, O 1s, N 1s, F 1s spectra of ACD-HATU.

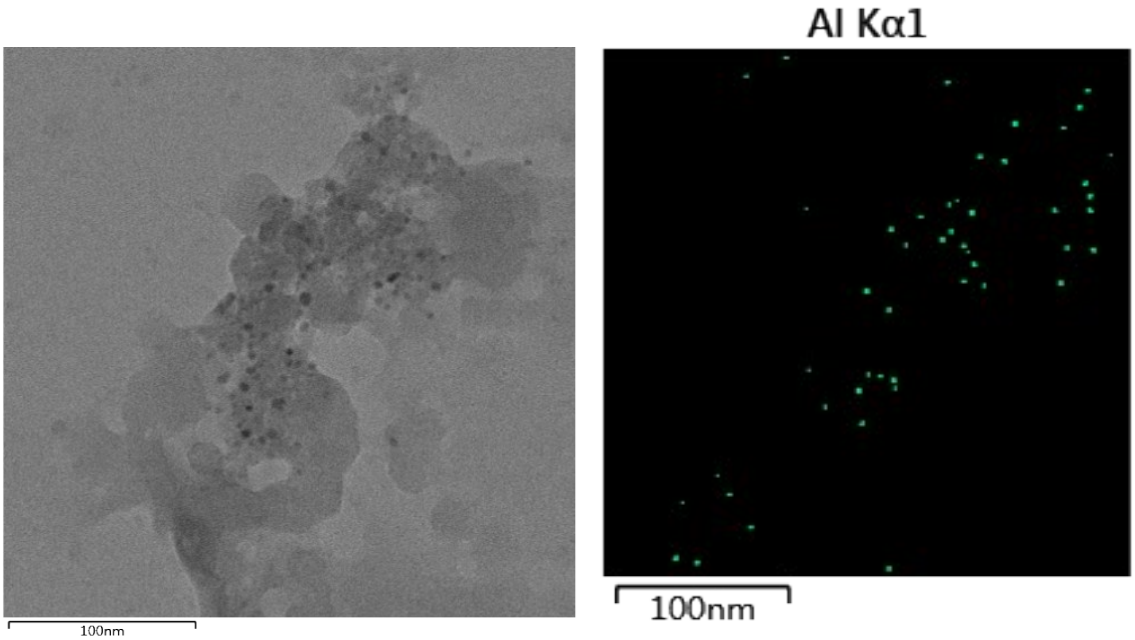


Figure S8. Transmission electron microscopy (TEM)-energy dispersive X-ray spectroscopy (EDS) image (left) of Al doped ACD-HATU and the mapping for aluminum (right).

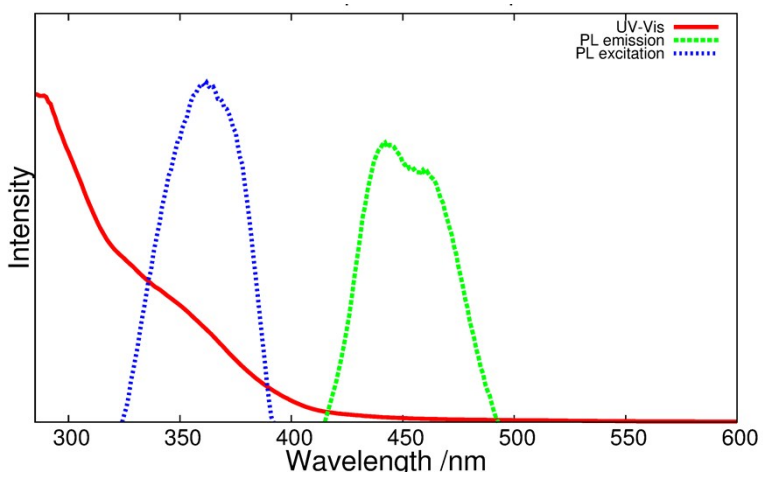


Figure S9. The normalized optical absorption spectra (red curve), photoluminescent excitation (blue curve) and photoluminescent emission (green curve) spectra of Al doped ACDs.

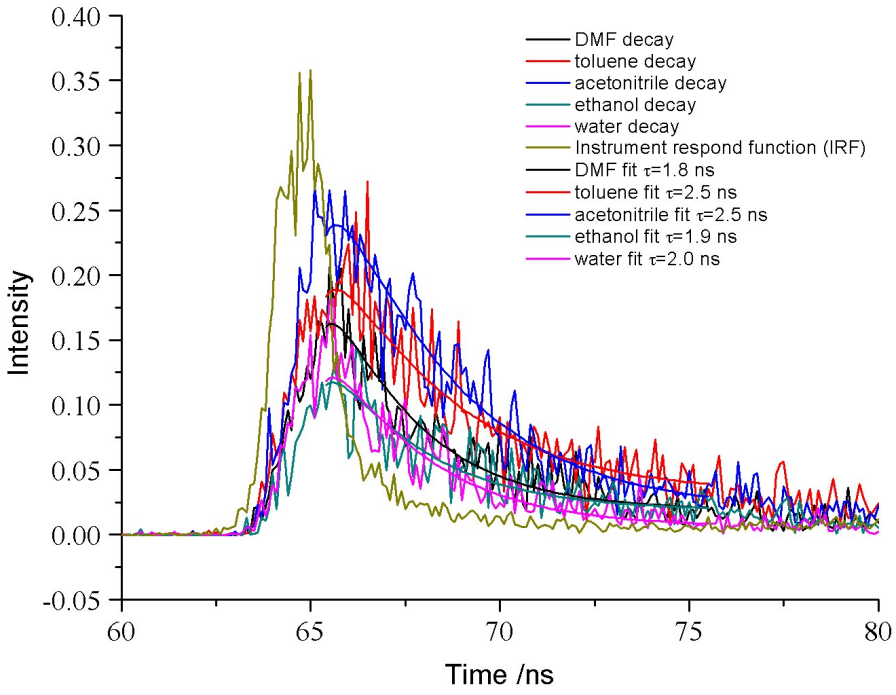
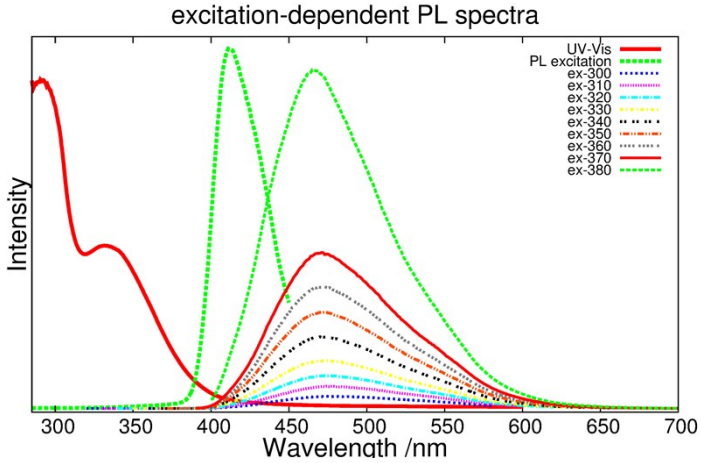


Figure S10. The time-resolved decay spectra and the fitting curves which calculate fluorescence lifetimes of carbon dots obtained in different solvents.



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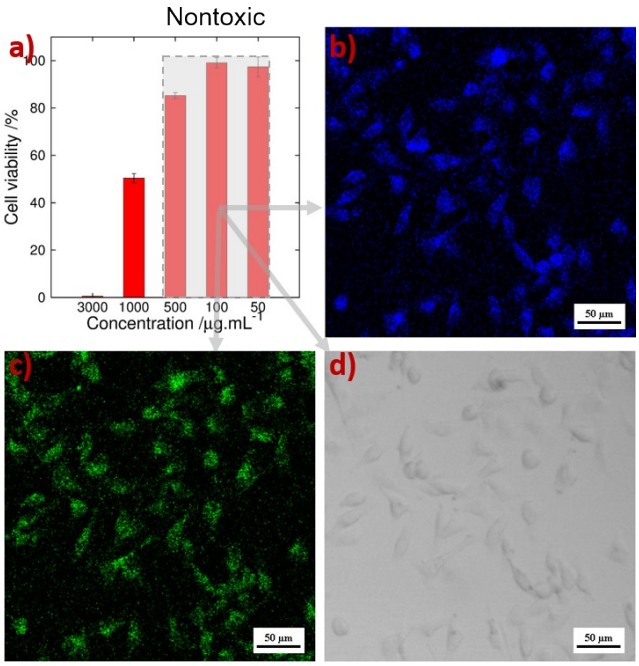

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