

Macroscopic Wires from
Fluorophore-Quencher Dyads with
Long-Lived Blue Emission

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Part I. Supplementary discussion and Figures

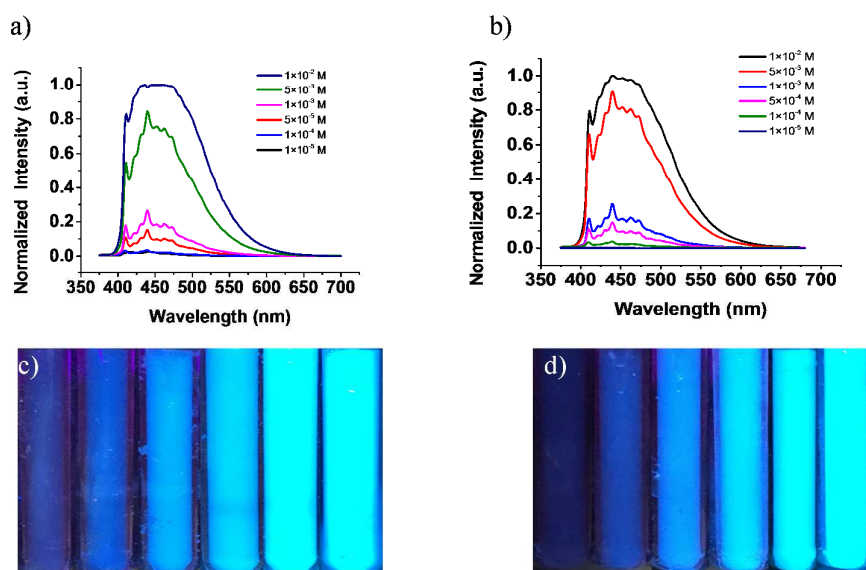


Figure S1. Steady-state emission spectra of a) 2 and b) 3 in 2-methyl-tetrahydrofuran at 77 K; Photos of c) 2 and d) 3 in different concentrations, (from left to right: 1×10^{-5} , 1×10^{-4} , 5×10^{-4} , 1×10^{-3} , 5×10^{-3} , and $1 \times 10^{-2} M$) at 77k.

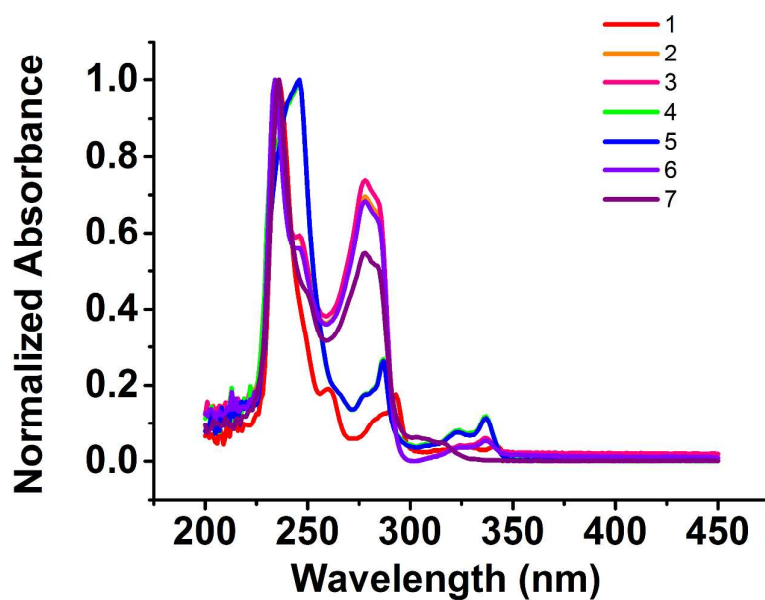


Figure S2. Absorption spectra of FQDs 1-7 in THF solution ($5 \times 10^{-6} M$) at 298k.

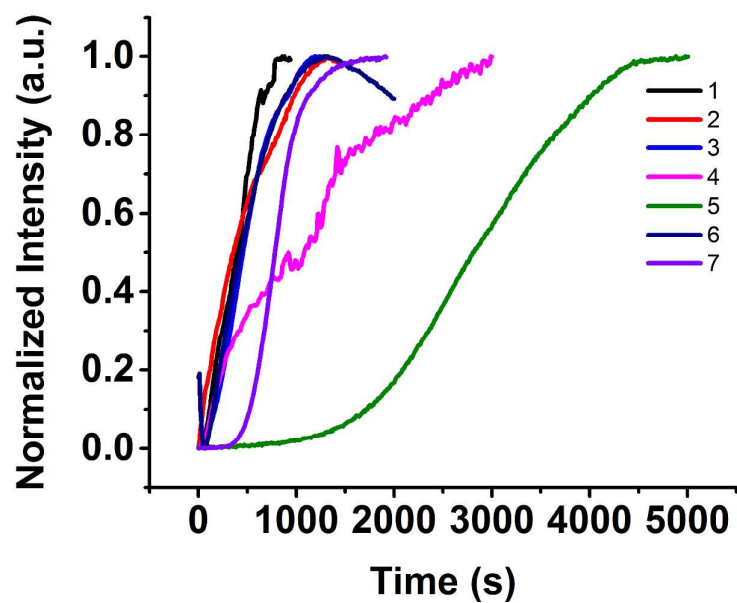


Figure S3. Time-dependent PL spectra of FQDs 1-7 at 298K in THF (80%) and water (20%) (THF solution $\approx 1.5 \times 10^{-2}$ M).

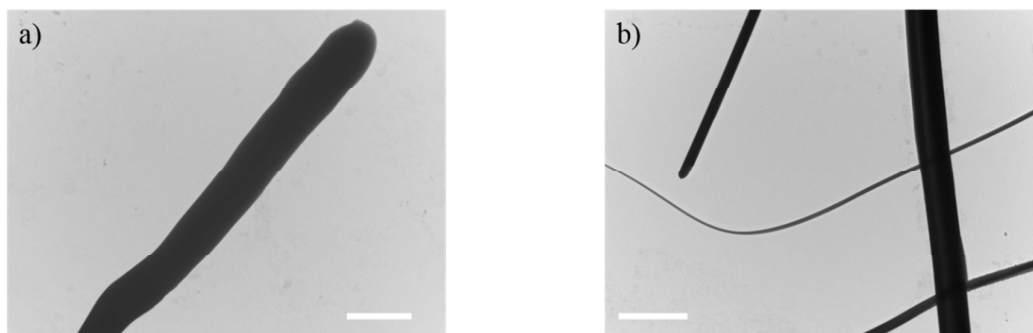


Figure S4. Transmission electron microscopy (TEM) images of FQDs 1 and 2 on copper plates from the mixture of THF (70%, v) and water (30%, v) (scale bar : 5 μ m).

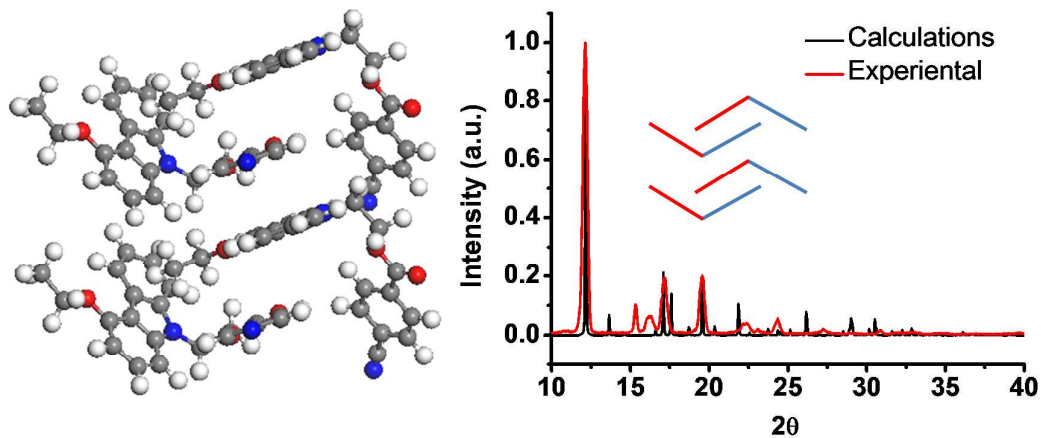


Figure S5. Left: simulated molecular packing of Dyad 2; right: measured (red line) and calculated (black line) X-ray diffraction patterns for Dyad 2 in the solid state. Inset: cartoon illustration of molecular packing with red representing the fluorophore and blue representing the quencher.

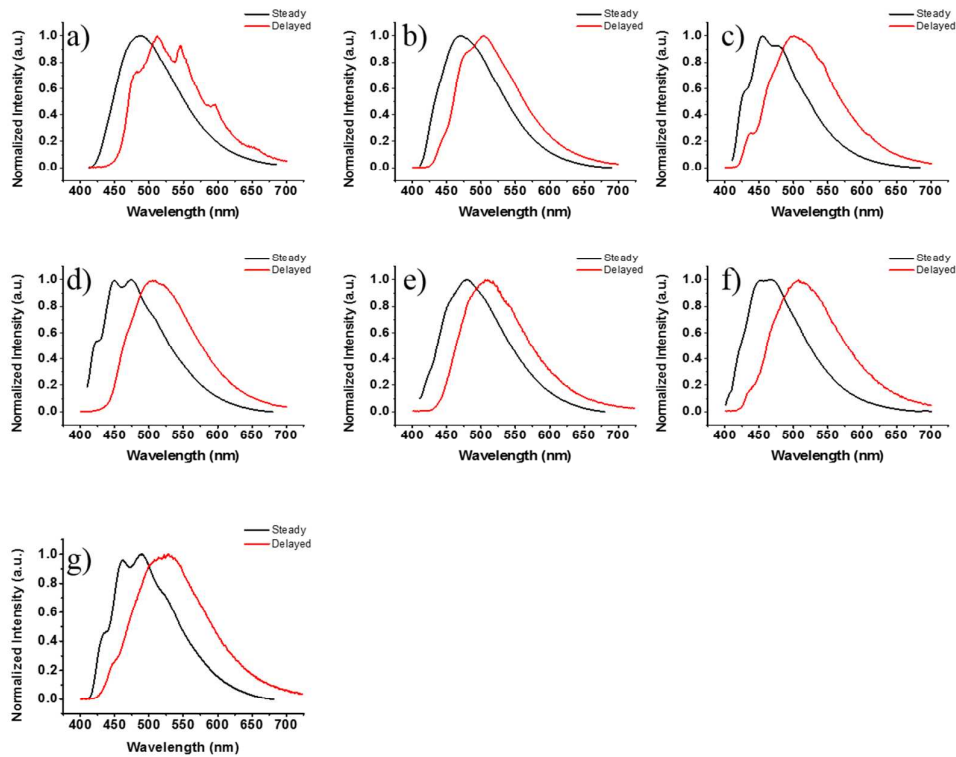


Figure S6. Steady-state (black line) and delayed (red line) emission spectra of FQDs a) 1, b) 2, c) 3, d) 4, e) 5, f) 6, g) 7 at 77K.

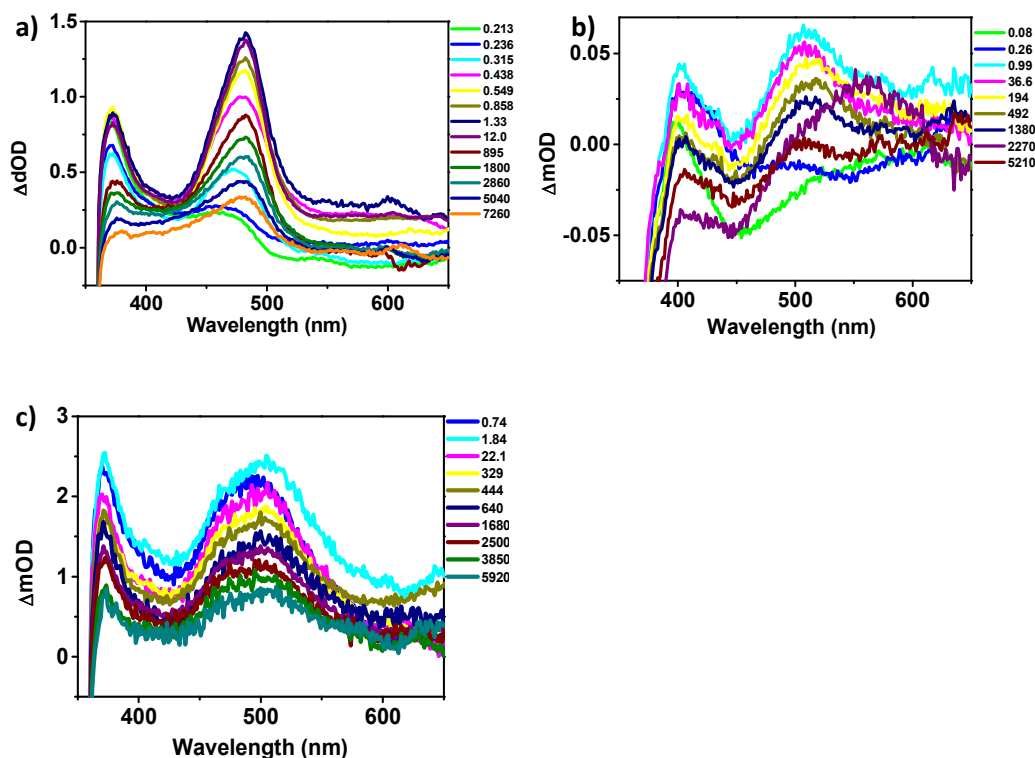


Figure S7. Transient absorption spectra ($\lambda_{\text{ex}} = 350$ nm) of **1** (a), **6** (b) and **7** (c) in solid State.

Table S1. Lifetime data for FQDs 1-7.

	λ_{air} (nm) ^a	λ_{vacuum} (nm) ^b	$\lambda_{77\text{k}}$ (nm) ^c	τ_{short} (s) ^d	τ_{long} (s) ^e	$\tau_{77\text{k}}$ (s) ^f
1	462	460	469	4.674769×10^{-8}	4.674769×10^{-8}	9.383236×10^{-2}
				(36.23%)	(36.23%)	(29.68%)
				9.763916×10^{-8}	9.763916×10^{-8}	0.2524764
				(52.19%)	(52.19%)	(70.32%)
2	461	461	458	1.779745×10^{-7}	1.779745×10^{-7}	
				(11.58%)	(11.58%)	
				3.399641×10^{-8}	3.399641×10^{-8}	7.797113×10^{-2}
				(26.78%)	(26.78%)	(30.21%)
3	449	454	455	7.061487×10^{-8}	7.061487×10^{-8}	0.5807022
				(68.72%)	(68.72%)	(65.42%)
				8.719963×10^{-8}	8.719963×10^{-8}	8.569774×10^{-4}
				(4.49%)	(4.49%)	(4.37%)
4	449	454	455	4.124962×10^{-8}	8.275221×10^{-6}	4.486966×10^{-2}
				(34.66%)	(26.43%)	(28.99%)
				8.8299×10^{-8}	1.320636×10^{-7}	0.517372
				(62.20%)	(11.49%)	(57.54%)
5	449	454	455	7.653419×10^{-7}	9.241819×10^{-5}	9.071735×10^{-4}

				(3.14%)	(62.08%)	(13.47%)
4	446	448	447	1.912239×10^{-8}	5.128202×10^{-6}	6.810223×10^{-2}
				(26.16%)	(24.32%)	(15.53%)
				3.872959×10^{-8}	2.902143×10^{-5}	0.8166875
				(71.44%)	(58.67%)	(79.34%)
				1.029361×10^{-7}	5.323147×10^{-8}	8.027803×10^{-4}
				(2.40%)	(17.01%)	(5.14%)
5	466	467	448	5.105612×10^{-9}	2.2251×10^{-5}	6.241274×10^{-2}
				(14.63%)	(30.94%)	(13.68%)
				4.921217×10^{-8}	2.07561×10^{-4}	0.6616253
				(65.20%)	(61.62%)	(78.10%)
				1.966607×10^{-7}	2.160035×10^{-7}	6.751061×10^{-4}
				(20.17%)	(7.44%)	(8.22 %)
6	448	446	446	1.270767×10^{-8}	6.348451×10^{-8}	5.536298×10^{-2}
				(12.53%)	(79.82%)	(21.52%)
				4.244335×10^{-8}	4.365136×10^{-6}	0.5579712
				(76.04%)	(20.18%)	(74.88 %)
				1.064381×10^{-7}		1.361252×10^{-3}
				(14.63%)		(3.60%)
7	483	484	487	1.307576×10^{-8}	4.788864×10^{-6}	0.1511825
				(4.41%)	(10.19%)	(33.44%)
				4.527515×10^{-8}	3.919392×10^{-3}	5.269679×10^{-4}
				(91.38%)	(89.81%)	(6.03%)
				1.720095×10^{-6}		0.4864905
				(4.22%)		(60.53%)

a. steady-state emission maxima in air at room temperature ($\lambda_{\text{ex}} = 365 \text{ nm}$)

b. steady-state emission maxima under vacuum at room temperature ($\lambda_{\text{ex}} = 365 \text{ nm}$)

c. steady-state emission maxima at 77 K ($\lambda_{\text{ex}} = 365 \text{ nm}$)

d. measured lifetimes in air at room temperature (excited with nanoLED at $\lambda_{\text{ex}} = 365 \text{ nm}$)

e. measured lifetimes in air at room temperature (excited with SpectraLED at $\lambda_{\text{ex}} = 365 \text{ nm}$)

f. measured lifetimes at 77 K ($\lambda_{\text{ex}} = 365 \text{ nm}$)

Part II. NMR and MS spectra

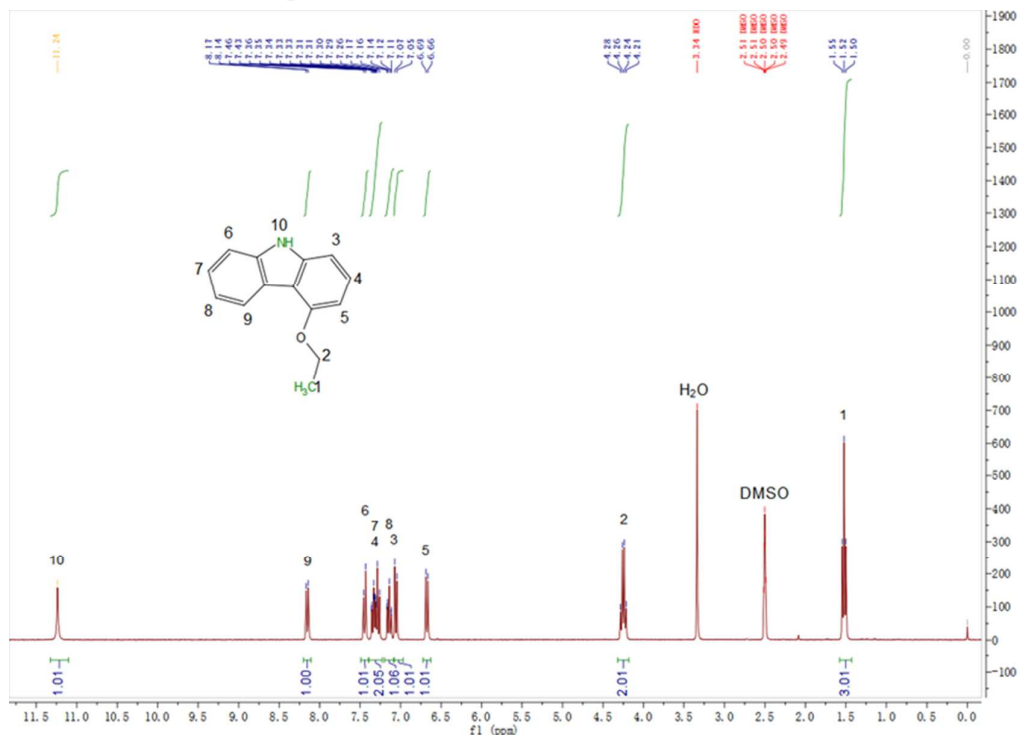


Figure S8. ¹H NMR spectrum of 4-ethoxy-9H-carbazole in DMSO.

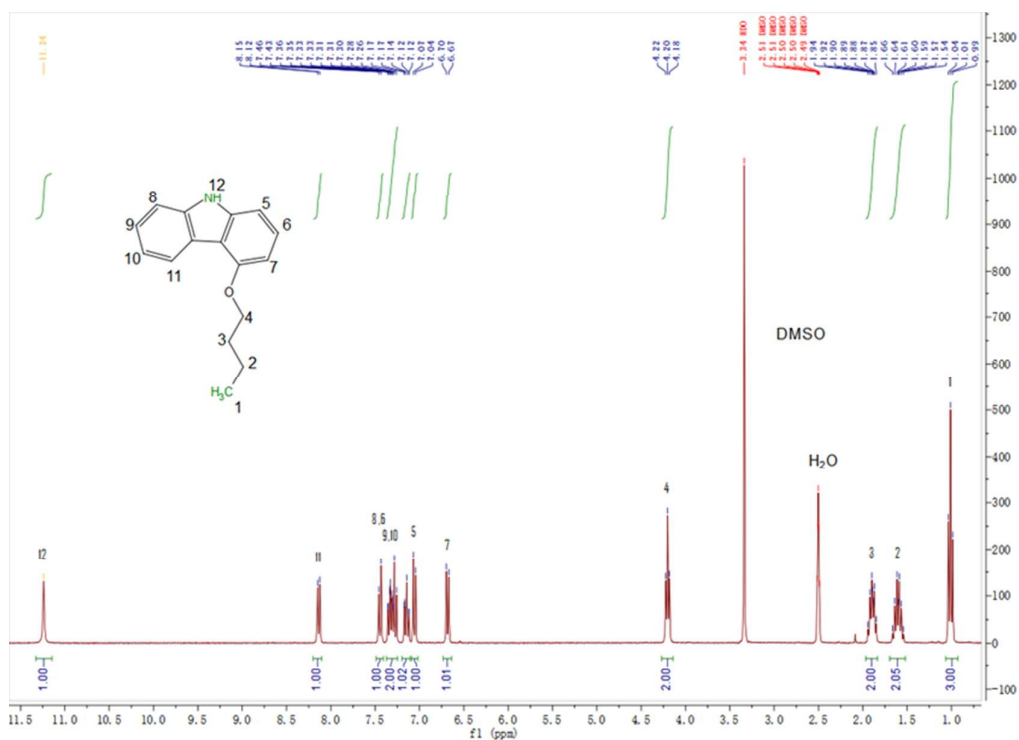


Figure S9. ¹H NMR spectrum of 4-butoxy-9H-carbazole in DMSO.

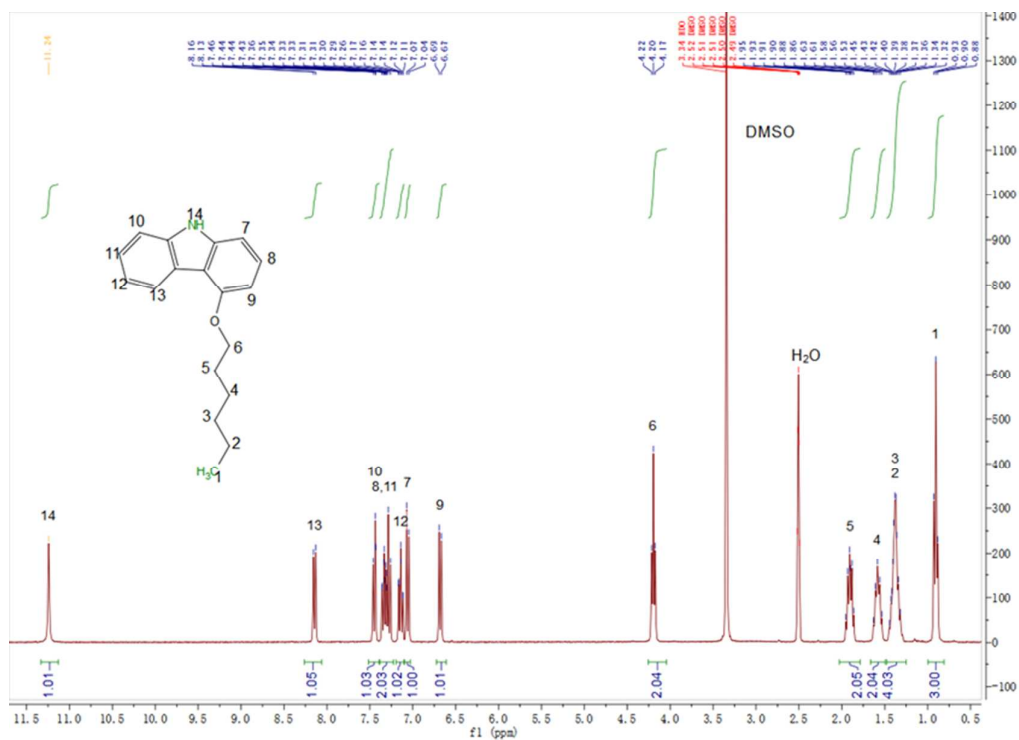


Figure S10. ^1H NMR spectrum of 4-hexyloxy-9H-carbazole in DMSO.

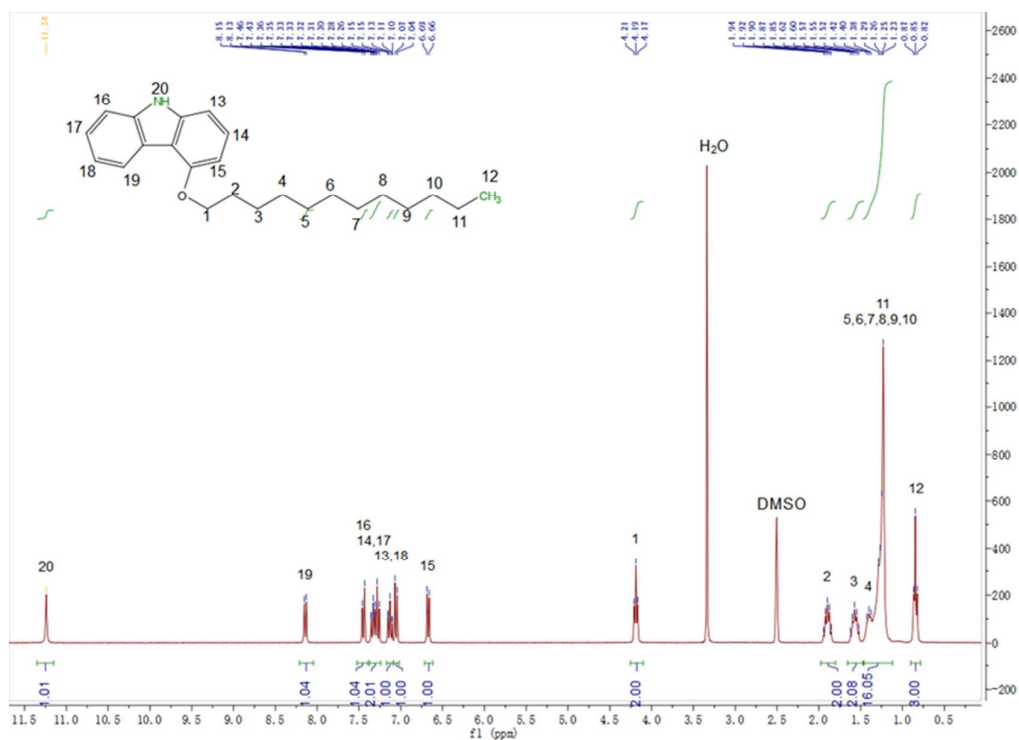


Figure S11. ^1H NMR spectrum of 4-dodecyloxy-9H-carbazole in DMSO.

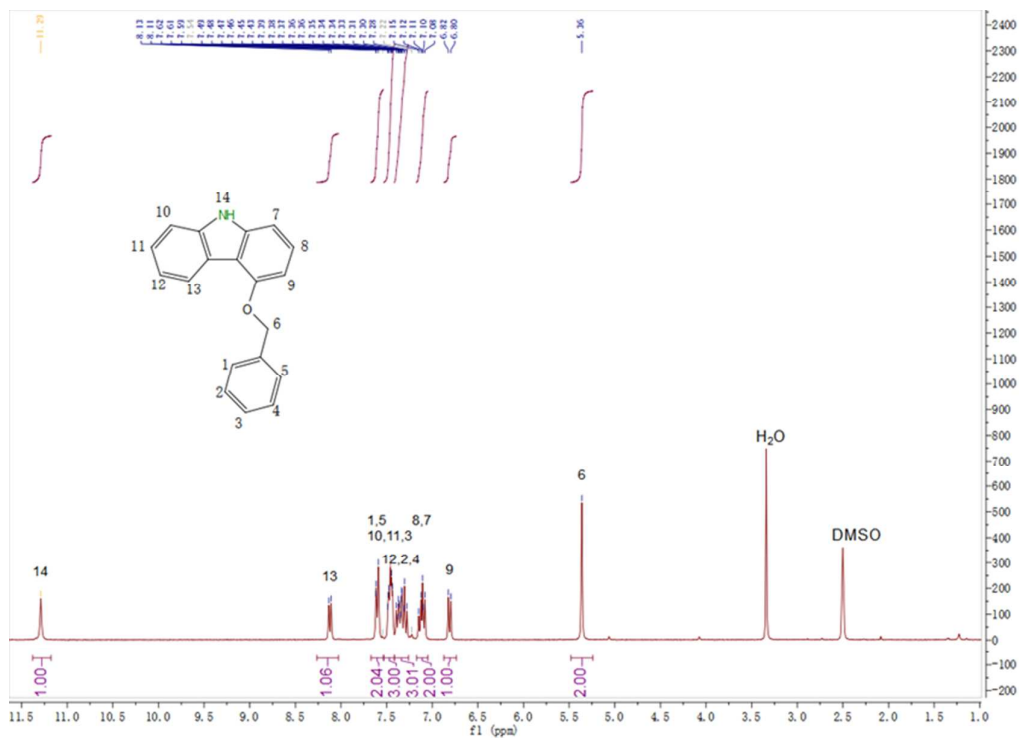


Figure S12. ¹H NMR spectrum of 4- benzyloxy-9H-carbazole in DMSO.

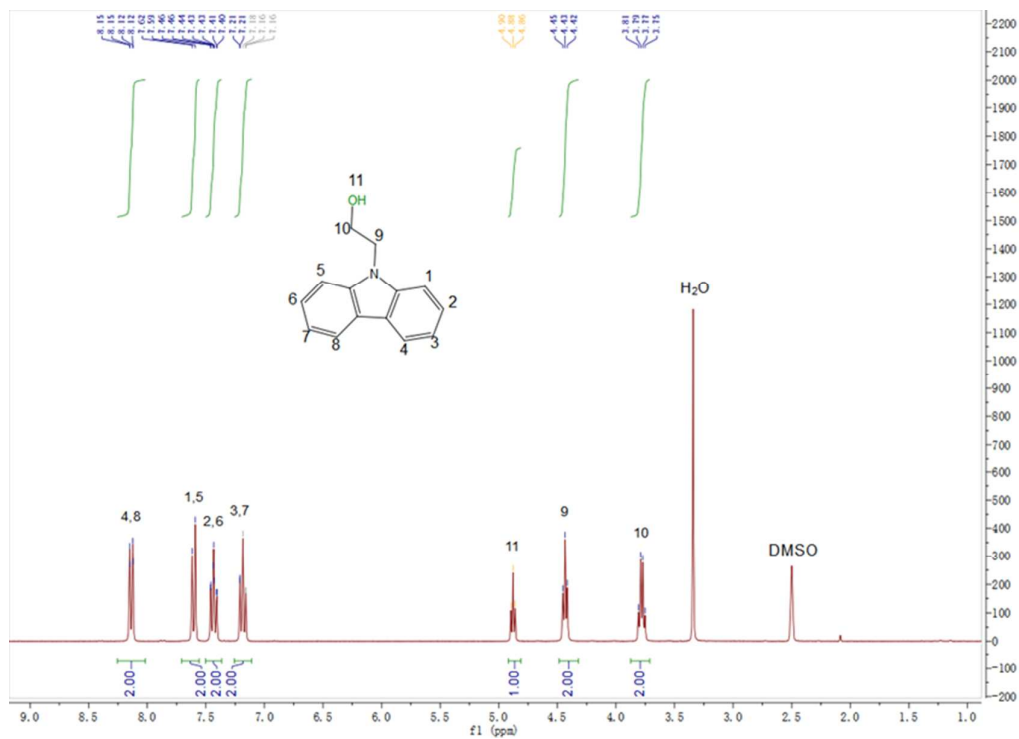


Figure S13. ¹H NMR spectrum of 2-(9H-carbazol-9-yl)ethan-1-ol in DMSO.

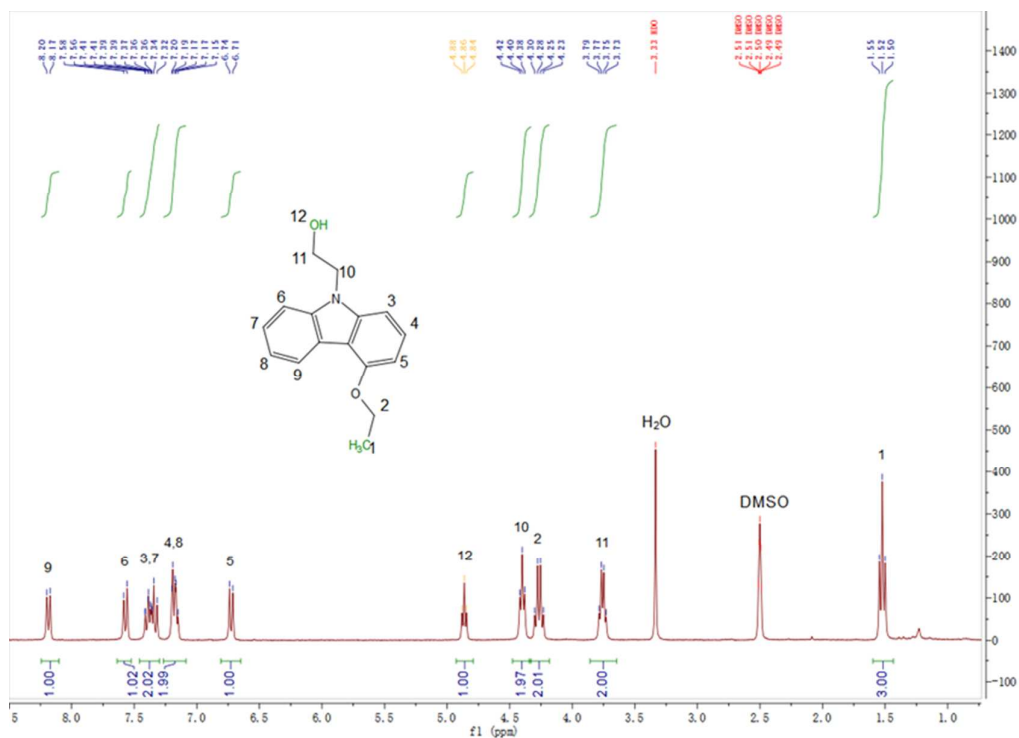


Figure S14. ¹H NMR spectrum of 2-(4-ethoxy-9H-carbazol-9-yl)ethan-1-ol in DMSO.

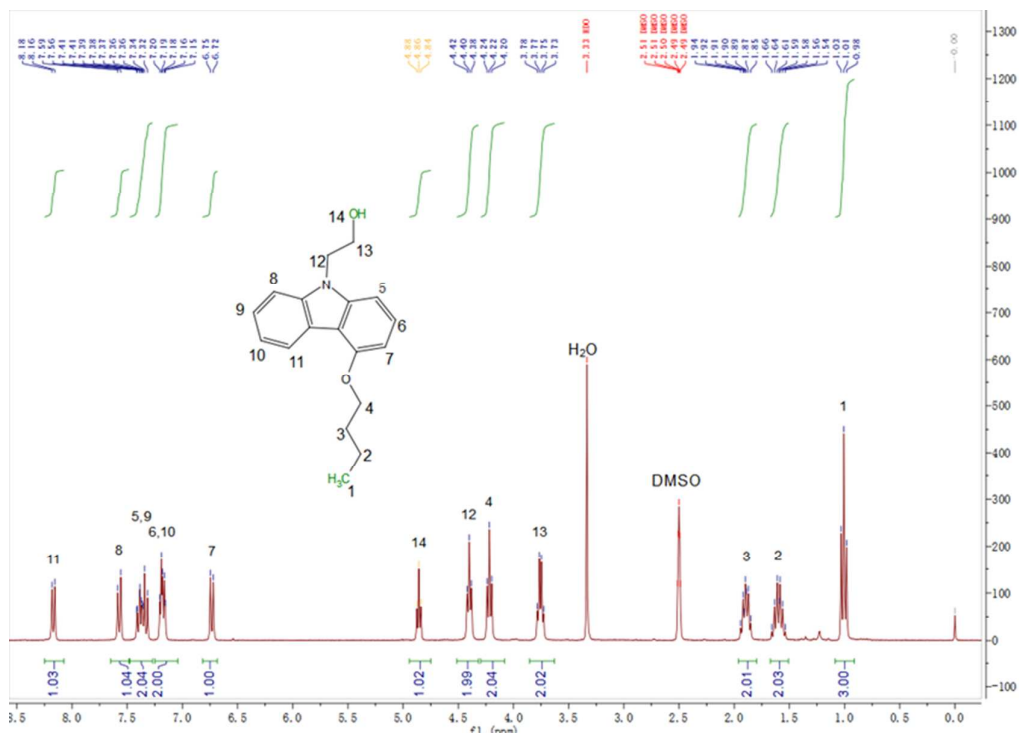


Figure S15. ¹H NMR spectrum of 2-(4-butoxy-9H-carbazol-9-yl)ethan-1-ol in DMSO.

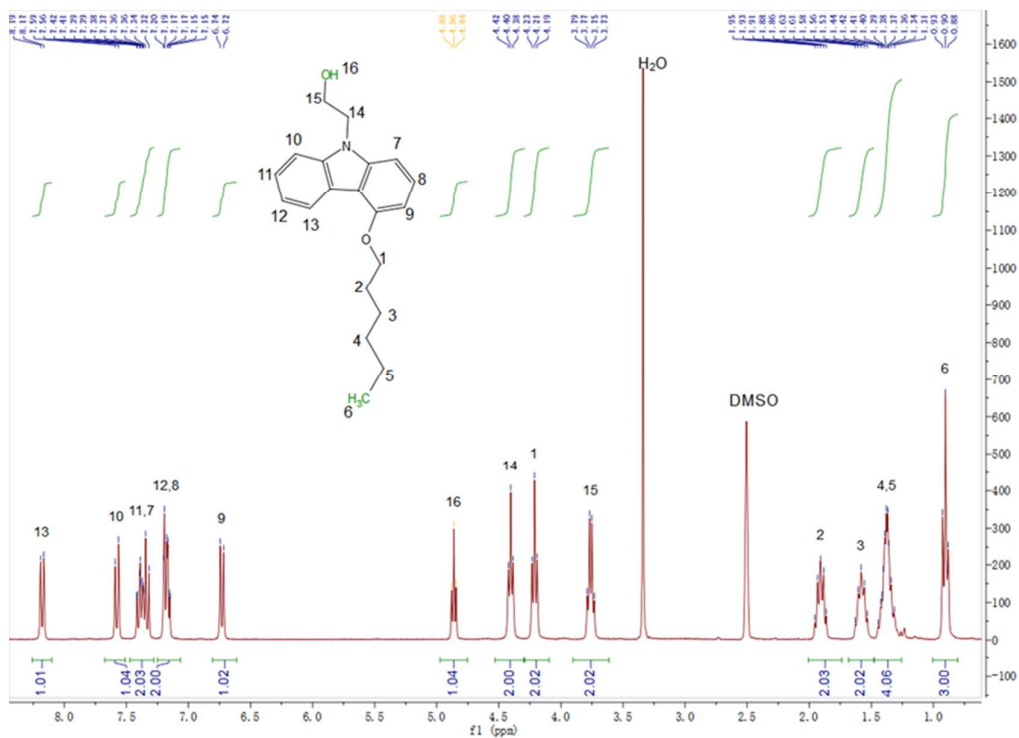


Figure S16. ¹H NMR spectrum of 2-(4-hexyloxy-9H-carbazol-9-yl)ethan-1-ol in DMSO.

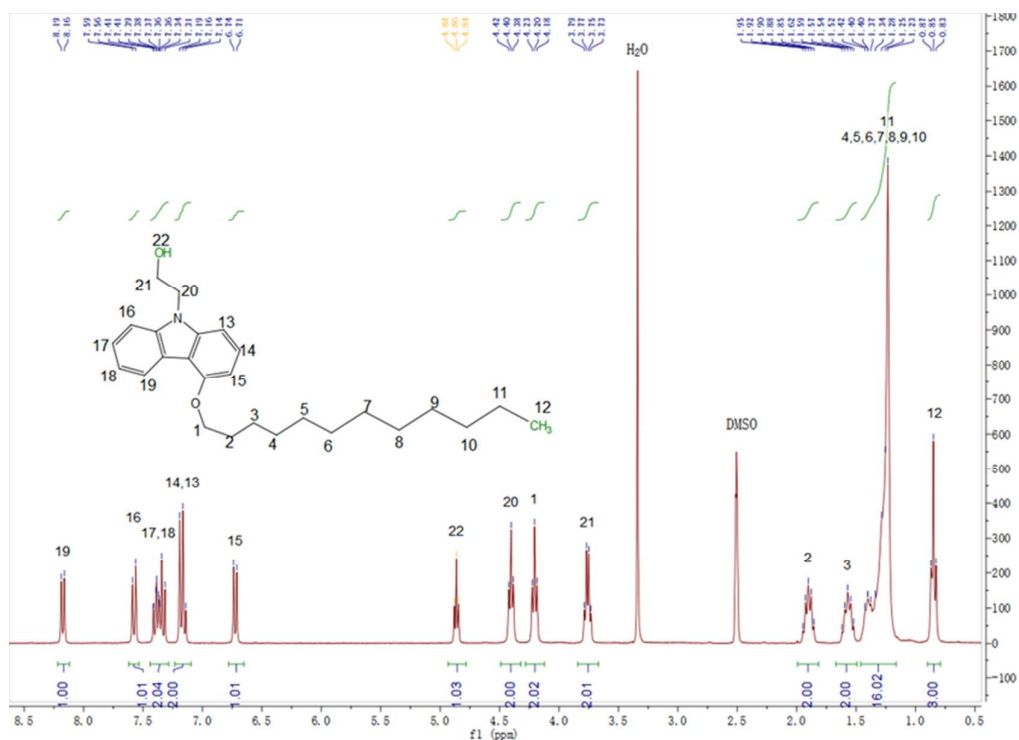


Figure S17. ¹H NMR spectrum of 2-(4-dodecyloxy-9H-carbazol-9-yl)ethan-1-ol in DMSO.

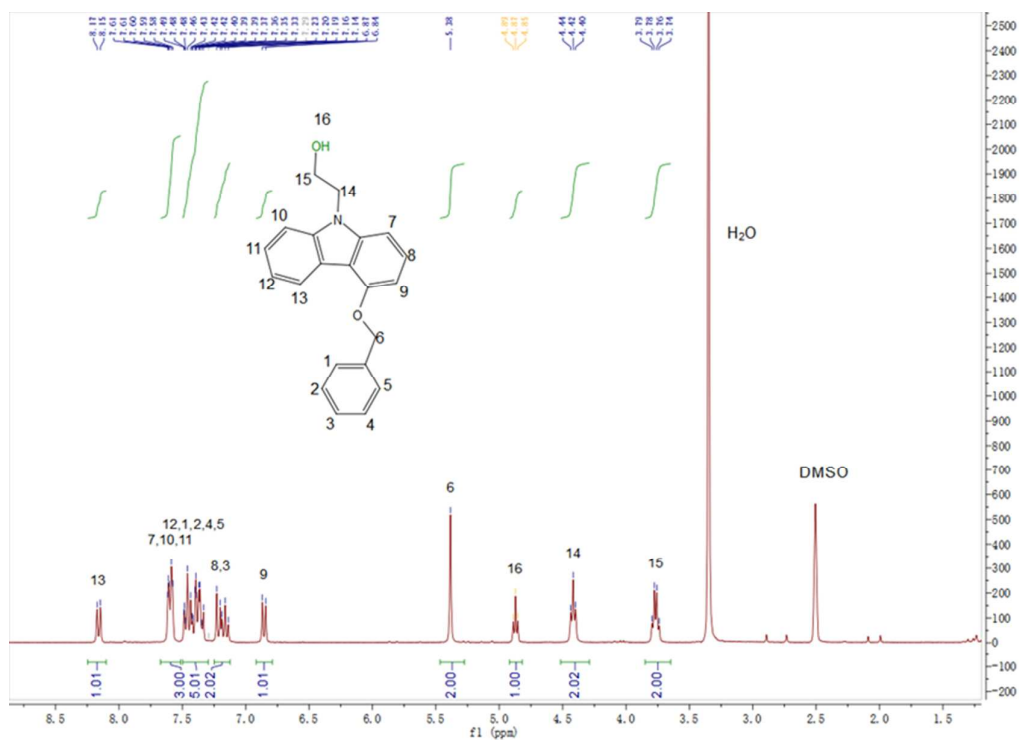


Figure S18. ^1H NMR spectrum of 2-(4-benzyloxy-9H-carbazol-9-yl)ethan-1-ol in DMSO.

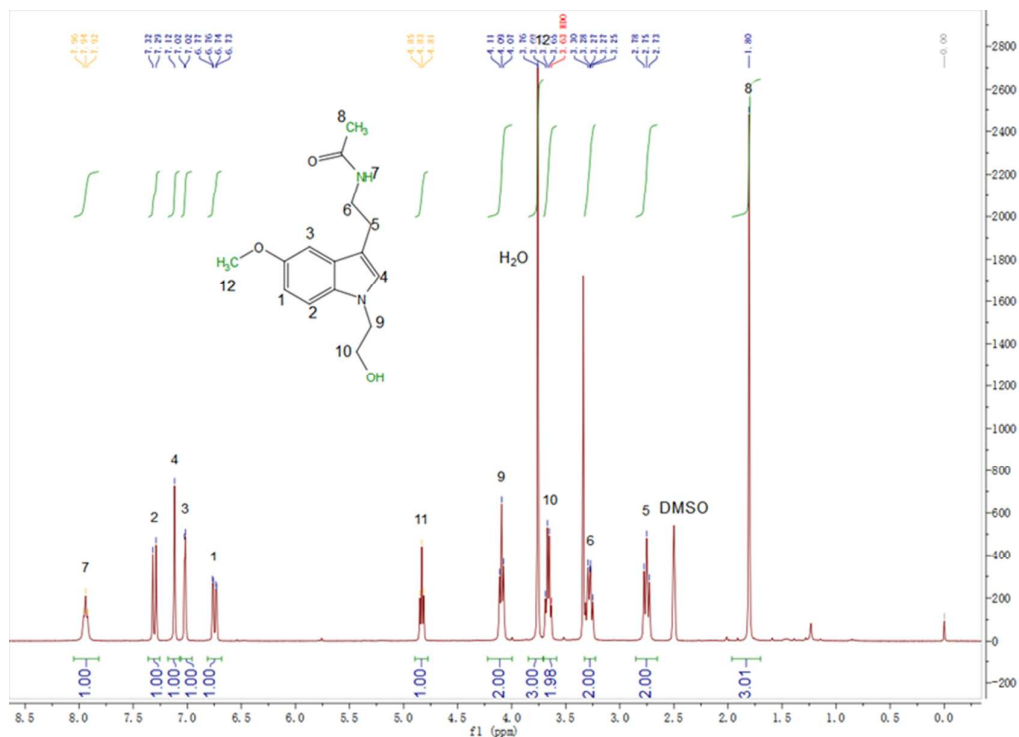


Figure S19. ^1H NMR spectrum of N-(2-(1-(2-hydroxyethyl)-5-methoxy-1H-indol-3-yl)ethyl)acetamide in DMSO.

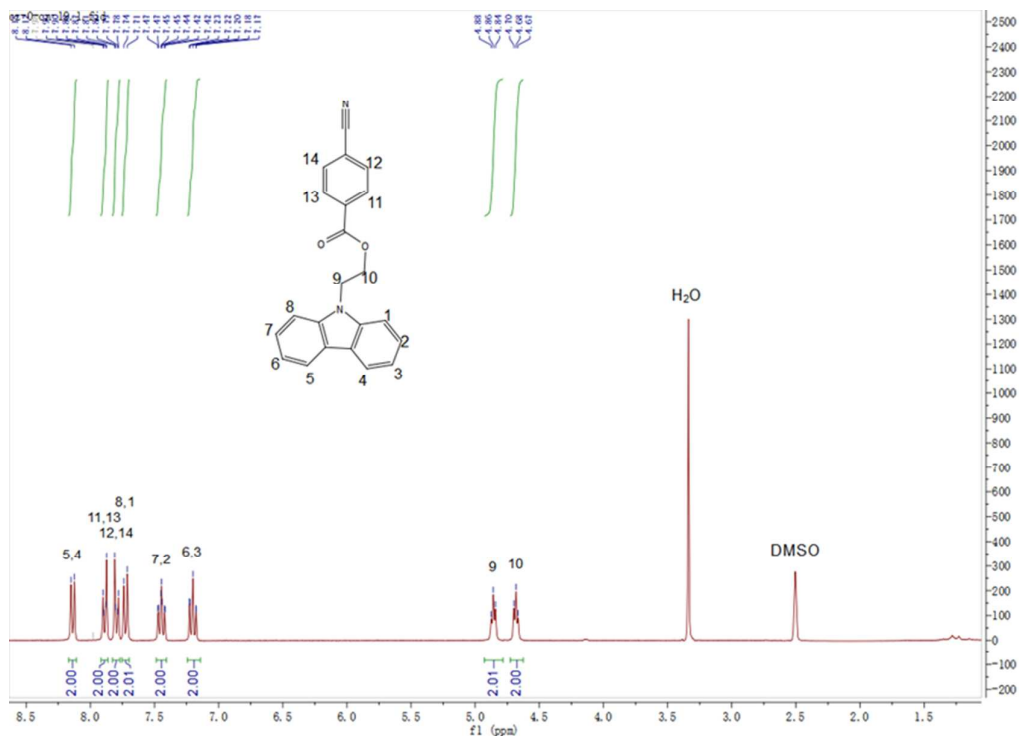


Figure S20. ¹H NMR spectrum of FQD 1 in DMSO.

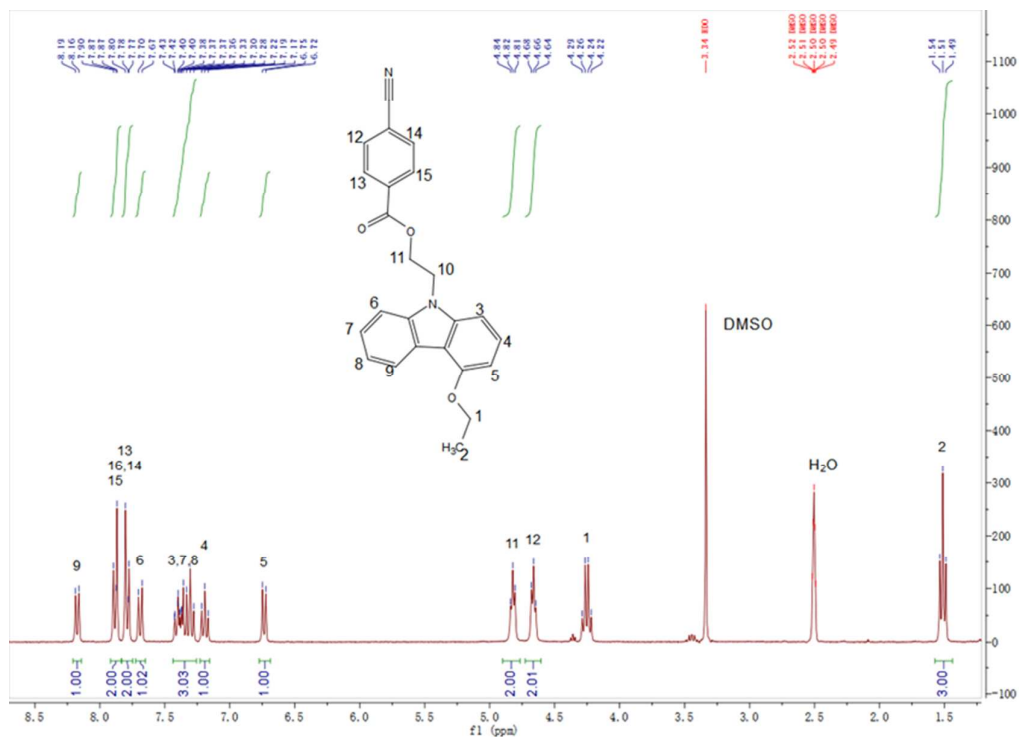


Figure S21. ¹H NMR spectrum of FQD 2 in DMSO.

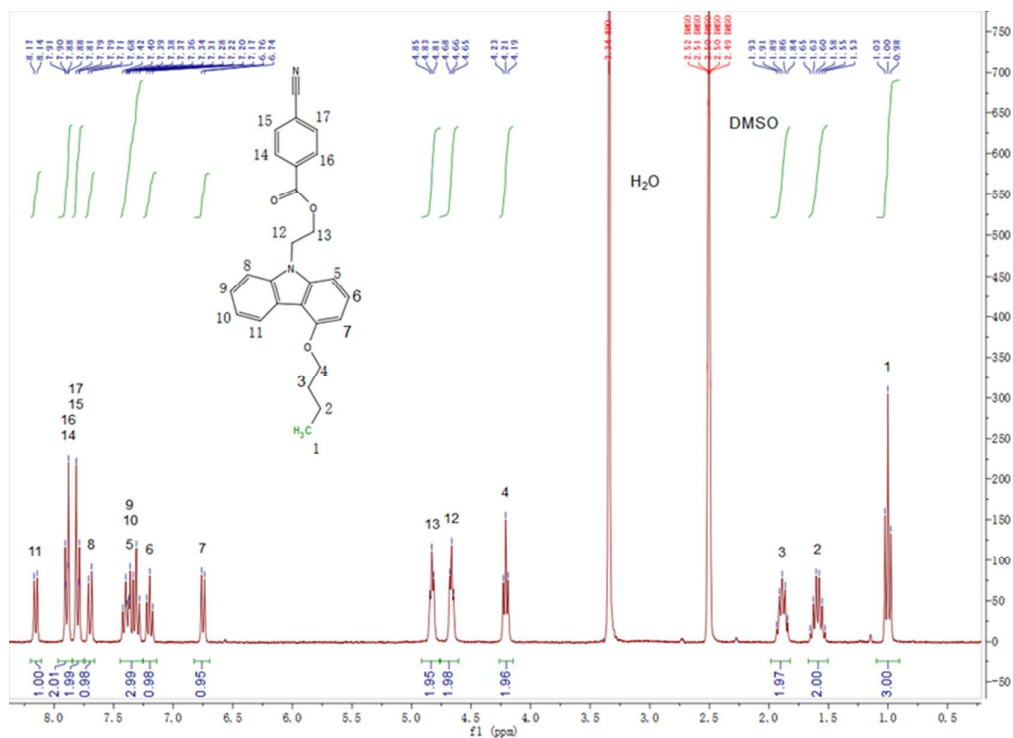


Figure S22. ^1H NMR spectrum of FQD 3 in DMSO.

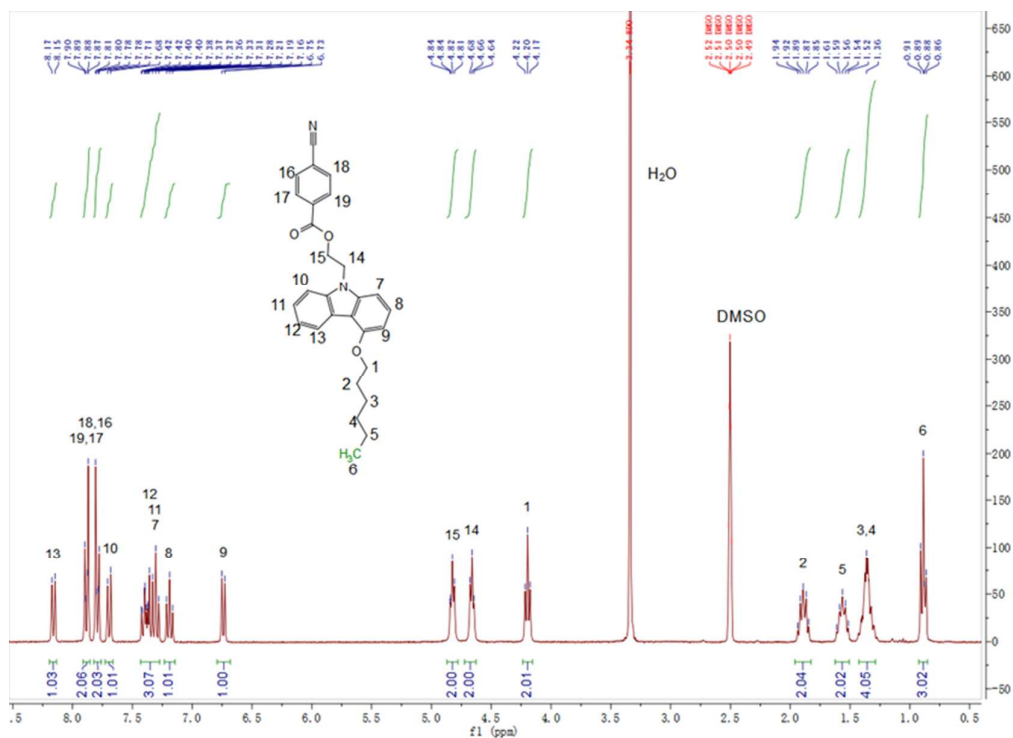


Figure S23. ^1H NMR spectrum of FQD 4 in DMSO.

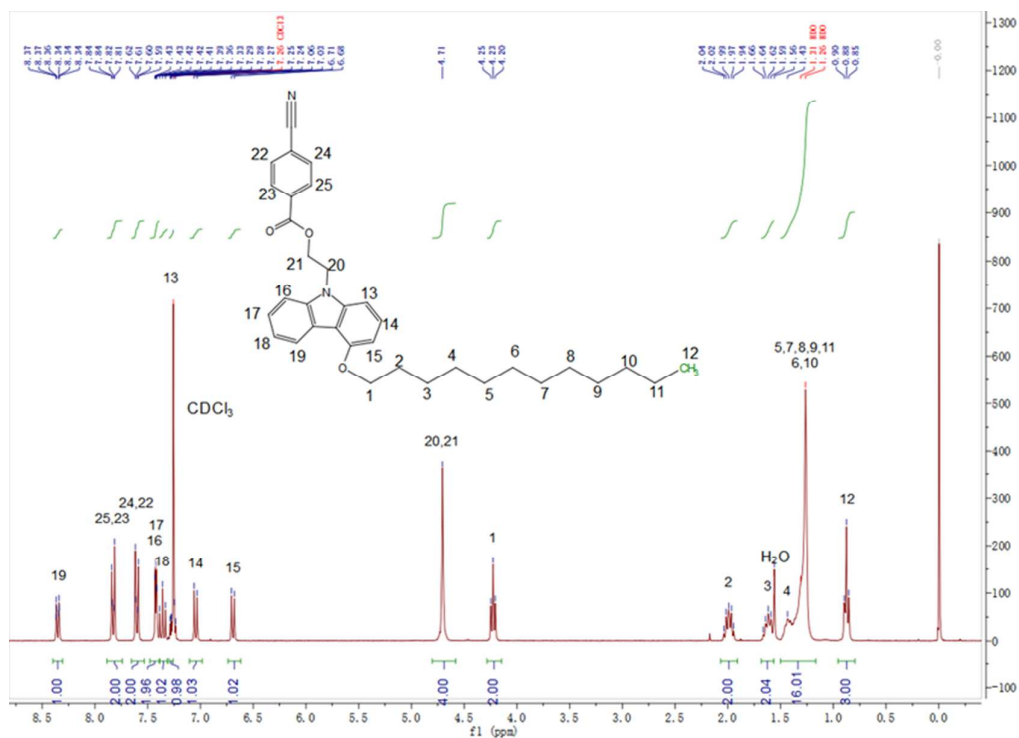


Figure S24. ^1H NMR spectrum of FQD 5 in DMSO.

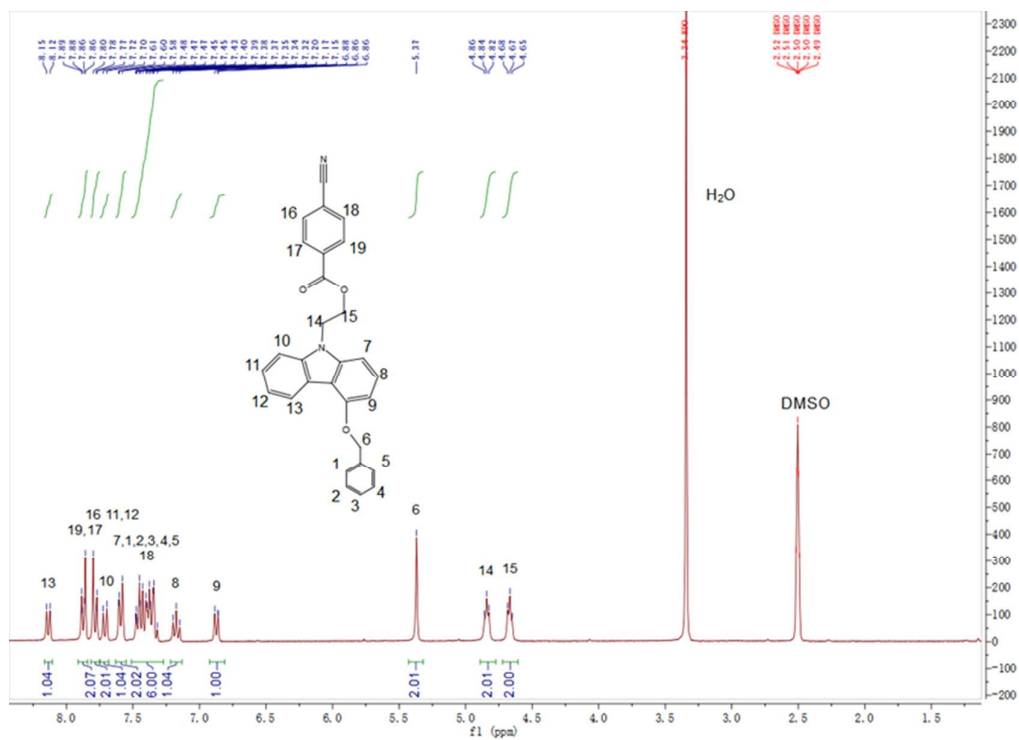


Figure S25. ^1H NMR spectrum of FQD 6 in DMSO.

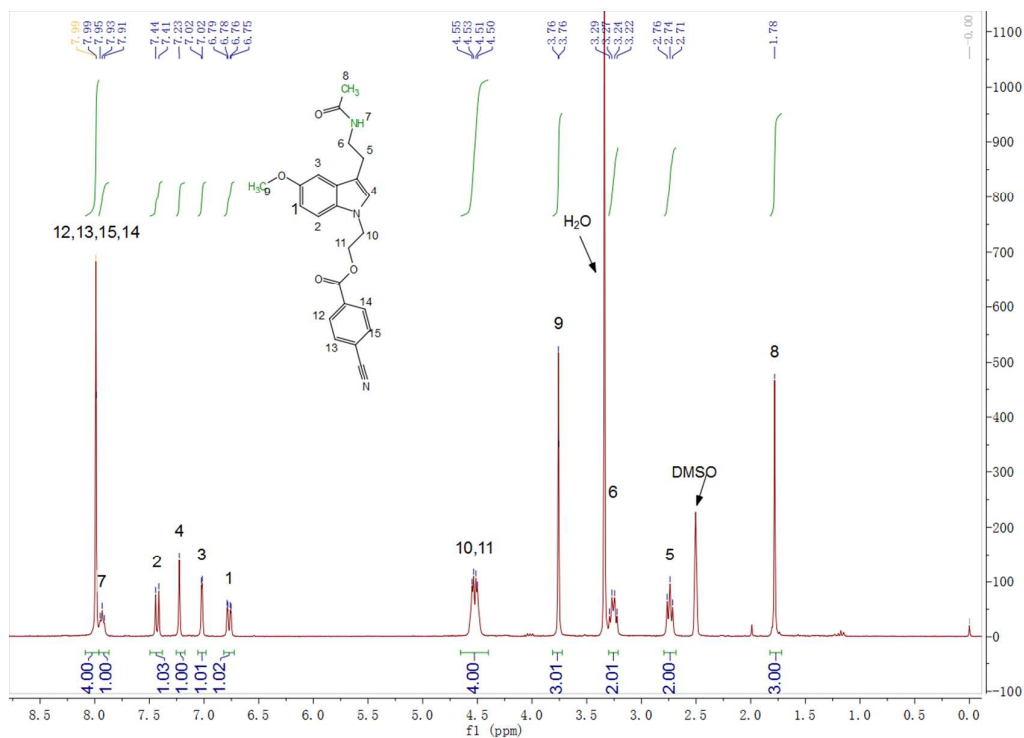


Figure S26. ¹H NMR spectrum of FQD 7 in DMSO.

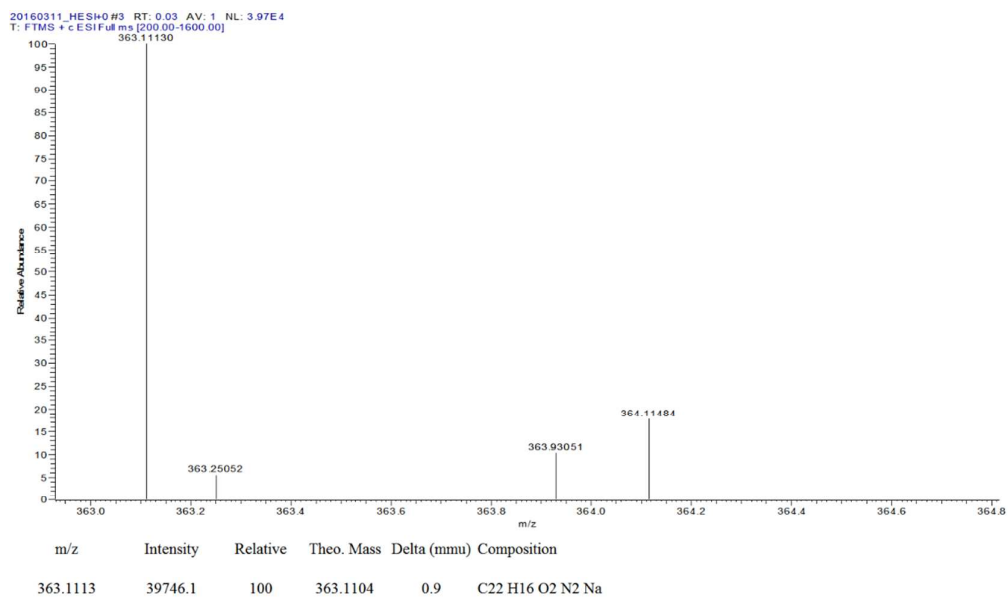


Figure S27. MALDI-TOF-MS spectrum of FQD 1.

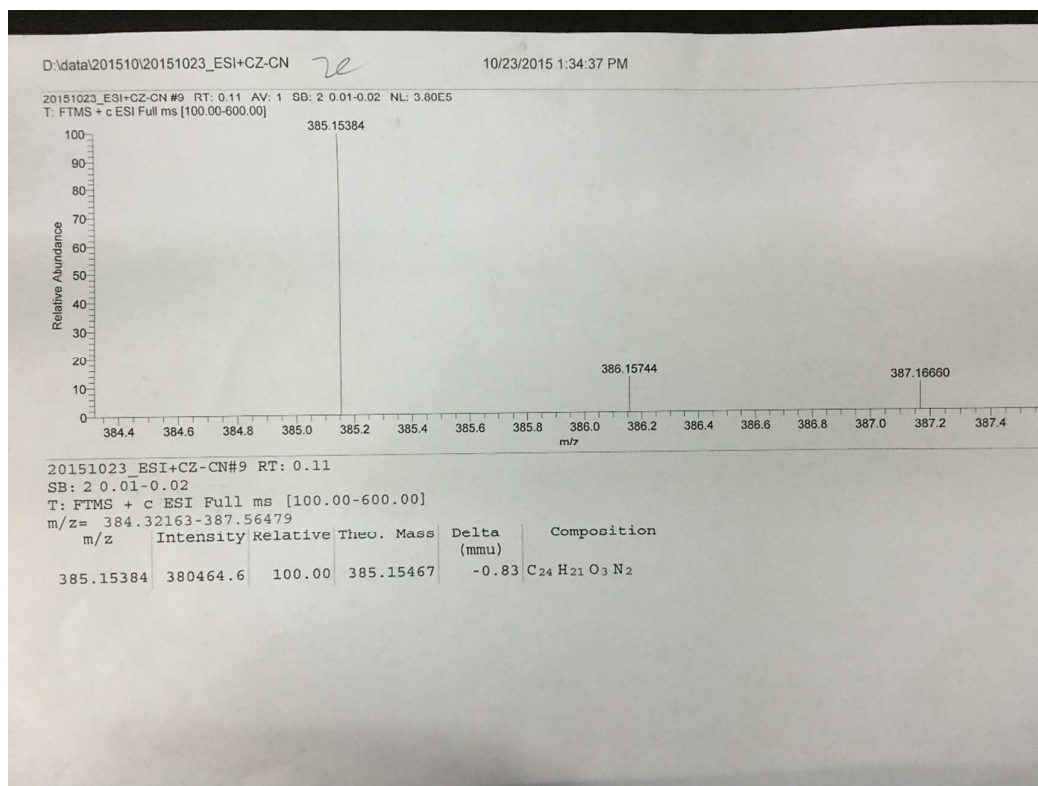


Figure S28. MALDI-TOF-MS spectrum of FQD 2.

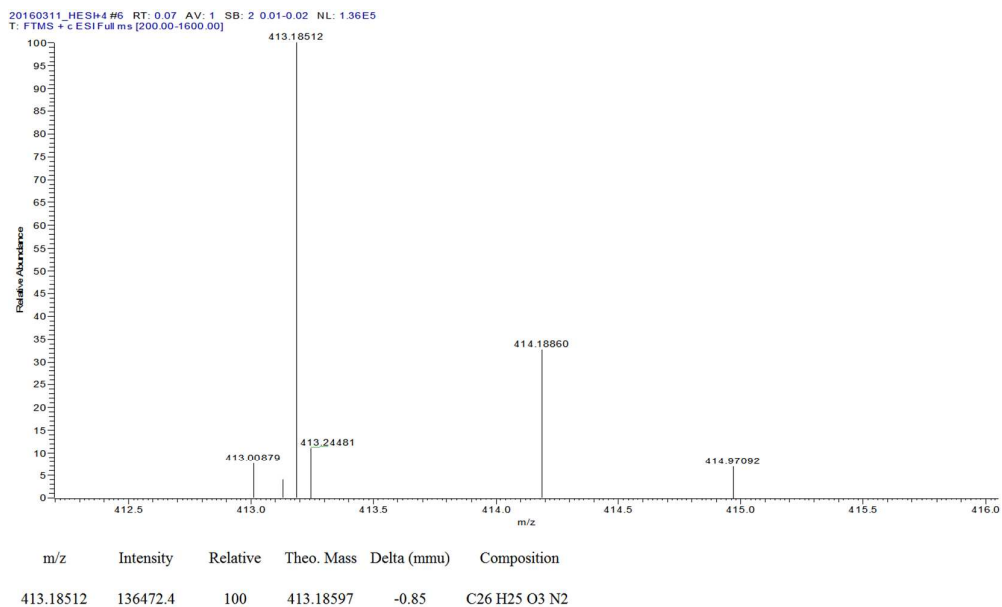


Figure S29. MALDI-TOF-MS spectrum of FQD 3.

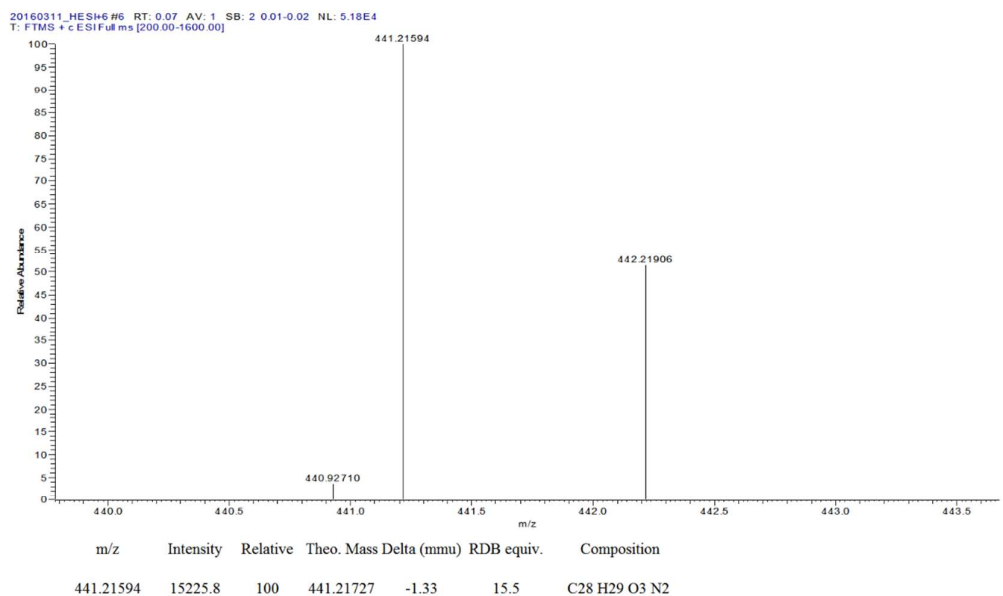


Figure S30. MALDI-TOF-MS spectrum of FQD 4.

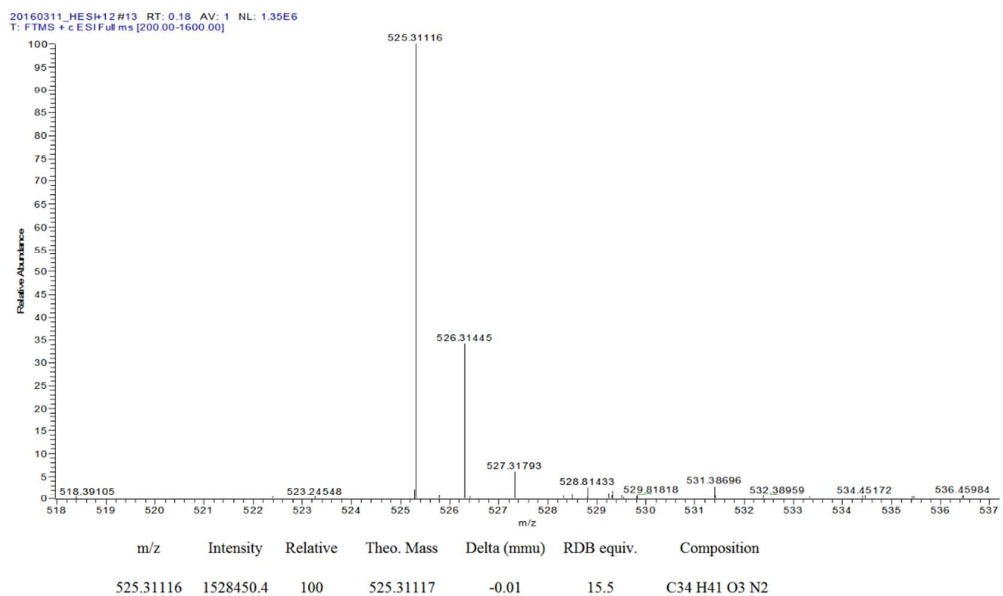


Figure S31. MALDI-TOF-MS spectrum of FQD 5.

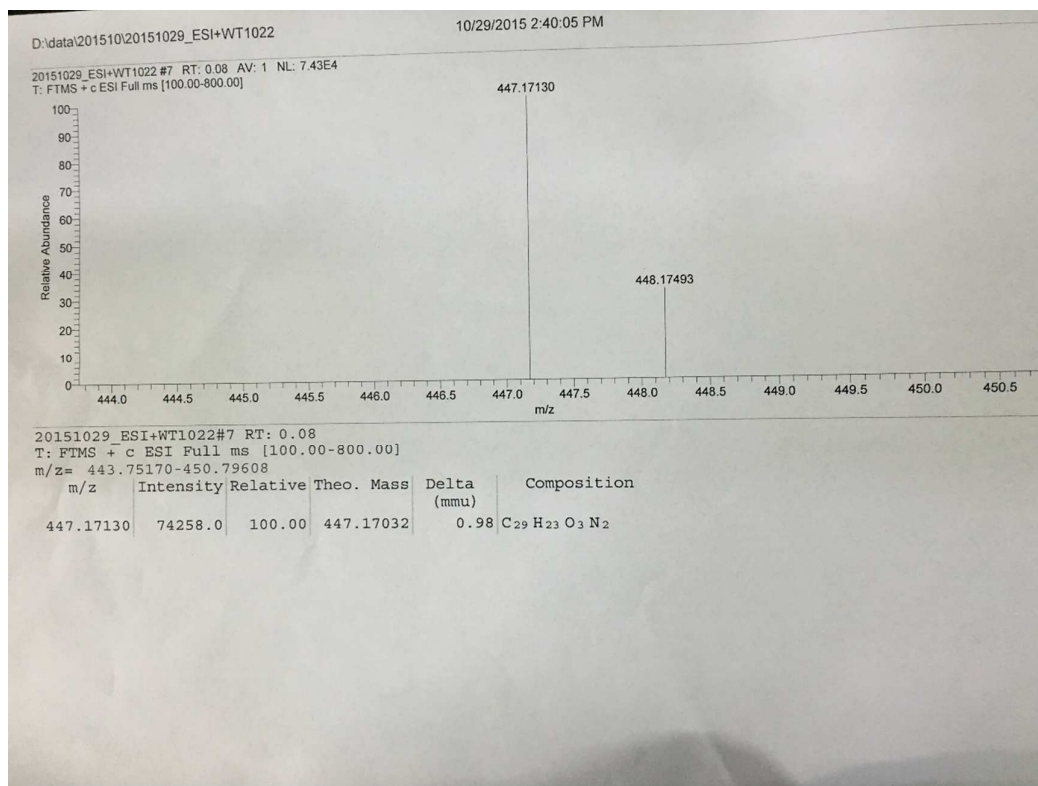


Figure S32. MALDI-TOF-MS spectrum of FQD 6.

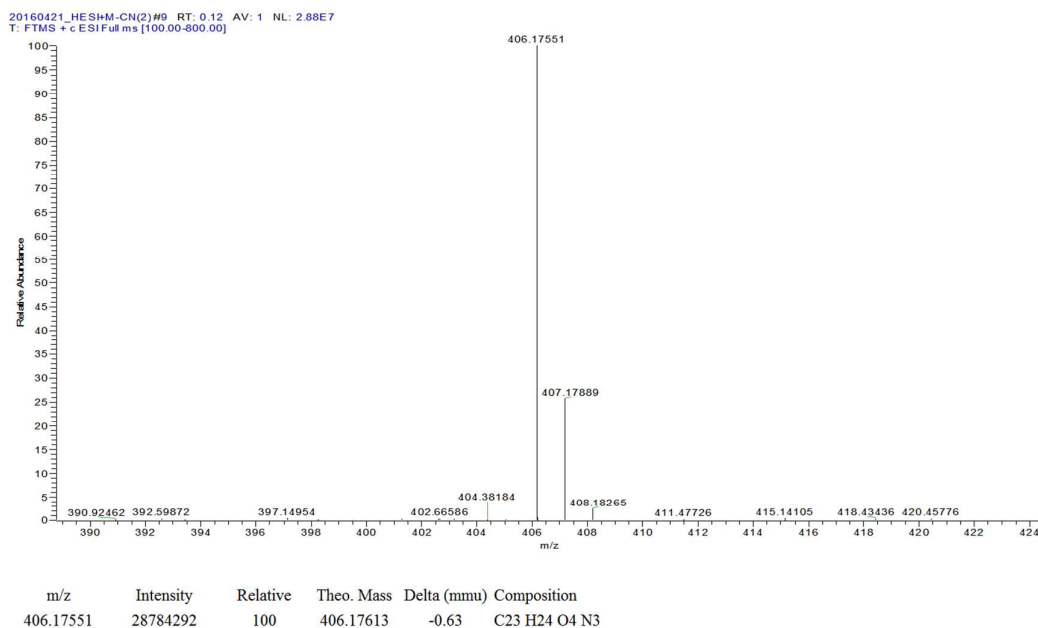


Figure S33. MALDI-TOF-MS spectrum of FQD 7.