

Electronic Supplementary Information (ESI)

Selectively Instant-Response Nanofibers with a Fluorescent Chemosensor toward Phosgene in Gas Phase

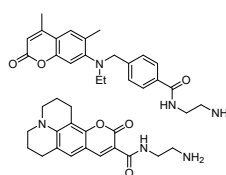
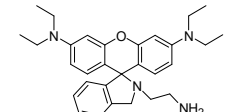
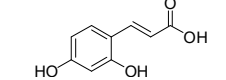
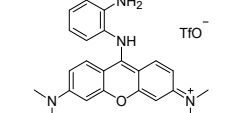
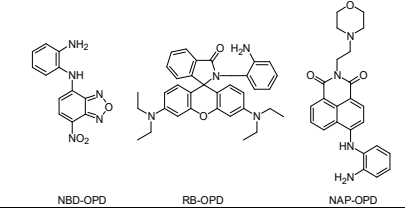
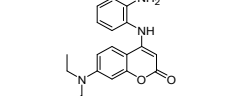
*Shao-Lin Wang,^a Chuan-Ling Zhang^b and Qin-Hua Song^{*a}*

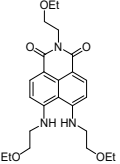
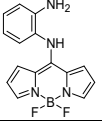
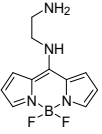
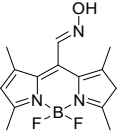
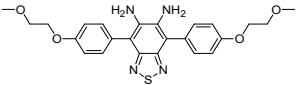
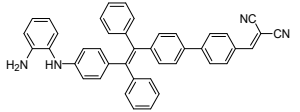
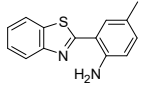
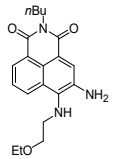
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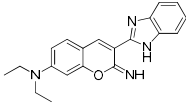
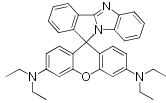
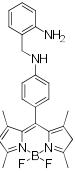
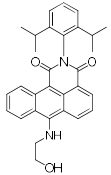
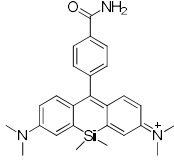
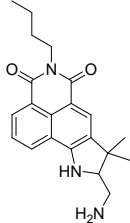
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1. Table S1. Summary of fluorescent chemosensors for phosgene and its substitutes

Entry	structures	LOD in solutions	Response Time		References
			in solutions	gaseous phosgene	
1		50 mM (phosgene)	--	--	Chem. Commun. 2007, 1238-1239.
2		50 nM (triphosgene)	1 μM triphosgene seconds	0~2×10 ⁴ ppm, 20~30 s (take photos)	Chem. Commun. 2012, 48, 1895-1897.
3		1 nM (phosgene)	--	--	Anal. Chem. 2012, 84, 4594-4597.
4		20 nM (triphosgene)	20 μM triphosgene 2 min	0~20 ppm, seconds (take photos)	Angew. Chem. Int. Ed. 2016, 55, 4729-4733.
5		NBD-OPD, 7 nM (phosgene) RB-OPD, 28 nM (phosgene) NAP-OPD, 28 nM (phosgene)	8 μM triphosgene, 3 min 10 μM triphosgene, 2 min 12 μM triphosgene, 1 min	0~200 ppm, 10 min 0~200 ppm, 10 min 0~2000 ppm, 5 min (take photos)	ACS Appl. Mater. Interfaces 2016, 8, 22246-22252.
6		3 nM (triphosgene)	50 μM triphosgene 20 s	0~40 ppm, 5 min (take photos)	ACS Sens. 2017, 2, 178-182.

7		1.3 nM (triphosgene)	25 μ M triphosgene 20 min	0~1000 ppm, 10 min (take photos)	Chem. Commun. 2017, 53, 1530-1533.
8		2.7 nM (triphosgene)	40 μ M triphosgene 15 s	0~80 ppm, 5 min (take photos)	Anal. Chem. 2017, 89, 4192-4197.
9		0.04 nM (triphosgene)	6 μ M triphosgene 1.5 s	0~0.5 ppm, 1 min (take photos)	ACS Appl. Mater. Interfaces 2017, 9, 13920-13927.
10		0.31 nM (triphosgene)	50 μ M triphosgene 10 s	0~20 ppm, 0.5 min (take photos)	Anal. Chem. 2017, 89, 12837-12842.
11		20 nM (phosgene)	50 μ M triphosgene 20 min	0~50 ppm, 5 min (take photos)	Org. Chem. Front. 2017, 4, 1719-1725.
12		--	--	64 ppm, 1 min (fluorescence change)	Chem. Commun. 2017, 53, 9813-9816.
13		1.4 nM (triphosgene)	6 μ M triphosgene 4 min	0~1000 ppm, 10 min (take photos)	Anal. Chem. 2017, 89, 12596-12601.
14		0.2 nM (triphosgene) 0.7 nM (diphosgene)	20 μ M diphosgene 10 min	20 ppm (diphosgene), 30 s (fluorescence change)	Chem. Eur. J. 2018, 24, 5652-5658.

15		27 nM (phosgene)	12 μ M triphosgene 2 min	0~500 ppm, 10 min (take photos)	Anal. Chim. Acta 2018, 1029, 97-103.
16		32 nM (phosgene)	5 μ M triphosgene 2 min	0~200 ppm --	Anal. Chem. 2018, 90, 3382-3386.
17		179 nM (triphosgene)	50 μ M triphosgene 30 s	50 ppm, 20 s (fluorescence change)	Chem. Eur. J. 2018, 24, 3136-3140.
18		2.3 nM (phosgene)	20 μ M triphosgene 5 min	0~100 ppm, 5 min (take photos)	Anal. Chem. 2018, 90, 8686-8691.
19		8.9 nM (triphosgene)	20 μ M triphosgene 4 min	0~500 ppm, 5 min (take photos)	J. Mater. Chem. C 2018, 6, 10472-10479.
20		0.3 nM (triphosgene)	30 μ M triphosgene 60 s	40 ppm Instant (<< 1 s) (video)	This work

“--” Not reported.

2. The spectral response of compound 2 to phosgene

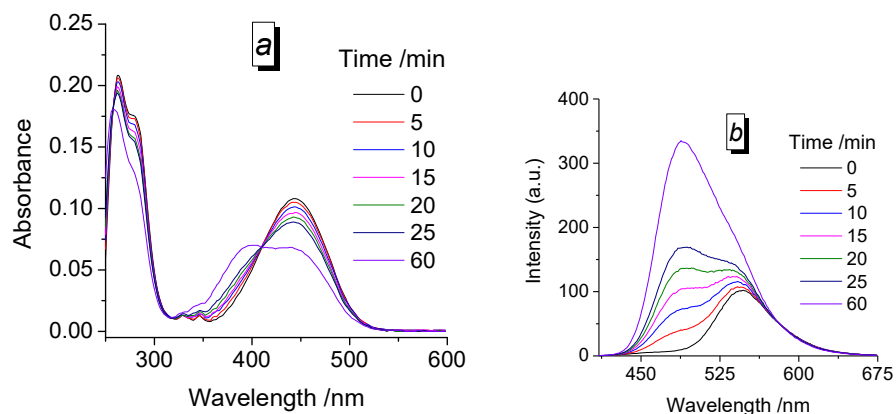


Figure S1. Time-dependent UV/vis absorption (a) and fluorescence (b) spectra of compound **2** (10 μM) in CH₃CN upon addition of triphosgene (30 μM)/Et₃N (300 μM), $\lambda_{\text{ex}} = 400$ nm.

3. Photostability of Phos-3 and its sensing product

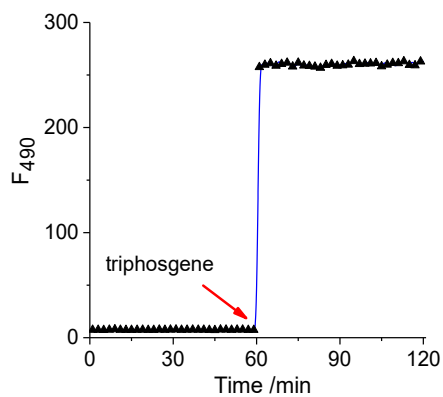


Figure S2. Time-dependent fluorescence intensity at 490 nm of 10 μM Phos-3 in CH₃CN containing Et₃N (0.5 mM) before and after addition of triphosgene (20 μM). $\lambda_{\text{ex}} = 430$ nm.

4. HRMS Evidence for the Sensing Mechanism

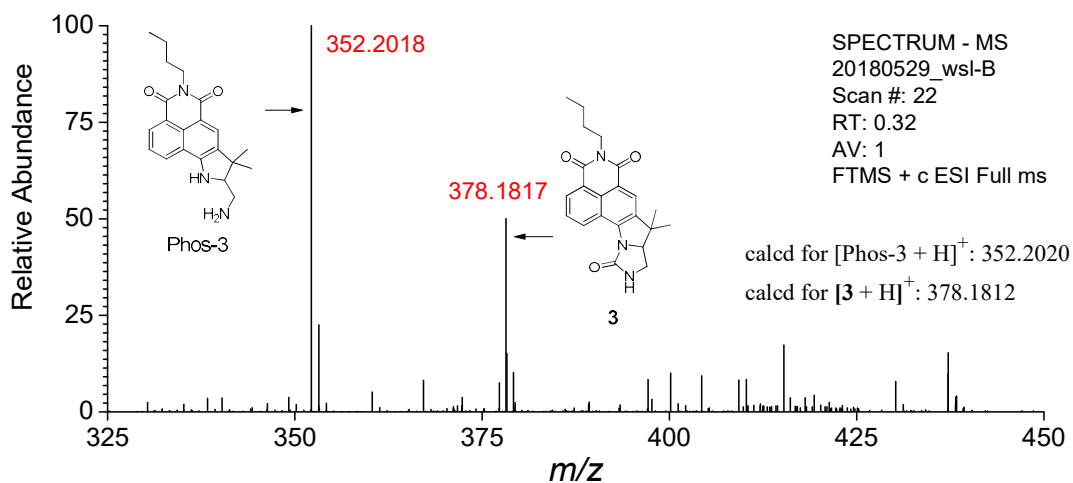


Figure S3. HRMS for the reaction mixture of Phos-3 with triphosgene in Et₃N/CH₃CN solution.

5. Preparation of Phos-3-Embedded Electrospun Fibers

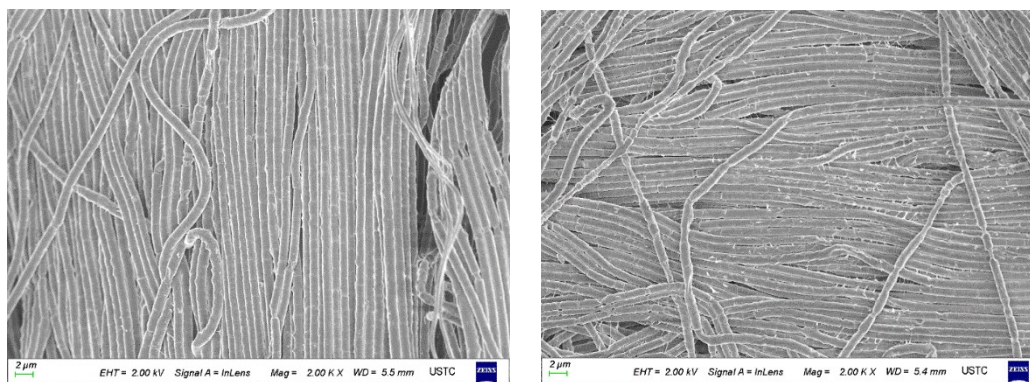
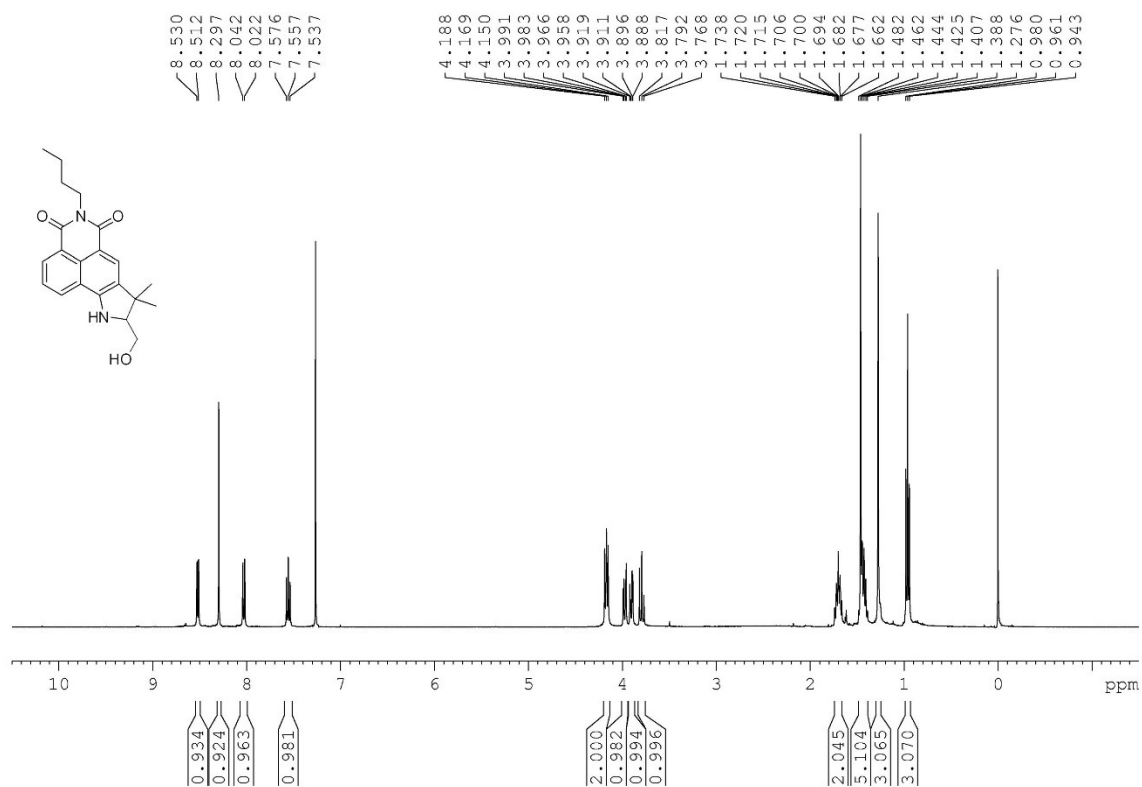
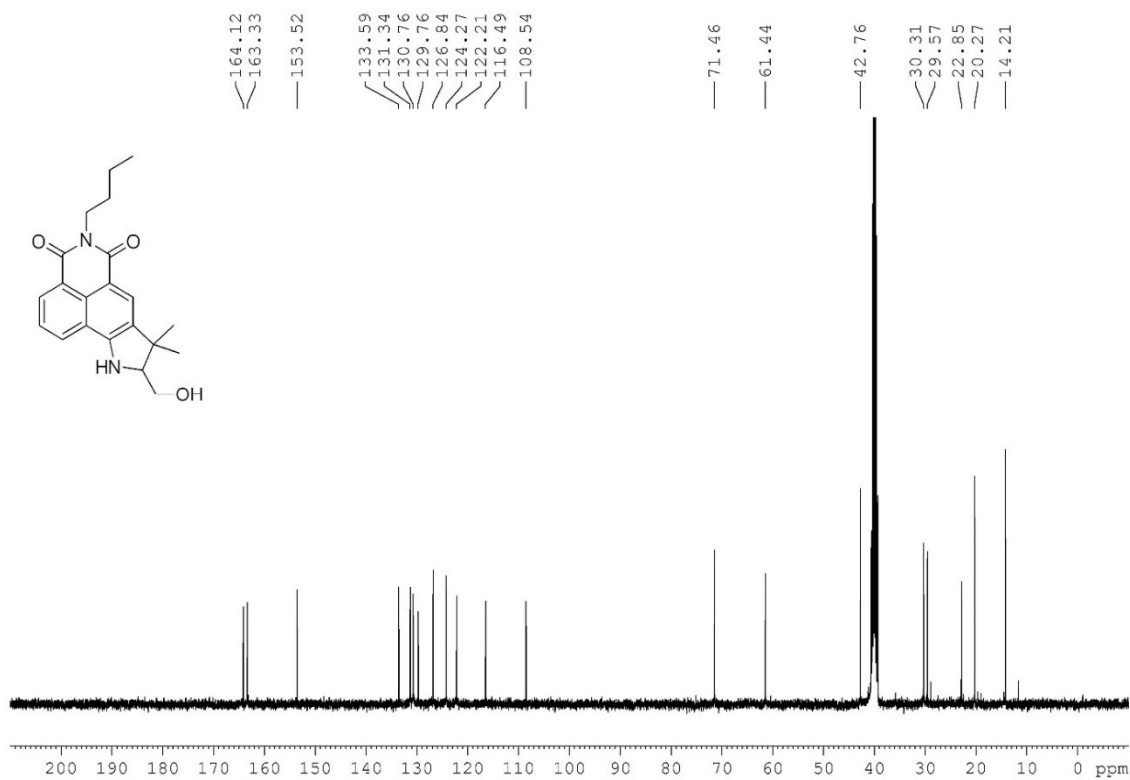


Figure S4. Scanning electron microscope images of Phos-3-embedded fibers before (left) and after (right) exposure to phosgene.

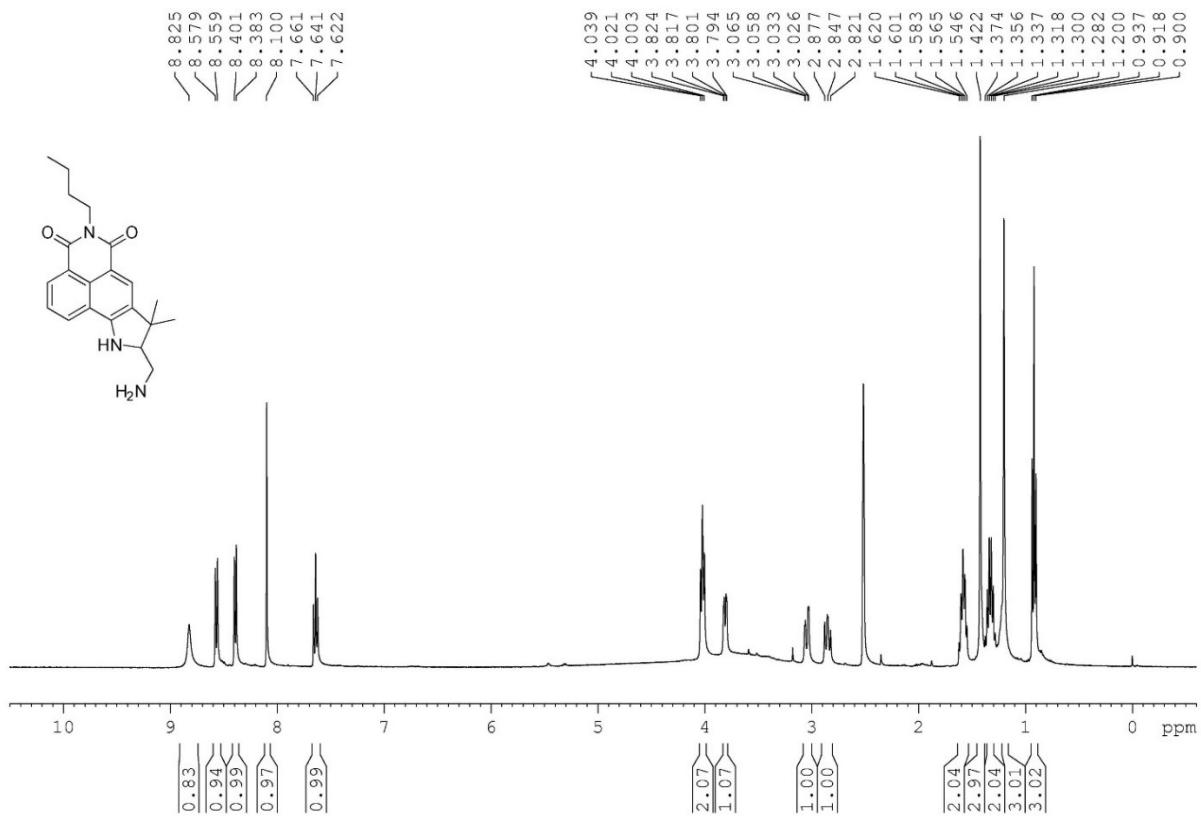
6. Copies for NMR spectra of Compound 2, Phos-3 and Compound 3



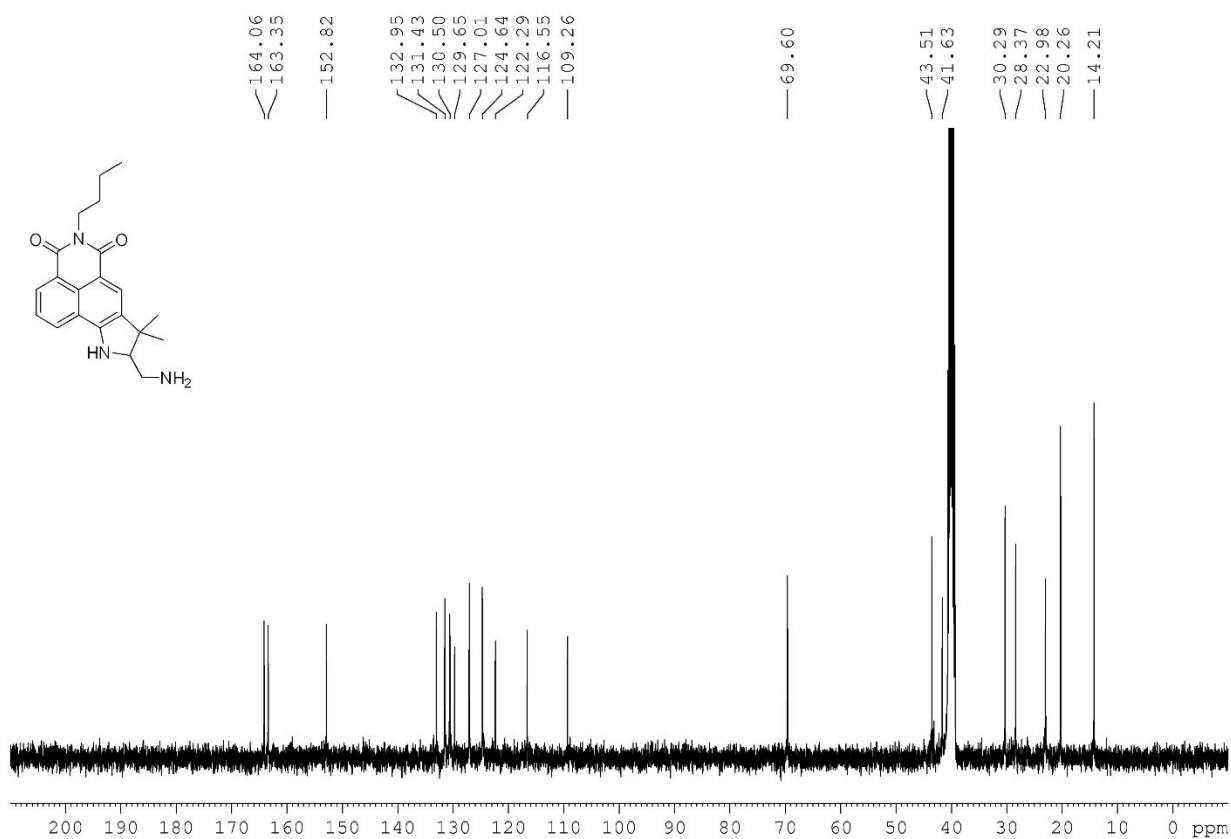
¹H NMR for compound 2 in CDCl₃



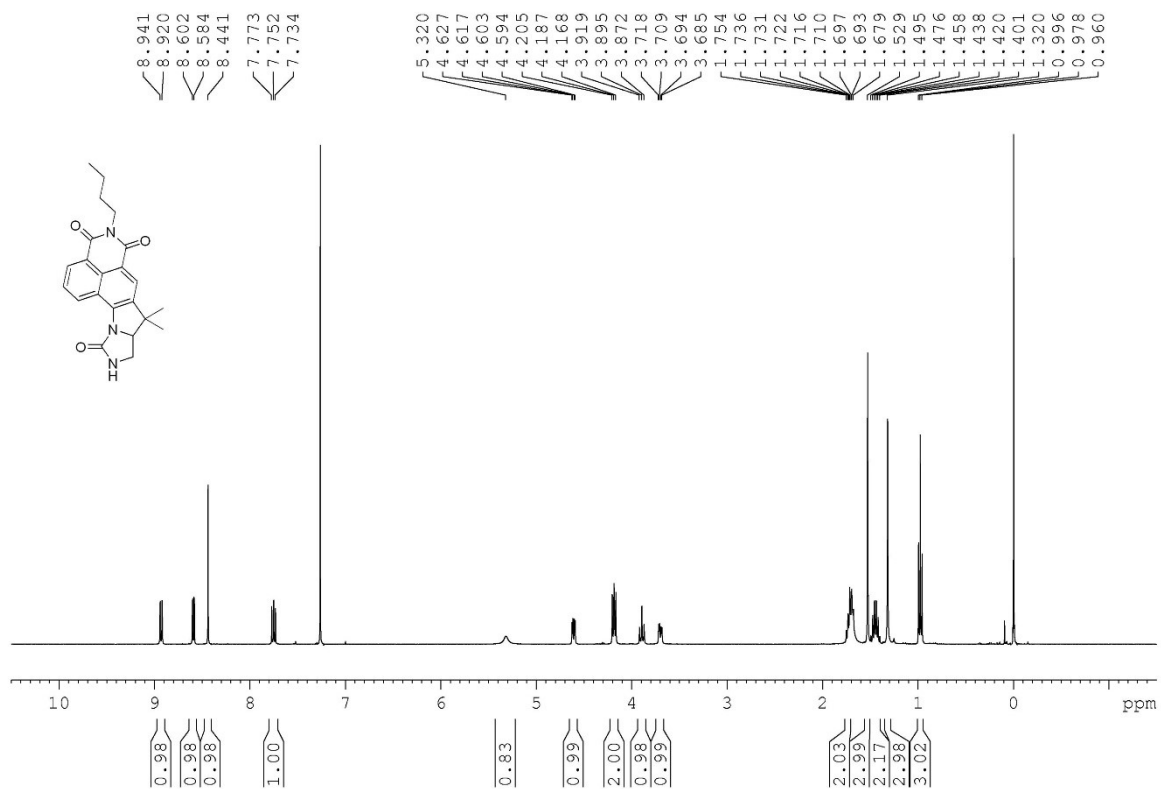
¹³C NMR for compound 2 in DMSO-*d*₆



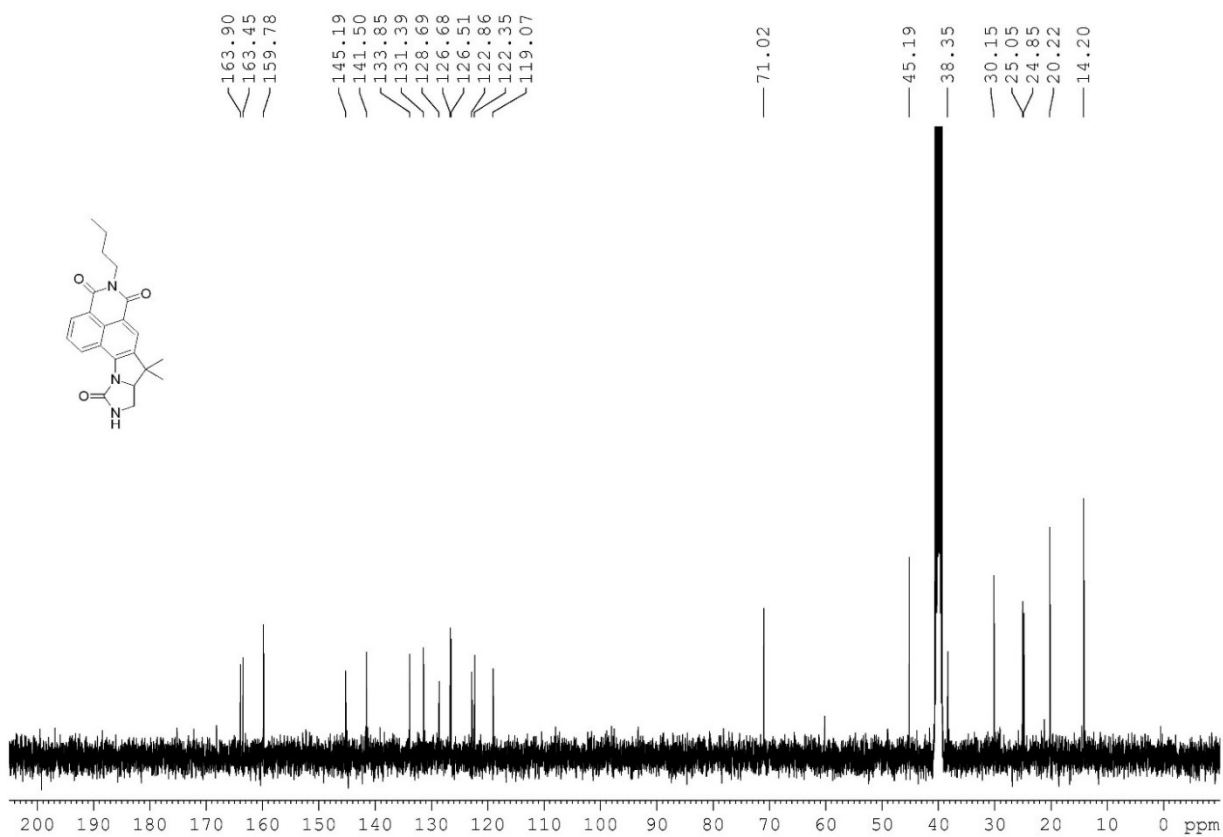
¹H NMR for Phos-3 in DMSO-*d*₆



¹³C NMR for Phos-3 in DMSO-*d*₆



¹H NMR for compound **3** in CDCl₃



¹³C NMR for compound **3** in DMSO-*d*₆