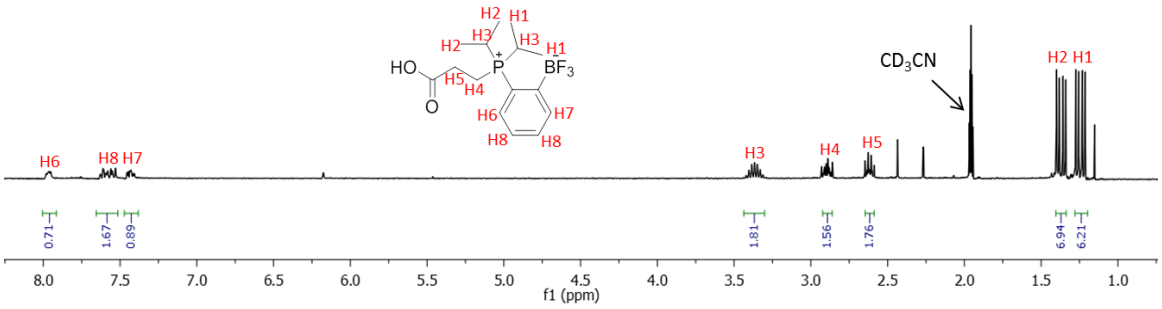
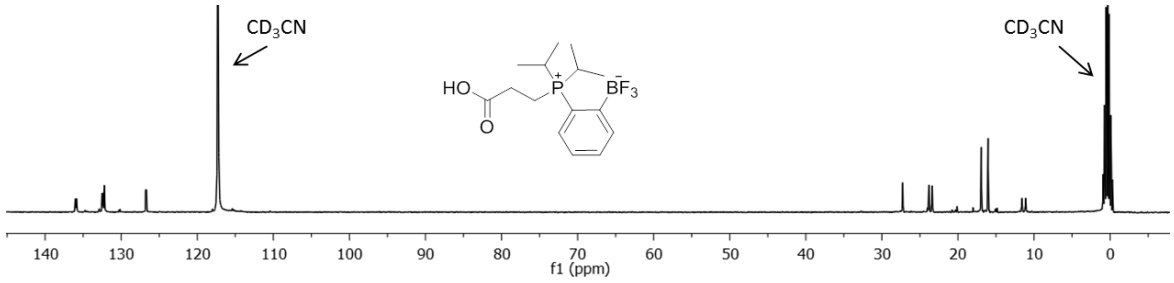
SUPPORTING INFORMATION

Figure S1 ^{1}H, ^{13}C, ^{31}P, ^{11}B, ^{19}F NMR spectra of (2-((2-carboxyethyl)diisopropylphosphonio) phenyl)trifluoroborate (**5**)

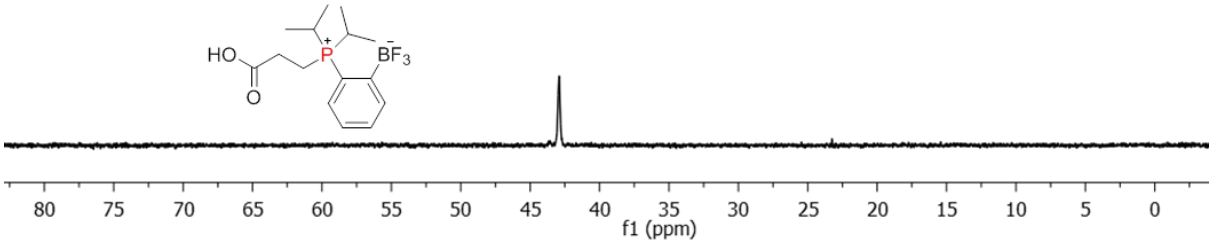
^{1}H NMR



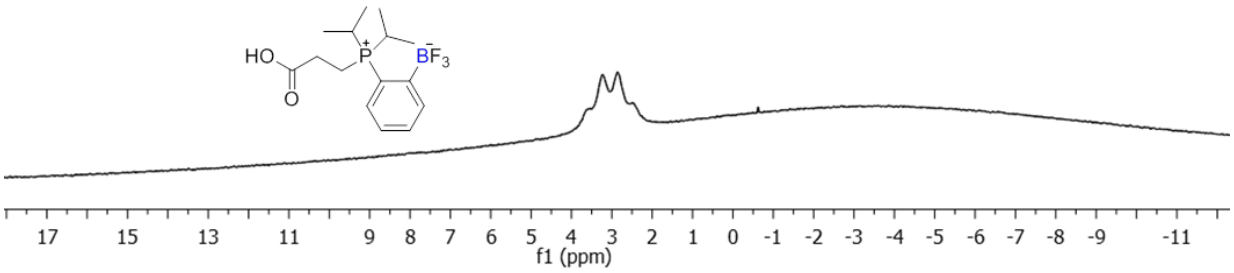
^{13}C NMR



^{31}P NMR



^{11}B NMR



^{19}F NMR

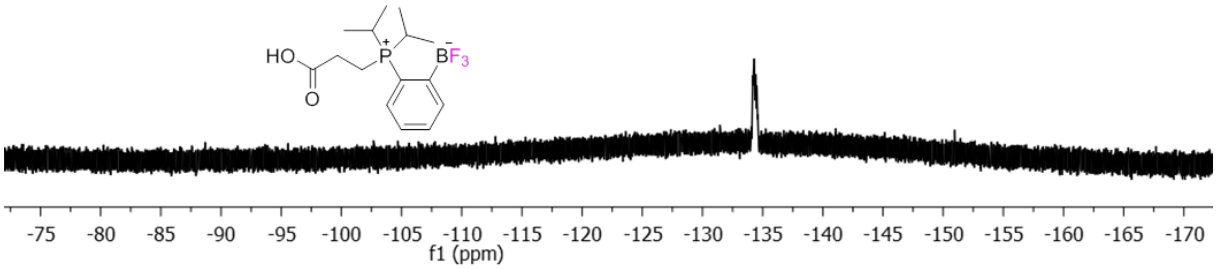
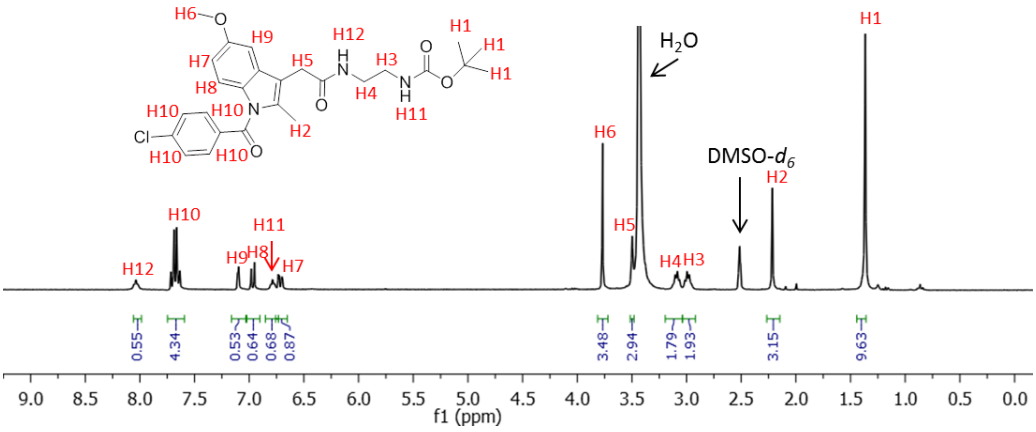


Figure S2 ^{1}H and ^{13}C NMR spectra of *tert*-butyl (2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1*H*-indol-3-yl)acetamido)ethyl)carbamate

^{1}H NMR



^{13}C NMR

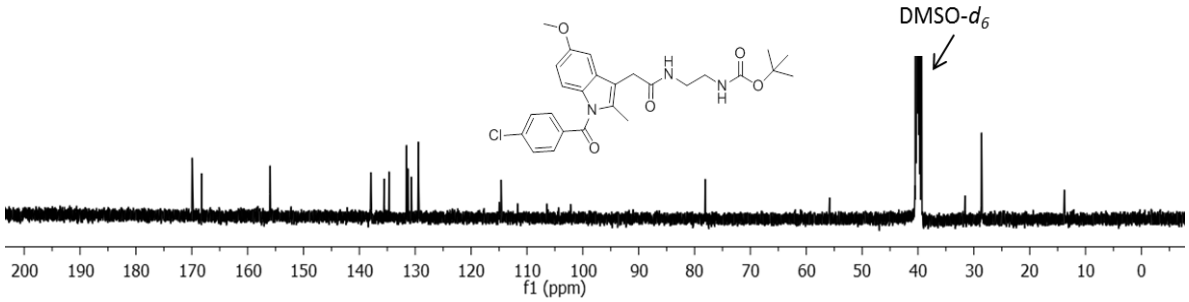


Figure S3 2-dimentional NMR spectrum of *tert*-butyl (2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1*H*-indol-3-yl)acetamido)ethyl)carbamate

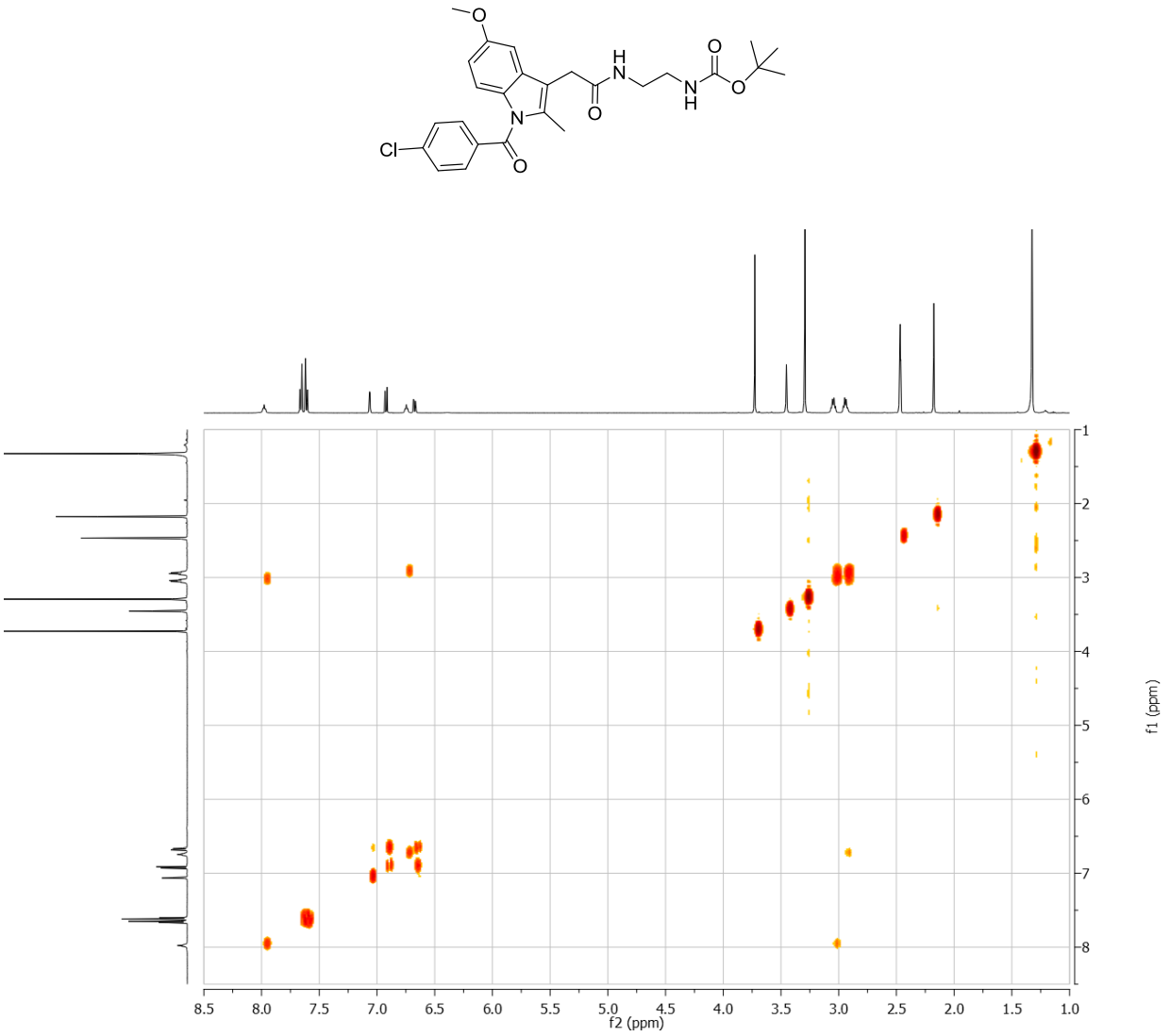
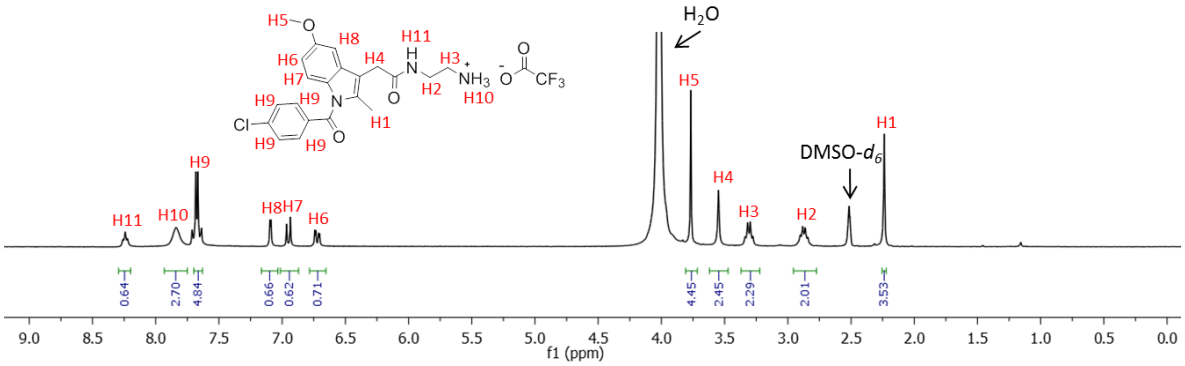


Figure S4 ^{1}H and ^{13}C NMR spectra of 2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1*H*-indol-3-yl) acetamido)ethanaminium trifluoroacetate (**6**)

^{1}H NMR



^{13}C NMR

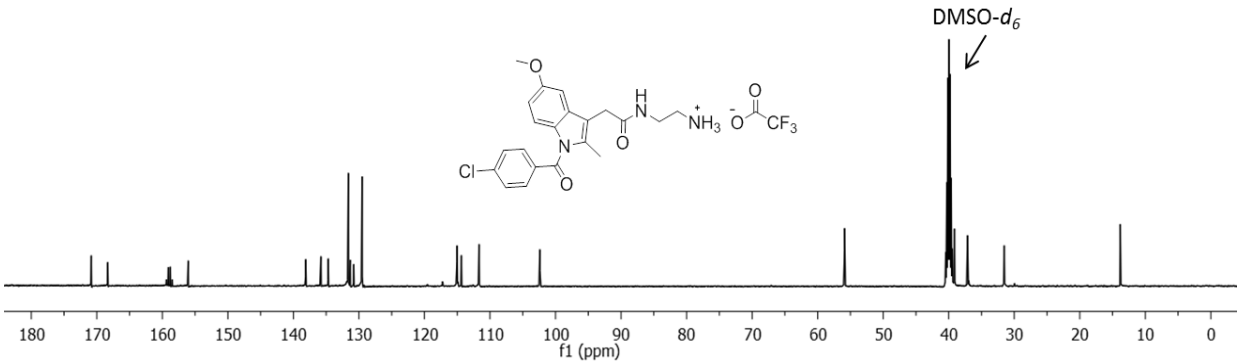
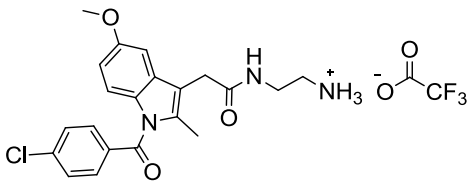


Figure S5 2-dimentional NMR spectrum of 2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1*H*-indol-3-yl) acetamido)ethanaminium trifluoroacetate (**6**)



6

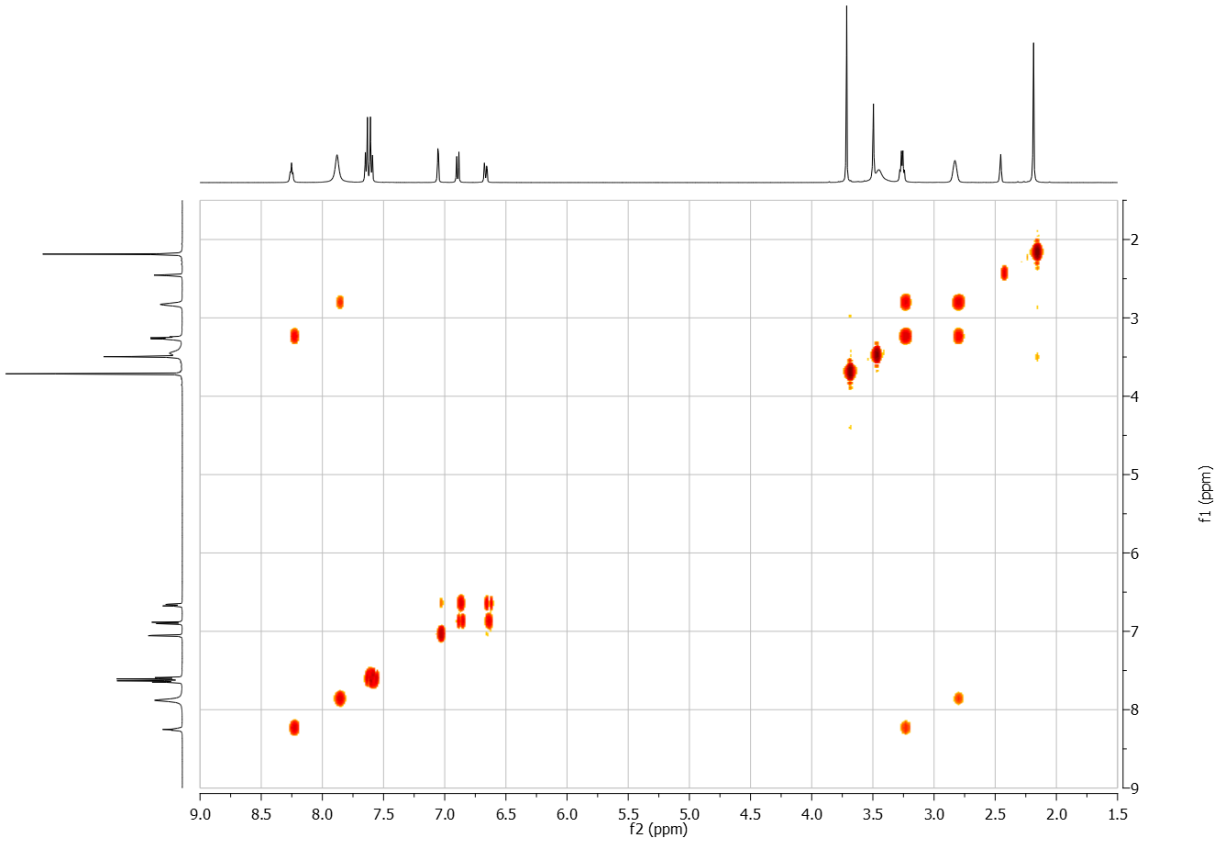


Figure S6 ^{1}H NMR spectra of (2-((3-((2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)ethyl)amino)-3-oxopropyl) diphenylphosphonio)phenyl) trifluoroborate (**7**)

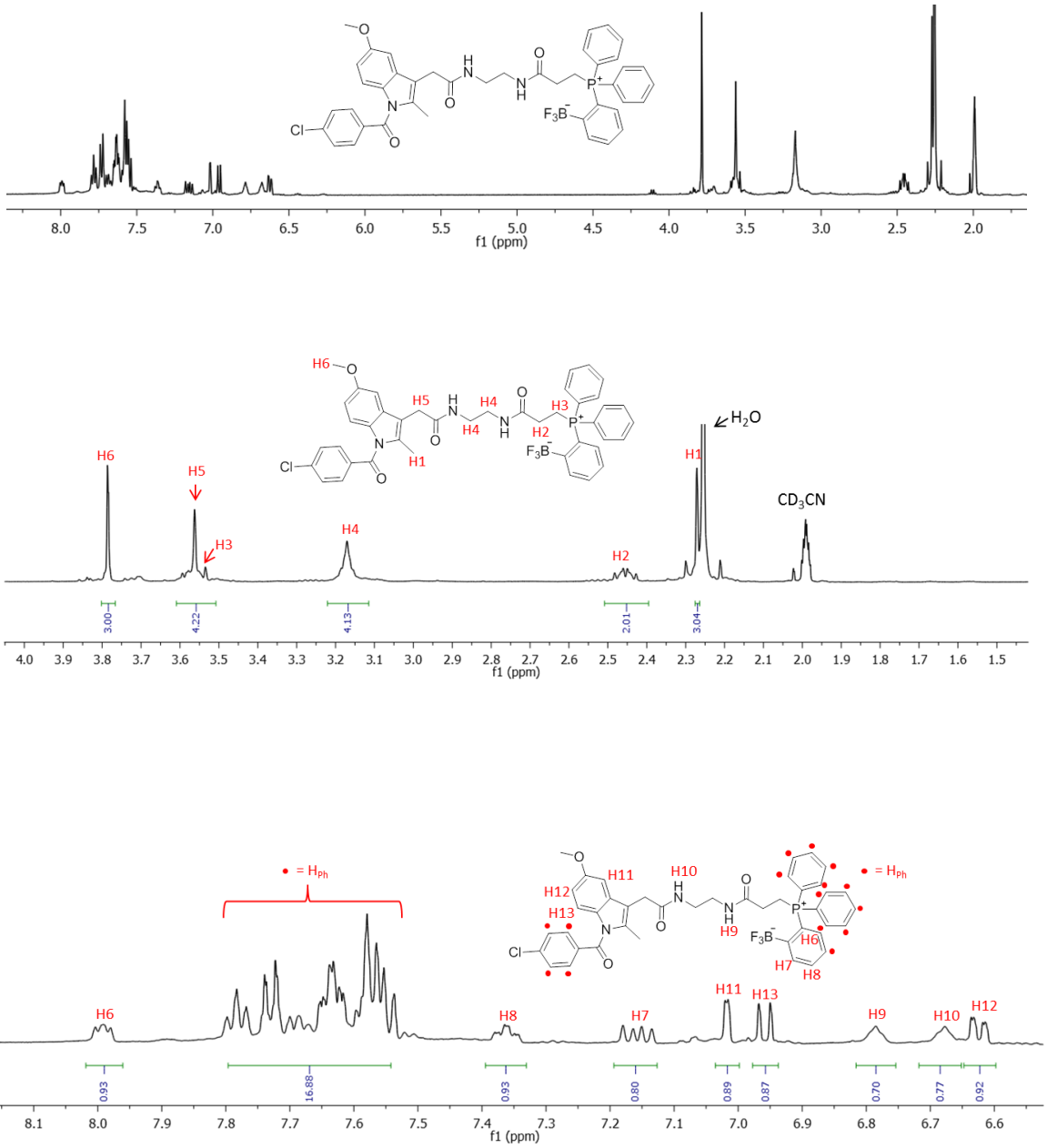
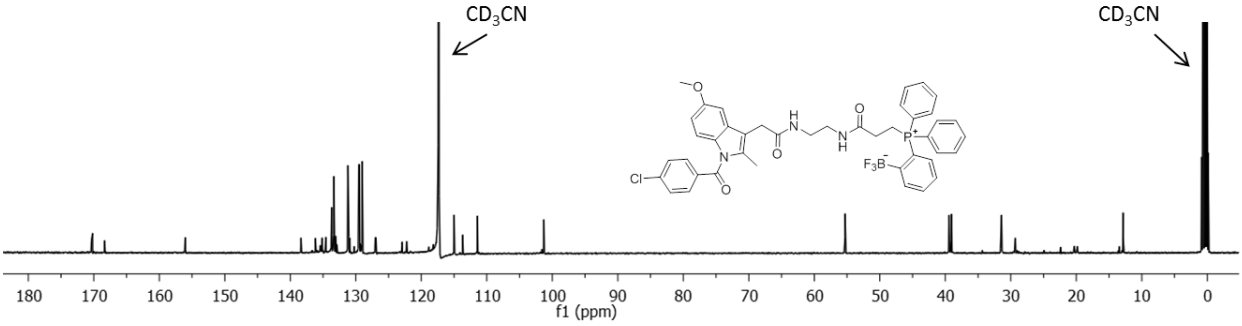
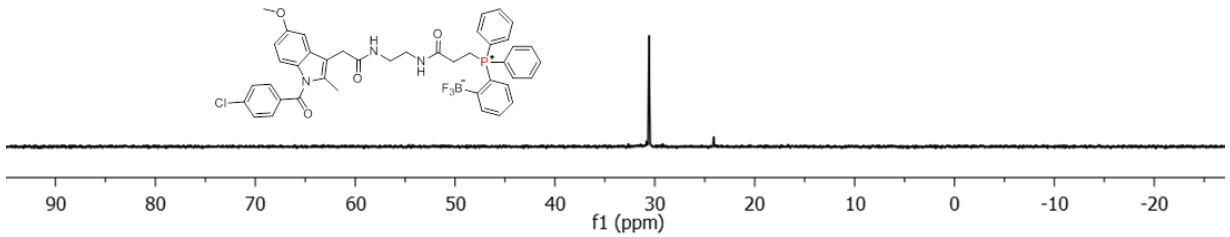


Figure S7 ^{13}C, ^{31}P, ^{11}B, ^{19}F NMR spectra of (2-((3-((2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)ethyl)amino)-3-oxopropyl) diphenylphosphonio)phenyl) trifluoroborate (**7**)

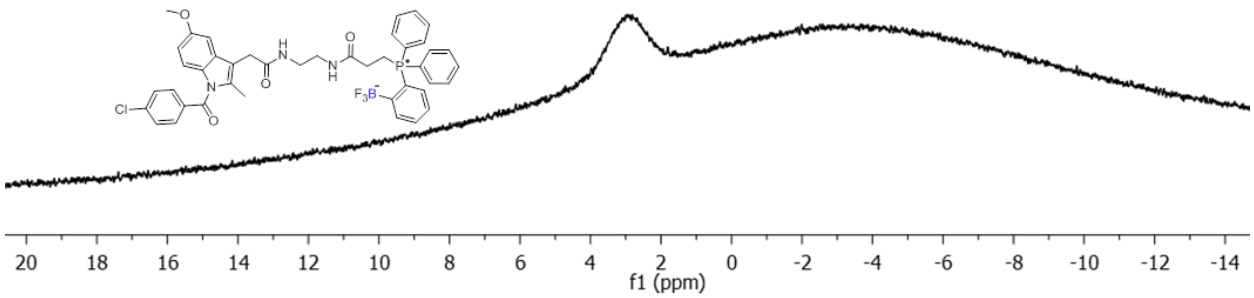
^{13}C NMR



^{31}P NMR



^{11}B NMR



^{19}F NMR

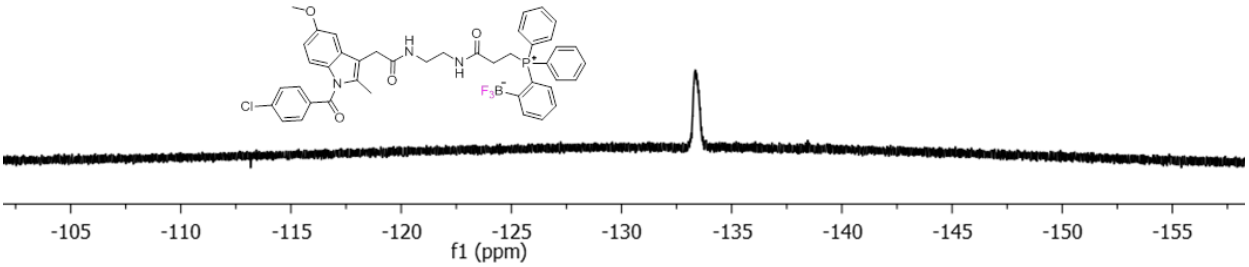


Figure S8 2-dimentional NMR spectrum of (2-((3-((2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)ethyl)amino)-3-oxopropyl) diphenylphosphonio)phenyl) trifluoroborate (**7**)

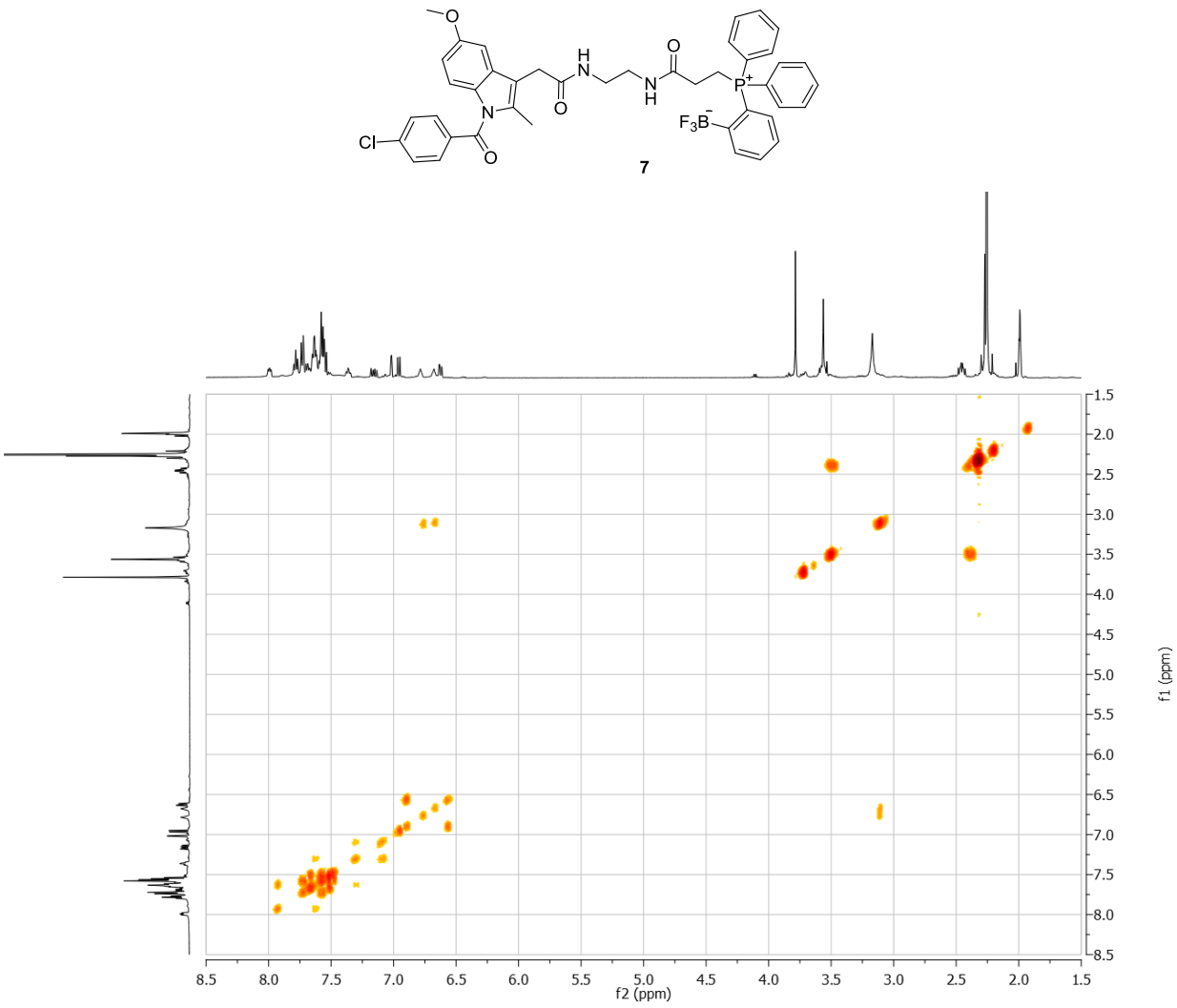
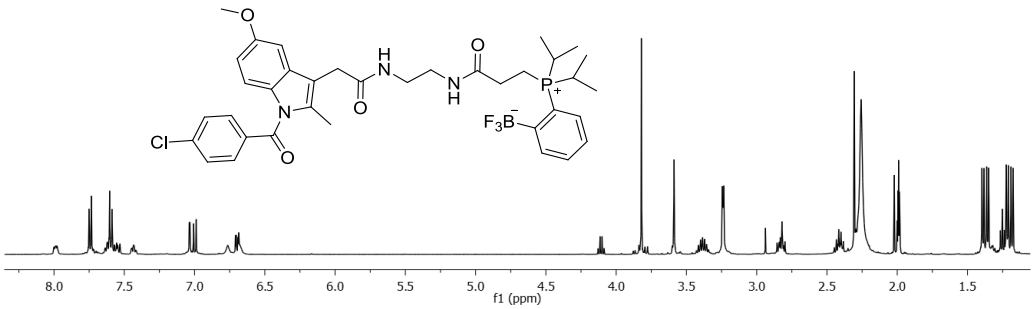
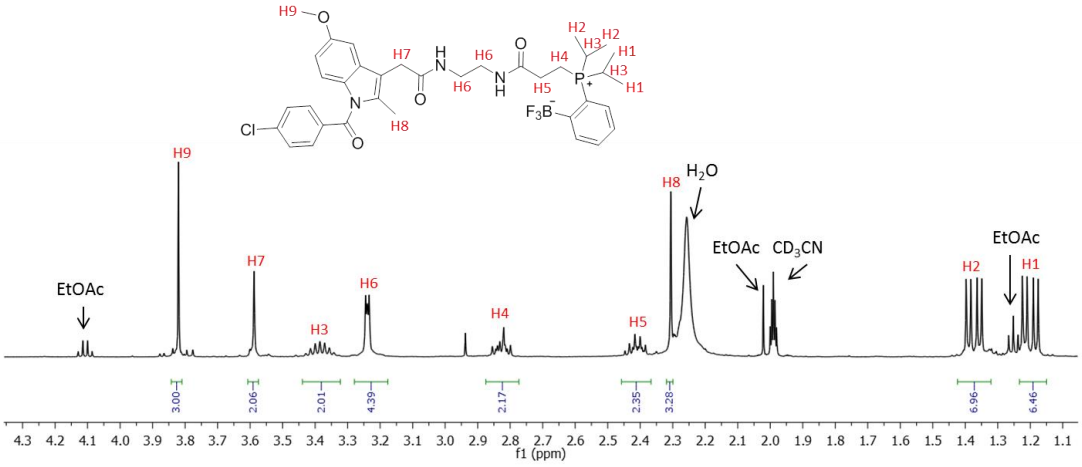


Figure S9 ^{1}H NMR spectra of (2-((3-((2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)ethyl)amino)-3-oxopropyl)diisopropylphosphonio)phenyl) trifluoroborate (**8**)





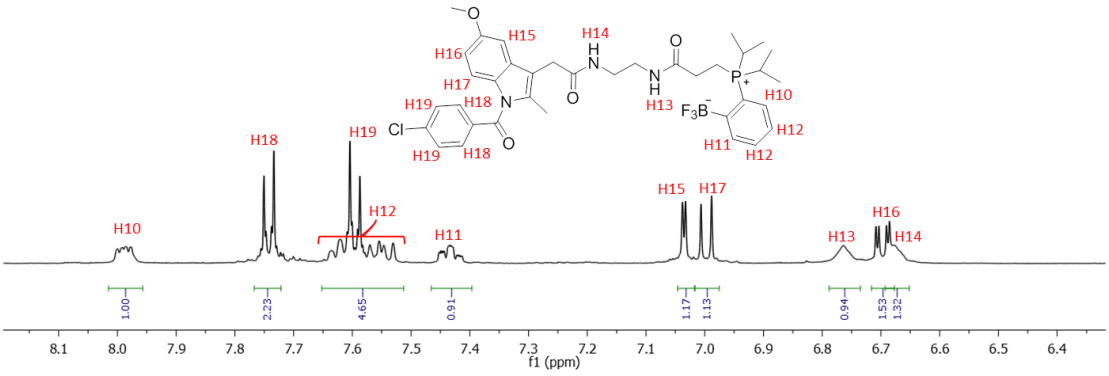
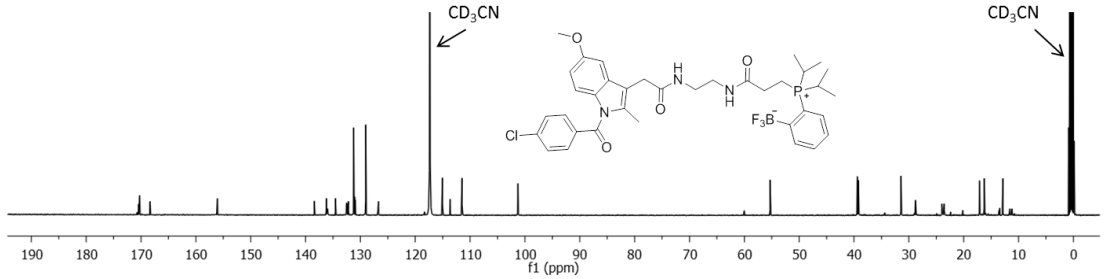
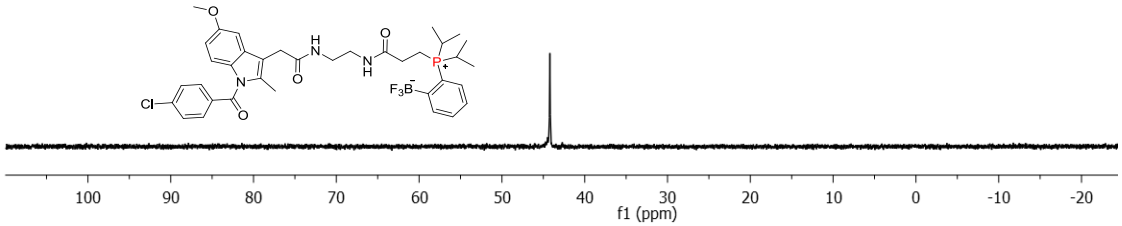


Figure S10 ^{13}C, ^{31}P, ^{11}B, and ^{19}F NMR spectra of (2-((3-((2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)ethyl)amino)-3-oxopropyl)diisopropylphosphonio) phenyl) trifluoroborate (**8**)

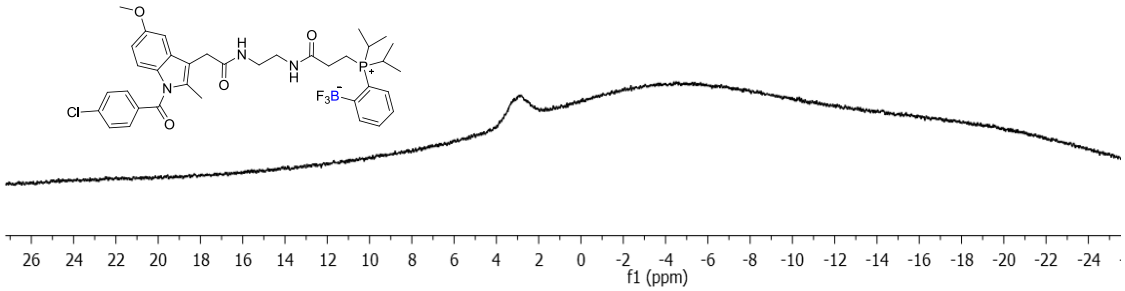
^{13}C NMR



^{31}P NMR



^{11}B NMR



^{19}F NMR

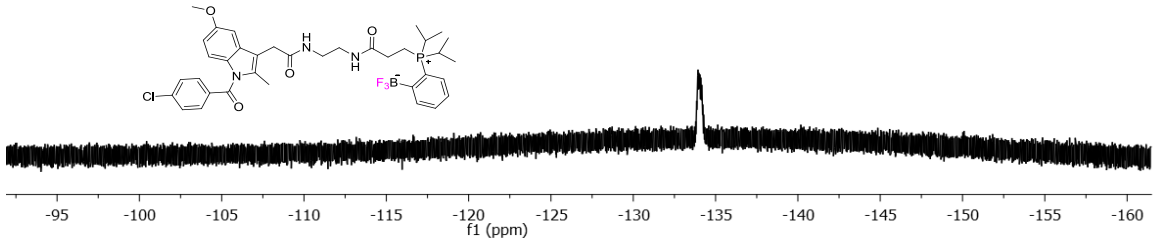


Figure S11 2-dimentional NMR spectrum of (2-((3-((2-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)ethyl)amino)-3-oxopropyl)diisopropylphosphonio)phenyl) trifluoroborate (**8**)

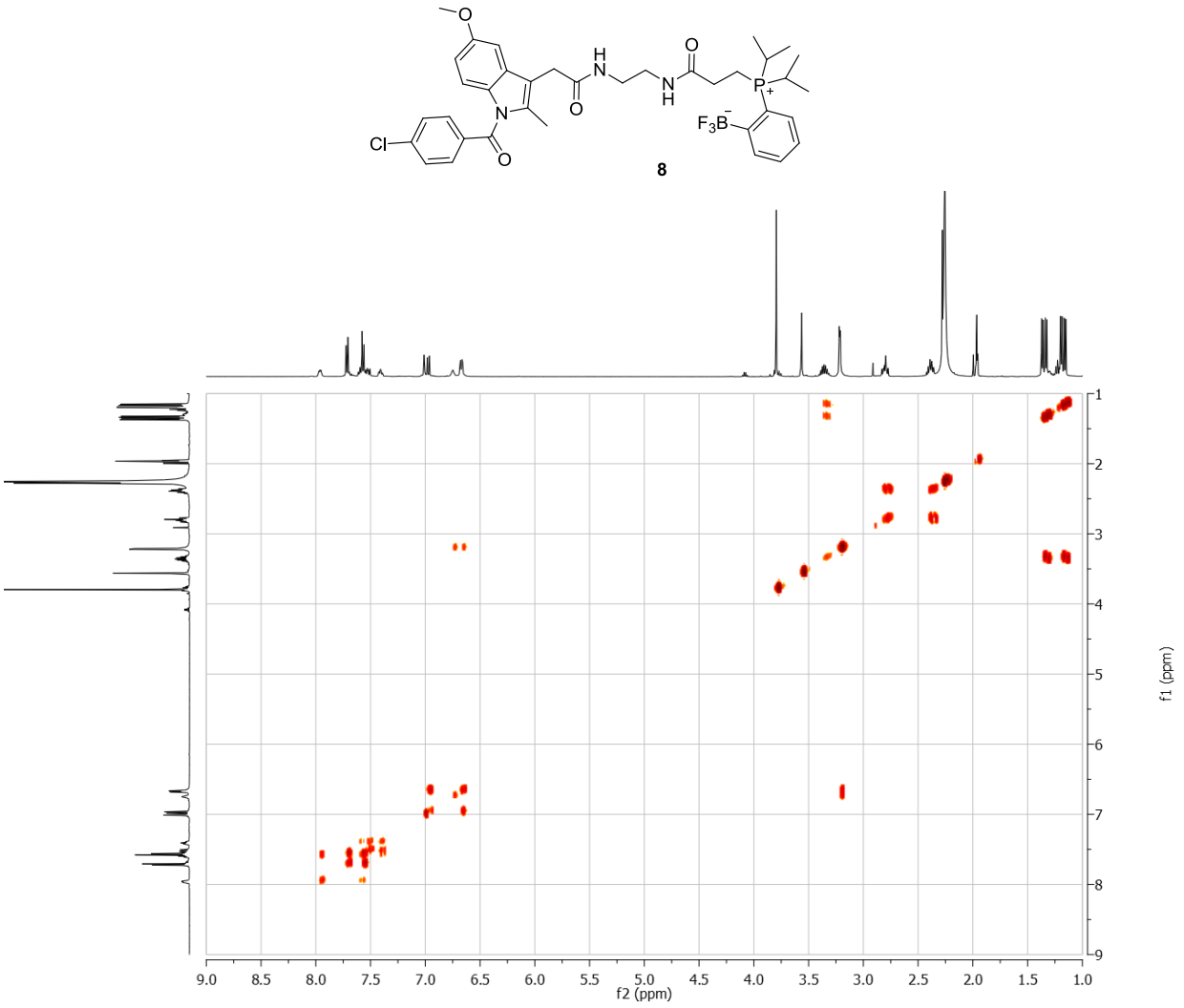


Figure S12. High resolution mass spectrum of **7**

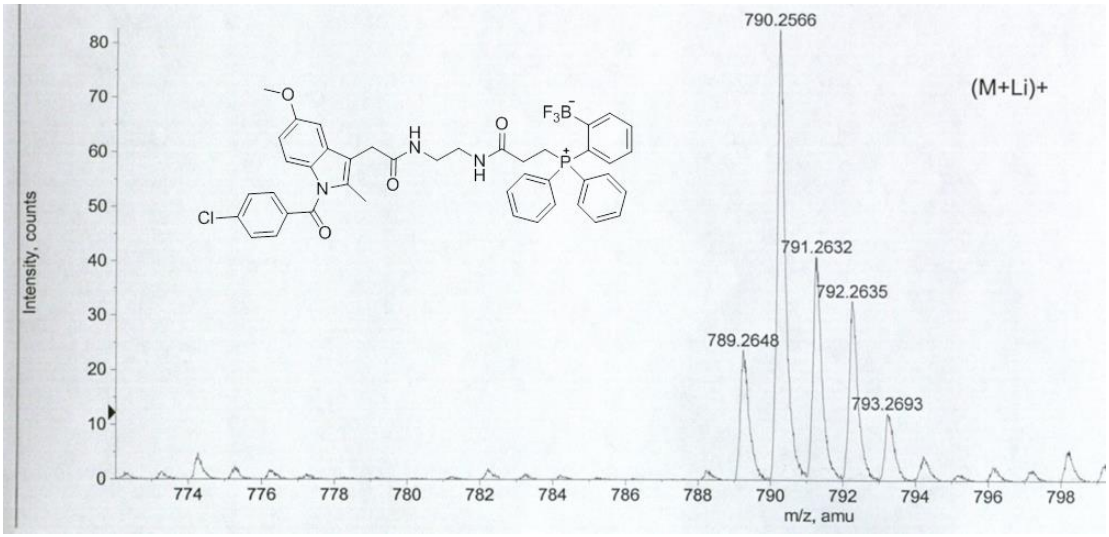


Figure S13. High resolution mass spectrum of **8**

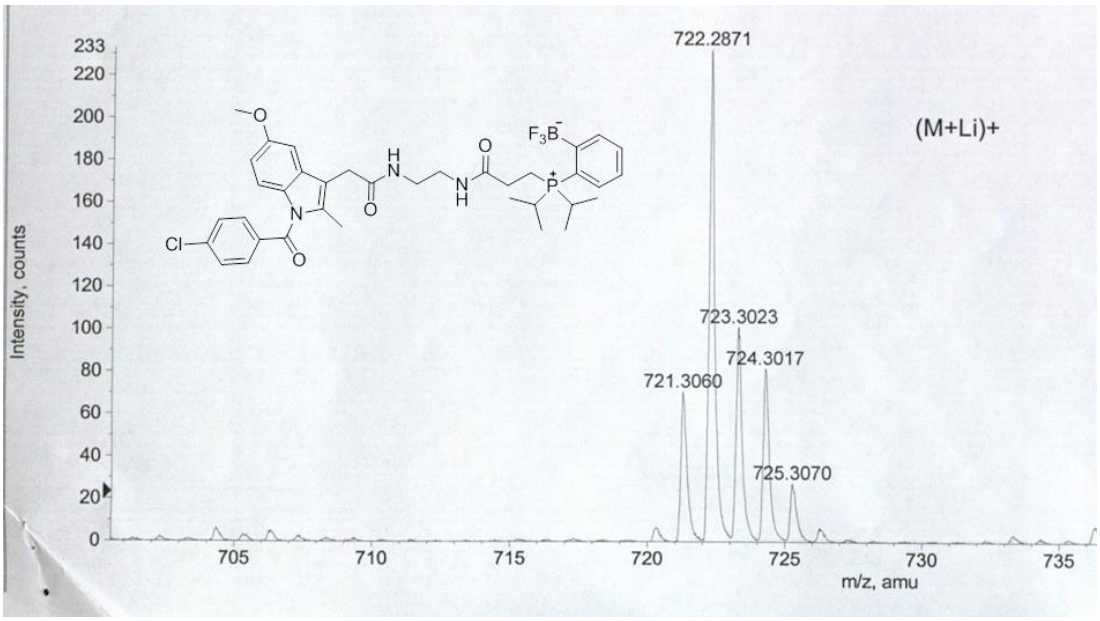


Table S1 Crystal data for **5**

Empirical formula	$C_{15}H_{23}BF_3O_2P$	
Formula weight	334.11	
Crystal size/mm	0.17 x 0.17 x 0.06	
Temperature	110(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P21/n	
Unit cell dimensions	a = 8.174(8) Å	α = 90°
	b = 14.54(1) Å	β = 92.57(1)°
	c = 13.76(1) Å	γ = 90°
Volume	1634(3) $Å^3$	
Z	4	
Density (calculated)	1.358 g cm^{-3}	
μ	0.202 mm^{-1}	
F(000)	704	
Scan mode	ω, φ	
hkl ranges	-10 → +10	
	-19 → +18	
	-16 → +17	
Reflections collected	14358	
Unique reflections [Rint]	3926 [0.0576]	
Reflection used for refinement	3926	
Refined parameters	199	
GooF	1.046	
R1,[a] *w*R2[b] (all data)	0.0483, 0.1230	
Largest diff. peak and hole	0.36, -0.39 e.$Å^{-3}$	

[a]$R1 = \Sigma||F_o| - |F_c||/ \Sigma|F_o|$. [b]$wR2$ $([w(F_o^2 - F_c^2)^2]/[\Sigma w(F_o^2)^2])^{1/2}$; $w = 1/[\sigma^2(F_o^2) + (ap)^2 + bp]$; $p = (F_o^2 + 2F_c^2)/3$ with $a = 0.0522$ and $b = 0.4268$.

Table S2 Kinetic data for the hydrolysis of **5** in D_2O–CD_3CN (8/2 vol) at pH 7.5 ([phosphate buffer] = 500 mM). The values provided for F^- and $ArBF_3$ correspond to the integration of the corresponding NMR signal.

Data for **5** in D_2O–CD_3CN (8/2 vol) at pH 7.5				
				k=0.000052
			exp. Ratio	calc. ratio
Time (min)	$[F^-]$	[BF3]	[BF3]/([BF3]+$[F^-]$	[BF3]/([BF3]+$[F^-]$
0	0	100	1.0000	1.0000
1030	5.4	100	0.9488	0.9478
2491	14.86	100	0.8706	0.8785
5367	32.58	100	0.7543	0.7565
6800	43.52	100	0.6968	0.7022
8240	52.59	100	0.6554	0.6515
9689	63.75	100	0.6107	0.6042
11189	76.21	100	0.5675	0.5589
20000				0.3535
30000				0.2101
40000				0.1249
50000				0.0743
60000				0.0442

Table S3 Kinetic data for the hydrolysis of **3** in 10% w/v triton X-100 in H_2O/ DMSO (7/3 vol) at pH = 7.5 ([phosphate buffer] = 500 mM). The values provided for F^- and $ArBF_3$ correspond to the integration of the corresponding NMR signal.

Data for **3** in 10% w/v triton X-100 in H2O/ DMSO (7/3 vol) at pH = 7.5				
				k= 0.0000044
			exp. Ratio	calc. ratio
Time (min)	[F]	[BF3]	[BF3]/([BF3]+[F]	[BF3]/([BF3]+[F]
0	0	100	1.0000	1.0000
1676	0.87	100	0.9914	0.9927
3746	2.12	100	0.9792	0.9837
7425	3.27	100	0.9683	0.9679
11820	4.2	100	0.9597	0.9493
15582	5.12	100	0.9513	0.9337
20000				0.9158
25000				0.8958
30000				0.8763
35000				0.8573
40000				0.8386
50000				0.8025
60000				0.7680

Table S4 Kinetic data for the hydrolysis of **5** in 10% w/v triton X-100 in H_2O/ DMSO (7/3 vol) at pH = 7.5 ([phosphate buffer] = 500 mM). The values provided for F^- and $ArBF_3$ correspond to the integration of the corresponding NMR signal.

Data for **5** in 10% w/v triton X-100 in H2O/ DMSO (7/3 vol) at pH = 7.5				
				k= 0.000012
			exp. Ratio	calc. ratio
Time (min)	[F]	[BF3]	[BF3]/([BF3]+[F]	[BF3]/([BF3]+[F]
0	0	100	1.0000	1.0000
1626	3.54	100	0.9658	0.9800
7512	9.38	100	0.9142	0.9111
10376	11.76	100	0.8948	0.8793
17576	21.44	100	0.8235	0.8042
20000				0.7804
25000				0.7334
30000				0.6894
35000				0.6479
40000				0.6090
50000				0.5379
60000				0.4752

Table S5 Kinetic data for the hydrolysis of **8** in 10% w/v triton X-100 in H_2O/ DMSO (7/3 vol) at pH = 7.5 ([phosphate buffer] = 500 mM). The values provided for F^- and $ArBF_3$ correspond to the integration of the corresponding NMR signal.

Data for **8** in 10% w/v triton X-100 in H_2O/ DMSO (7/3 vol) at pH = 7.5				
				k= 4.0E-7
			exp. Ratio	calc. ratio
Time (min)	[F]	[BF3]	[BF3]/([BF3]+[F]	[BF3]/([BF3]+[F]
0	0	100	1.0000	1.0000
18720	0.49	100	0.9951	0.9926
25920	1.15	100	0.9886	0.9898
36012	1.26	100	0.9876	0.9859
44652	1.66	100	0.9837	0.9825
50000				0.9804
60000				0.9766

Figure S14 Kinetic plots for the hydrolysis of **3**, **5** and **8** in aqueous conditions

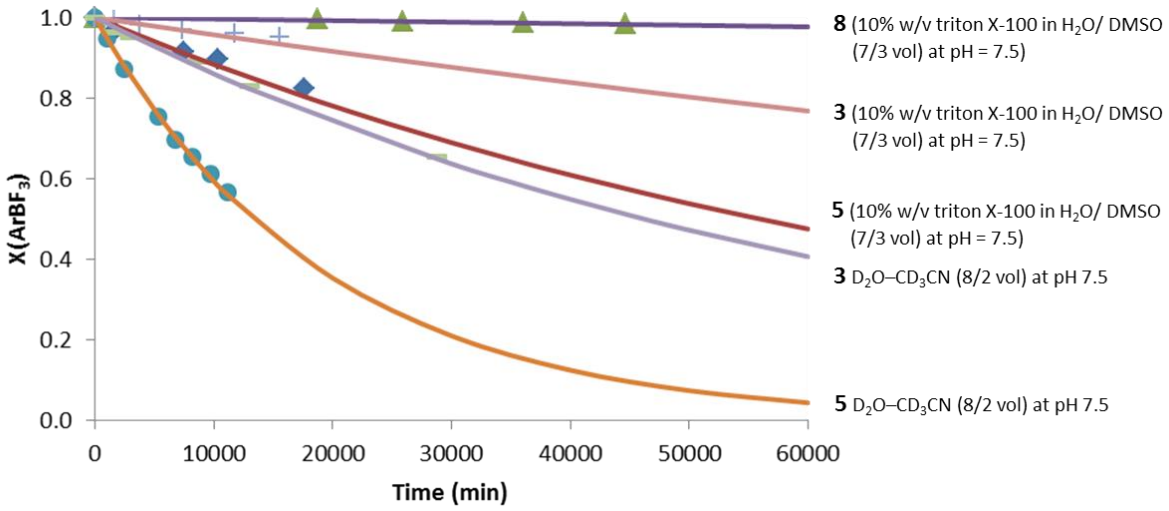
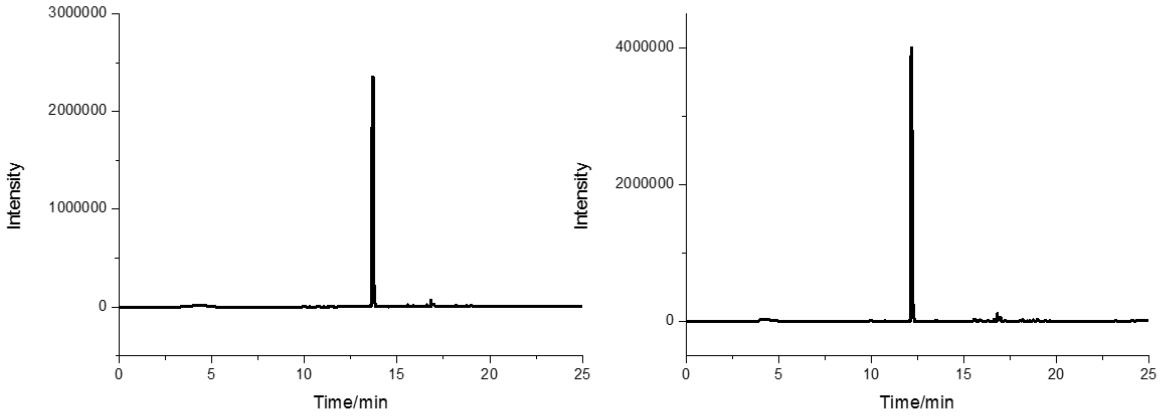


Figure S15 HPLC profile of [$^{17/18}$F]**7** and [$^{17/18}$F]**8** under 254nm UV absorbance channel



[$^{17/18}$F]**7** [$^{17/18}$F]**8**