Sulfonamide Paper ESI

Table of Figures

X-ray Photoelectric Spectroscopy and ToF-SIMS Data

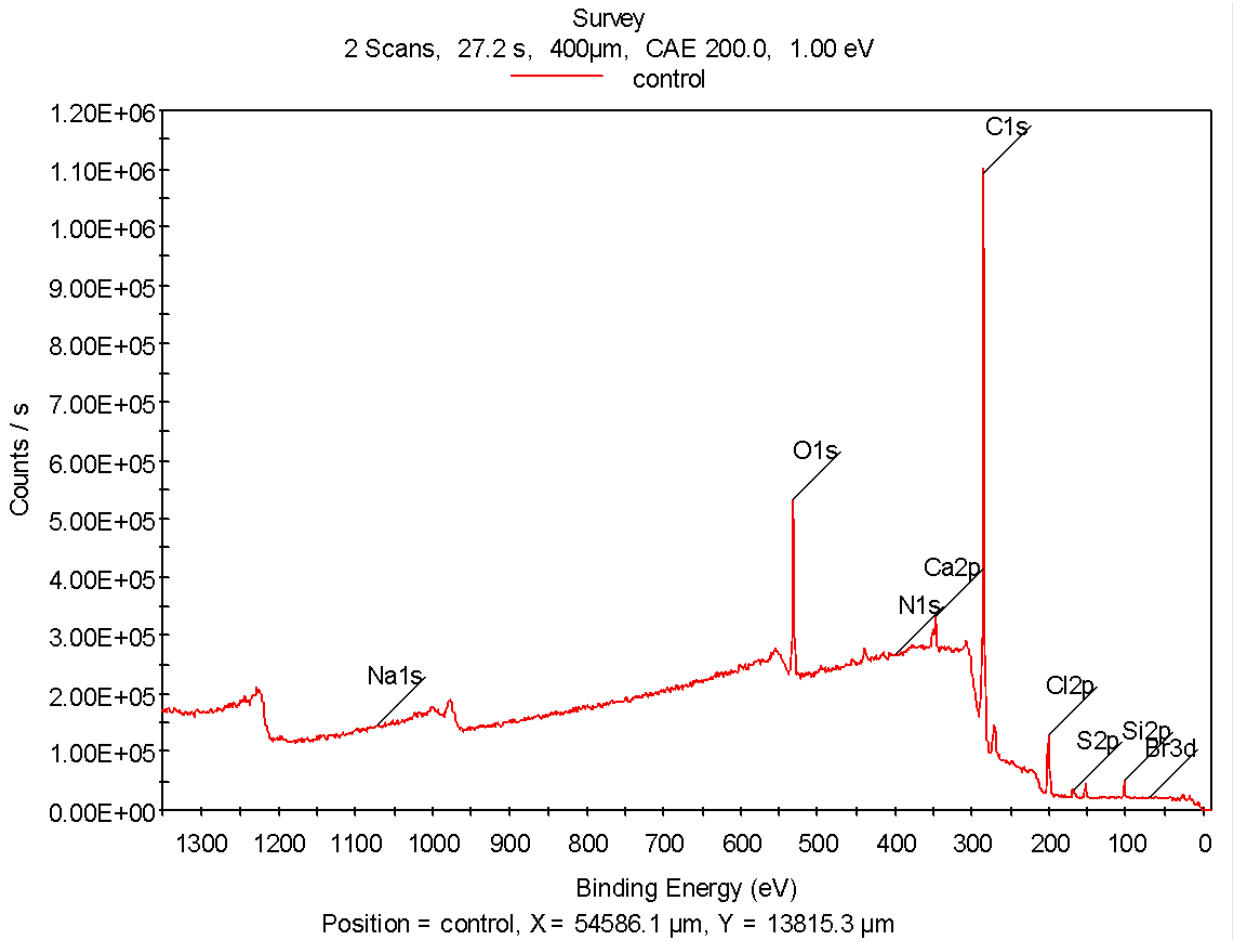


Figure S 1. Control (untreated) CPVC XPS survey data.

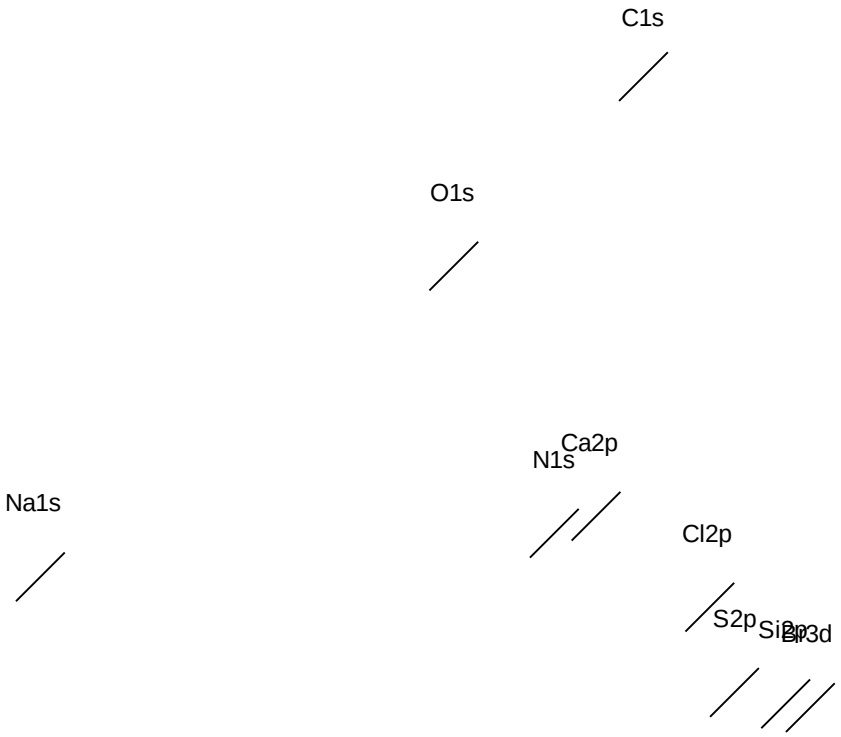


Figure S 2. Treated CPVC XPS survey data.

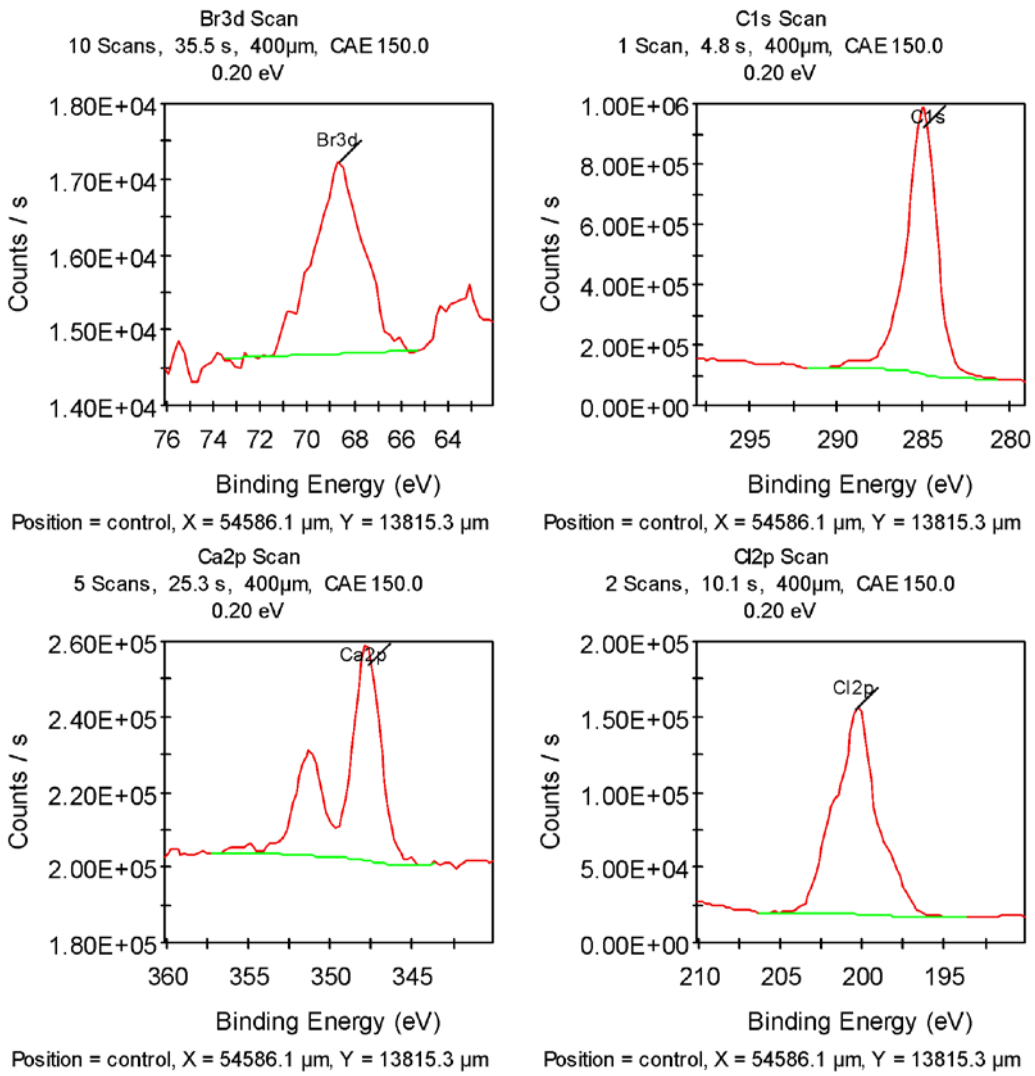


Figure S 3. Control CPVC identification XPS data.

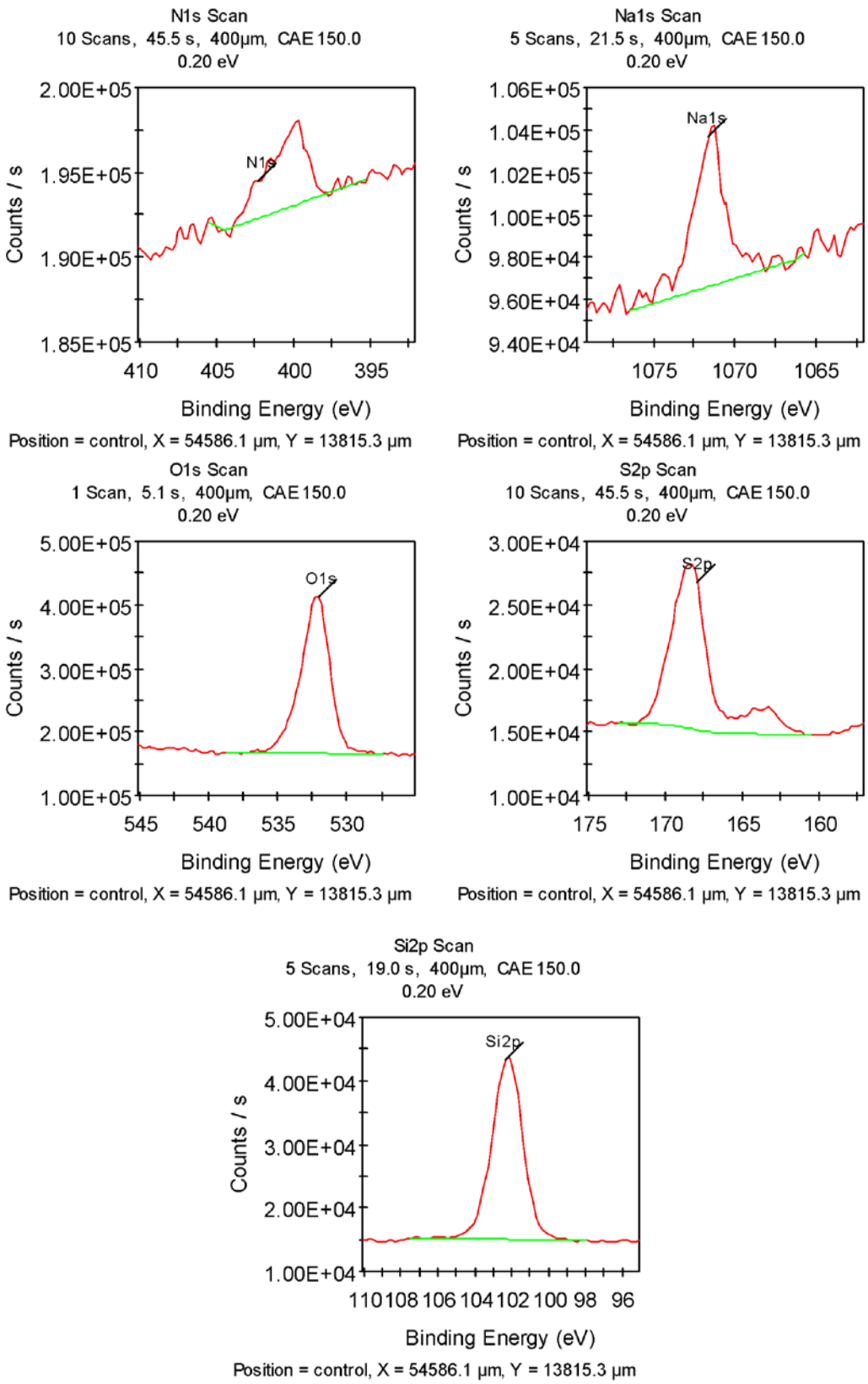


Figure S 4. Control CPVC Identification XPS data, continued.

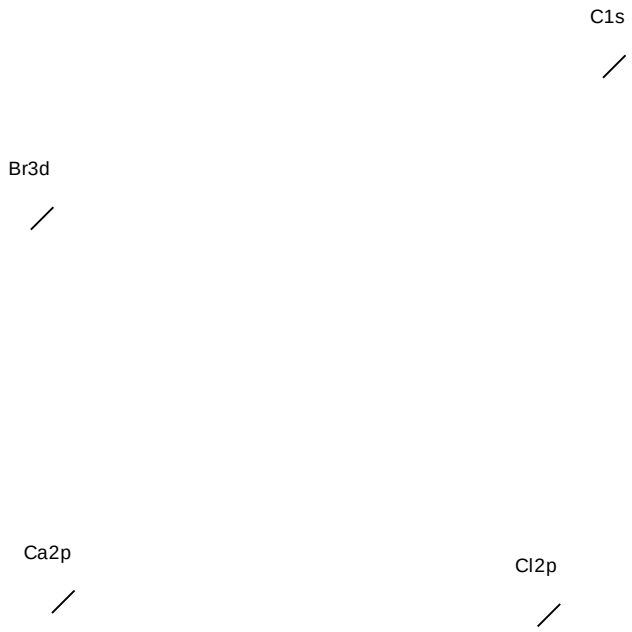


Figure S 5. CPVC treated with **3a** identification XPS data.

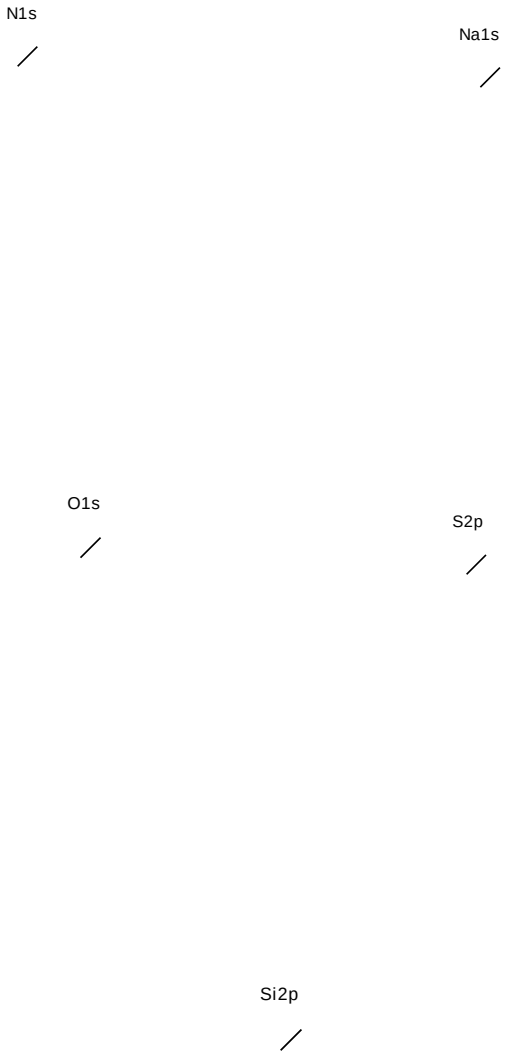


Figure S 6. CPVC treated with **3a** identification XPS data, continued.

Table S 1. Quantification XPS data for control and **3a** treated CPVC samples.

Control			Compound **3b**		
Element	**Concentration %**	**Sensitivity Factor**	**Element**	**Concentration %**	**Sensitivity Factor**
Br3d	0.08	2.840	Br3d	0.04	2.840
C1s	77.16	1.000	C1s	73.17	1.000
Ca2p	1.47	5.070	Ca2p	0.74	5.070
Cl2p	7.25	2.285	Cl2p	7.23	2.285
N1s	0.35	1.800	N1s	1.84	1.800
Na1s	0.17	8.520	Na1s	0.81	8.520
O1s	9.97	2.930	O1s	14.57	2.930
S2p	0.93	1.670	S2p	1.24	1.670
Si2p	2.62	0.817	Si2p	0.36	0.817

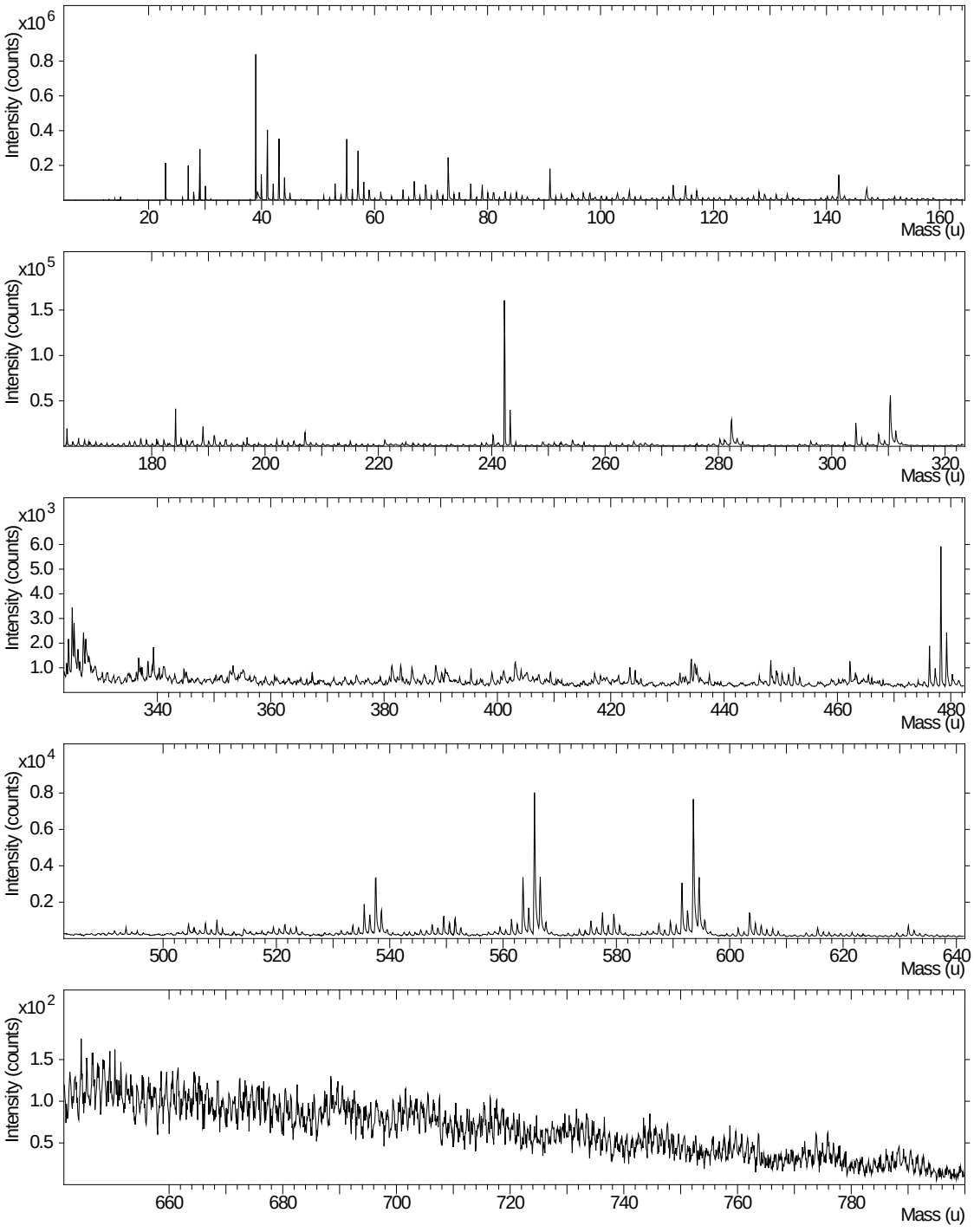


Figure S 7. Positive ion ToF-SIMS survey of control CPVC material.

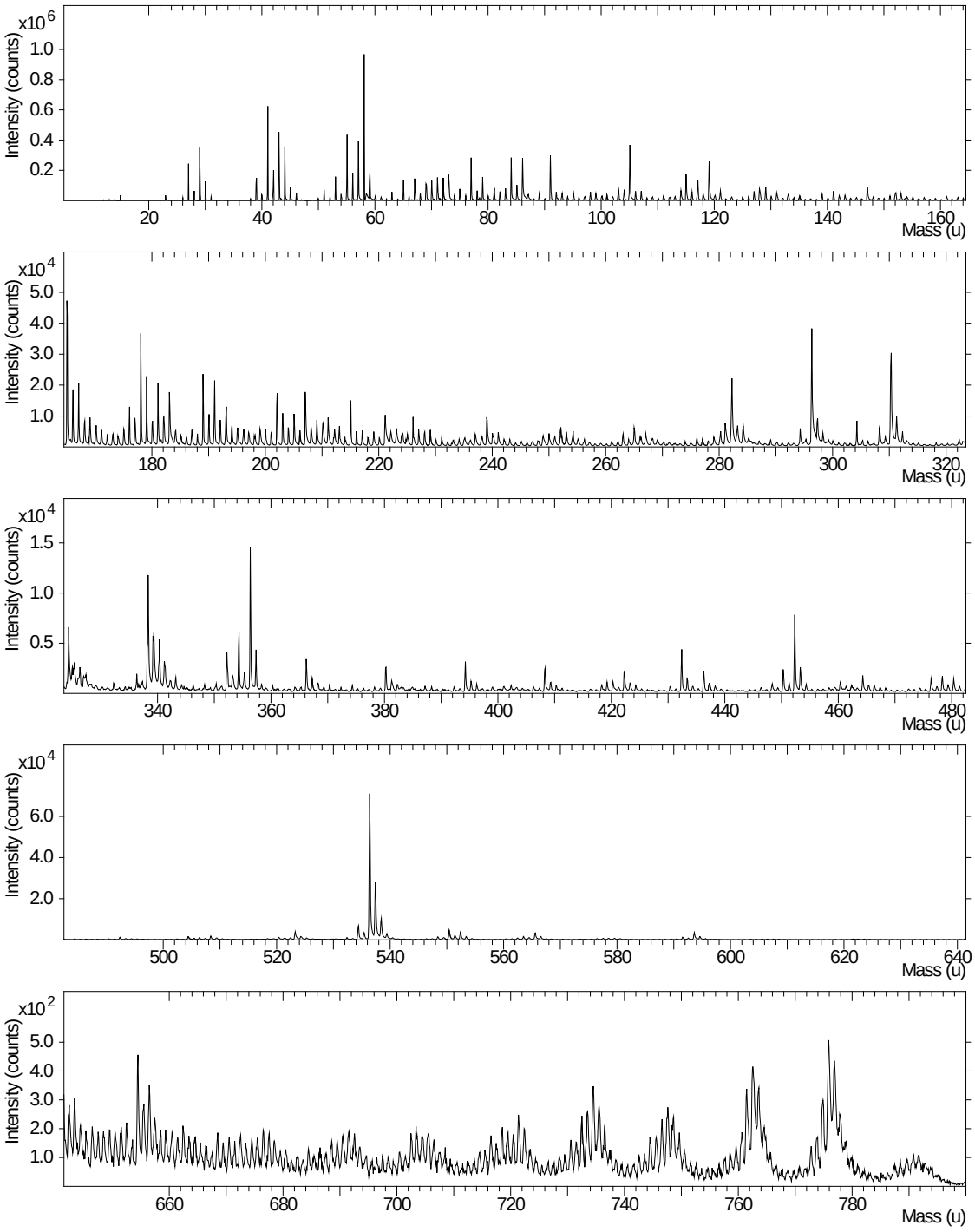


Figure S 8. Positive ion ToF-SIMS survey of **3a** treated CPVC material.

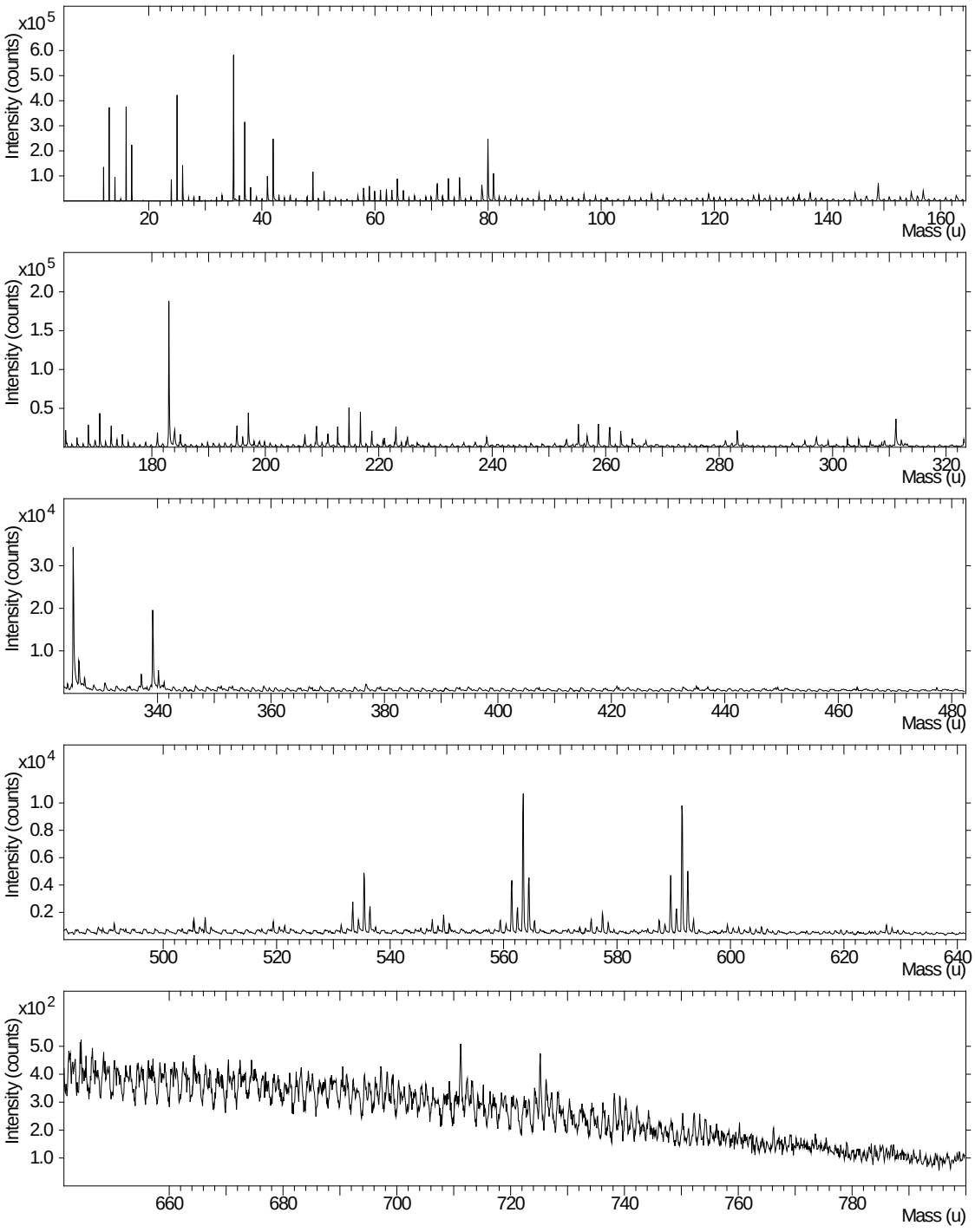


Figure S 9. Negative ion ToF-SIMS survey of control CPVC material.

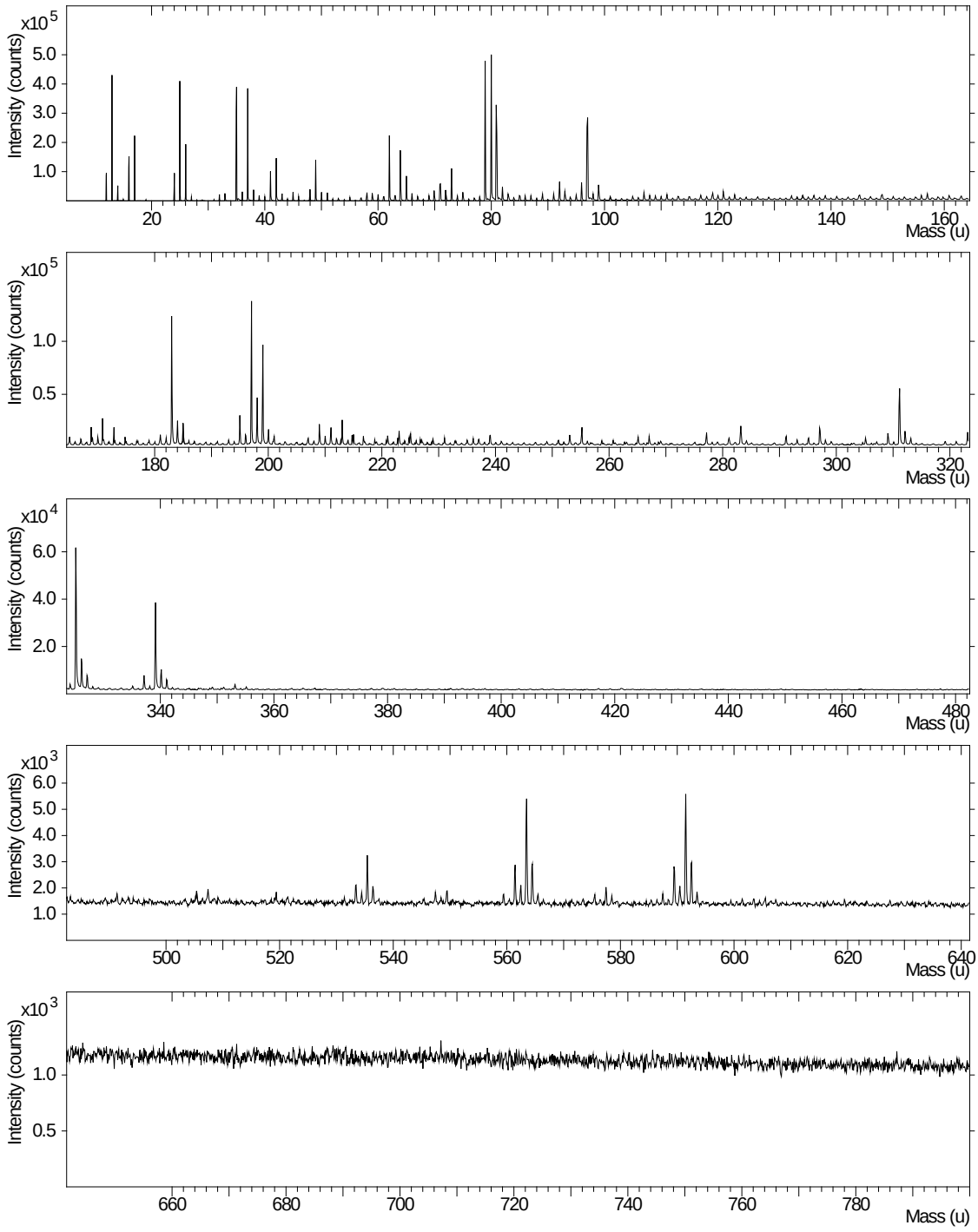


Figure S 10. Negative ion ToF-SIMS survey of **3a** treated CPVC material.

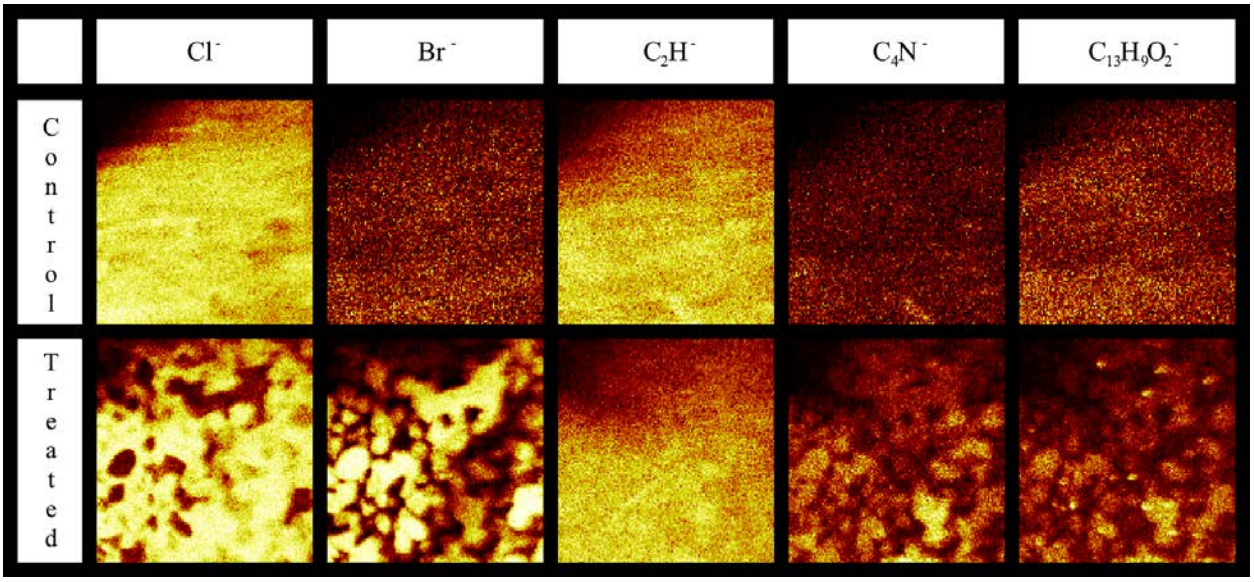


Figure S 11. Composite negative ion ToF-SIMS image of 500.0 × 500.0 µm section of control and **3a** treated samples. Intensity is a function of fragment quantity during analysis. Images correspond to negative ionic fragmentation products of chlorine (Cl^-), bromine (Br^-), ethane (C_2H^-), tetracarbonyl ammonium (C_4N^-), and hydroxybenzophenone ($C_{13}H_9O_2^-$).

Atomic Force Microscopy and Surface Profilometry Data

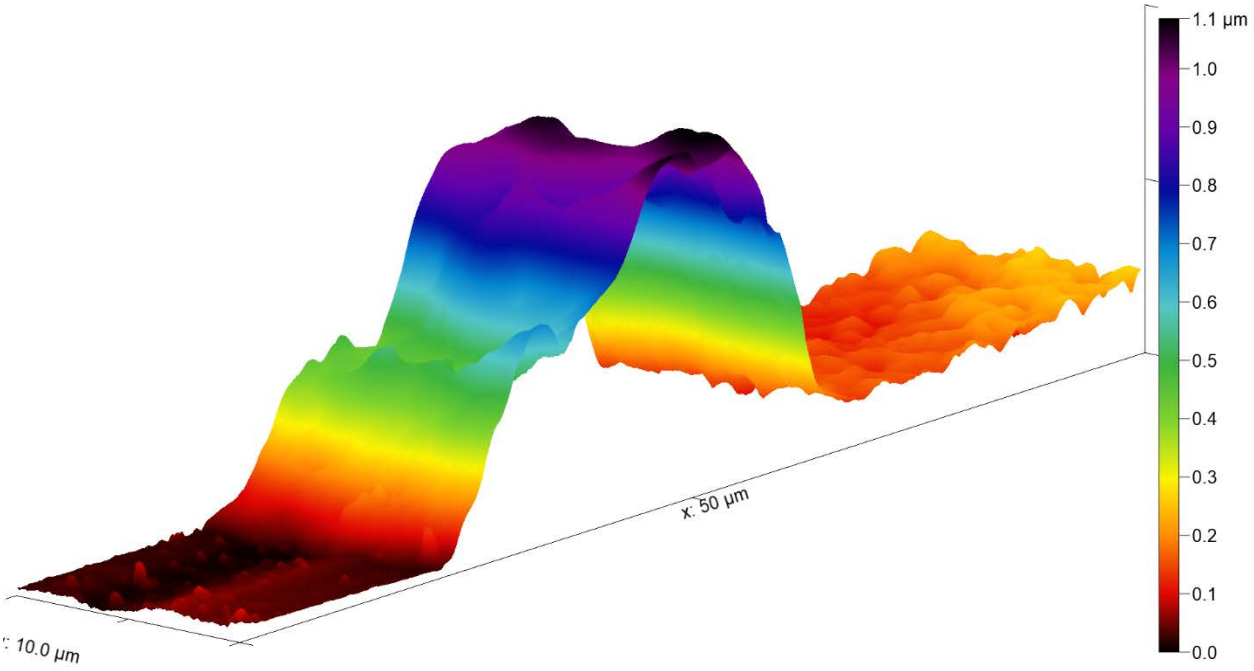


Figure S 12. Contact AFM profile scan of a polycarbonate (PC) surface partially treated with **3a**.

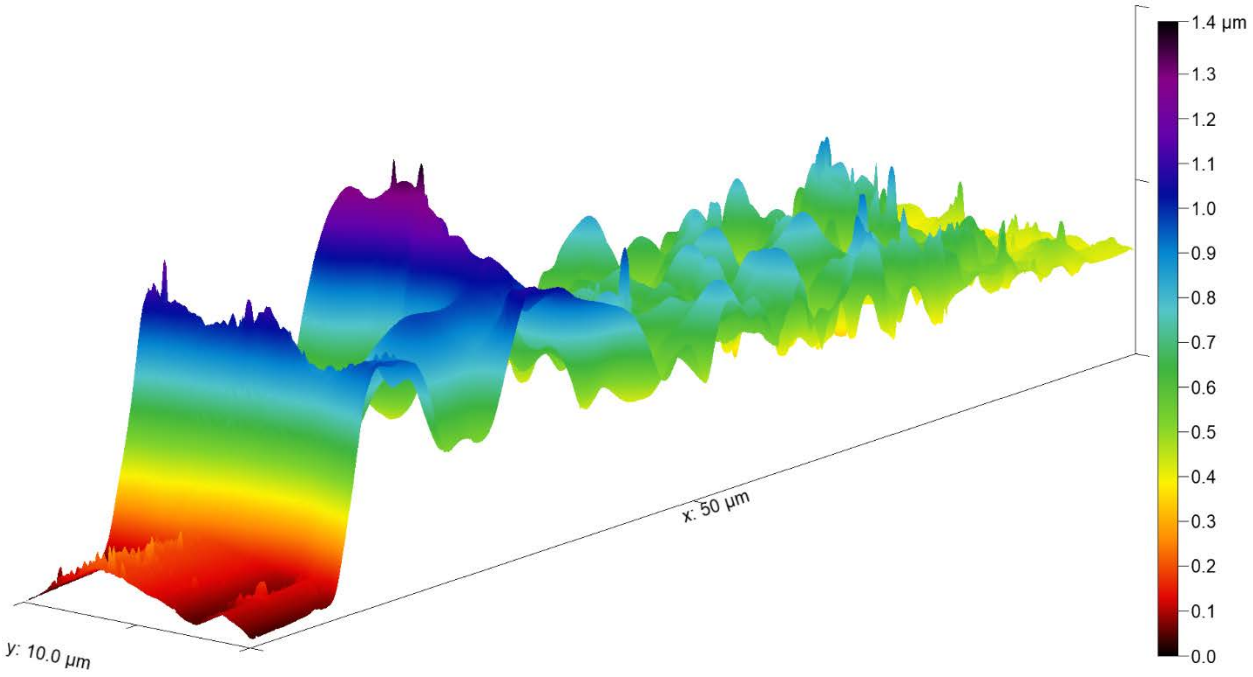


Figure S 13. Tapping AFM profile scan of a polycarbonate (PC) surface partially treated with **6a**.

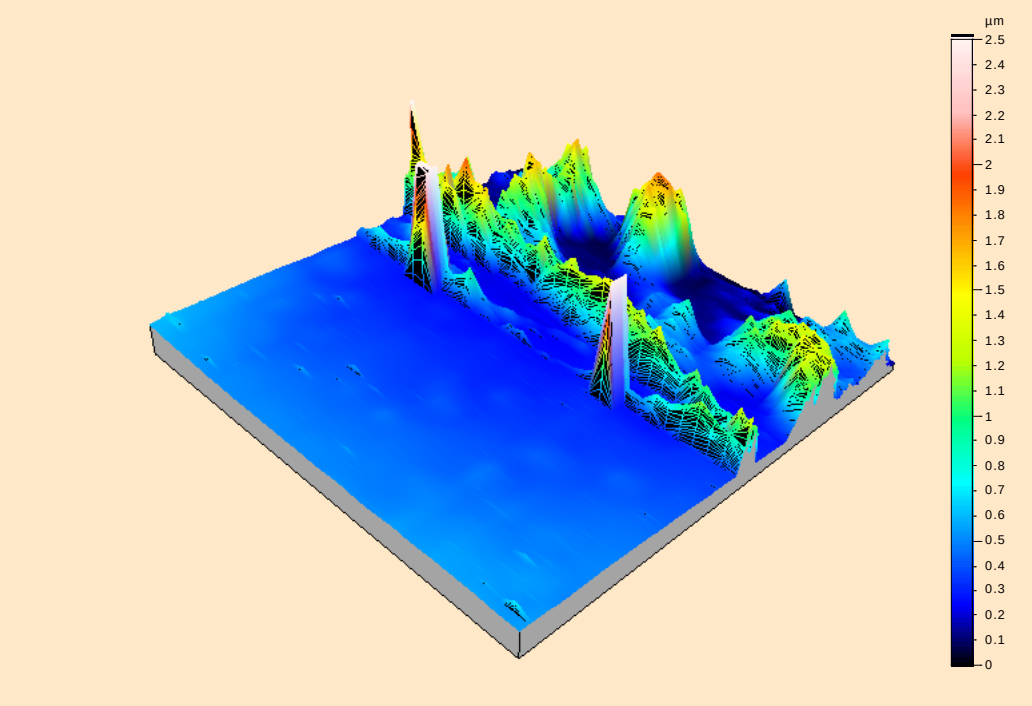


Figure S 14. SP profile scan of a polycarbonate (PC) surface partially treated with **3a.**

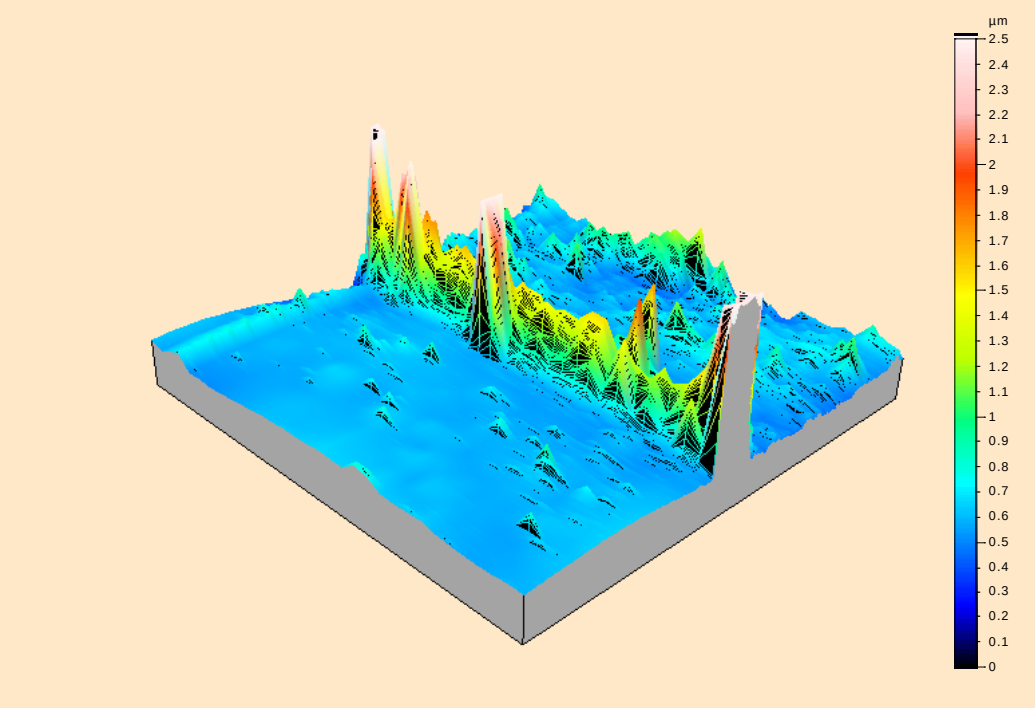


Figure S 15. SP profile scan of a polycarbonate (PC) surface partially treated with **6a**.

Microbiology Data

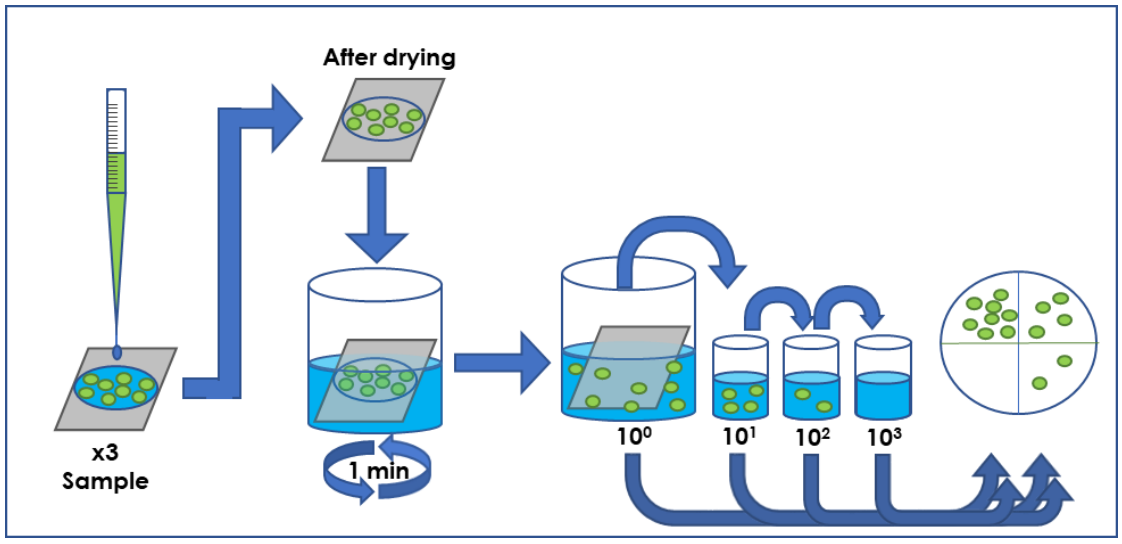


Figure S 16. Simplified schematic representation of the large drop inoculation (LDI) method.

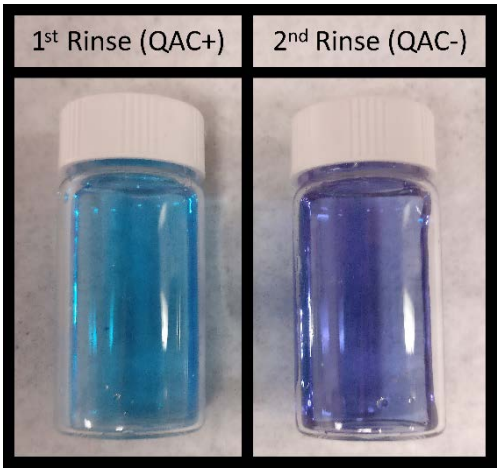


Figure S 17. Successive wash solutions of polystyrene coated with **3a**, exposed to 3 drops (~0.1 mL) 1000 ppm bromophenol blue dye. Samples were shaken for 30 seconds in sealed tubes containing 10 mL of distilled water. The blue colour indicates the first rinse contains the presence QAC, while the purple colour indicates the second rinse does not.

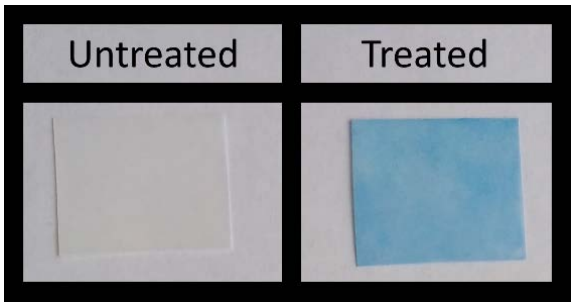
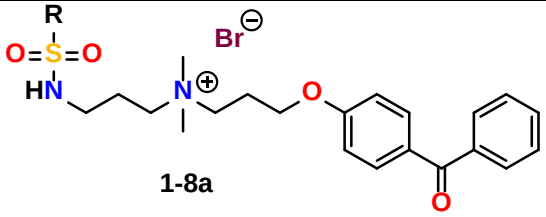
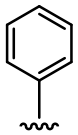
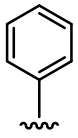
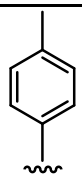
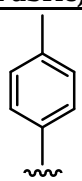
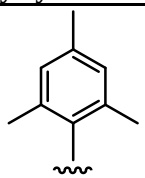
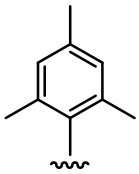
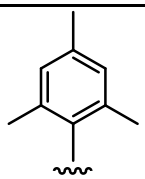
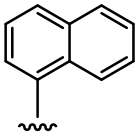
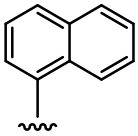
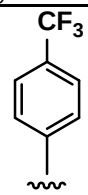
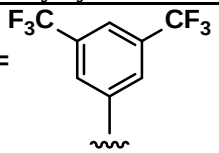
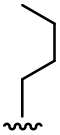


Figure S 18. Representative polystyrene samples, one left untreated (left) and treated (right) with **3a**, stained with bromophenol blue.

Table S 2. Large droplet inoculation (LDI) microbiology data. Microbiological testing was performed with triplicate treated and untreated controls. The inoculum load represents the quantity of viable cells placed onto each sample material, and was determined concurrently to sample data (± indicates standard deviation n = 3). A value of 1.70 log(cfu) represents the lowest number of detectable cells spot plated onto 3 g L^{-1} TSA (LOD: 50 cfu, 1 colony in 5 mL undiluted collection fluid).

		Average Data log(cfu)		
		Inoculum Load	**Control**	**Treated**
 **1-8a**				
1: R =  **Ph** ***Arthrobacter sp.* (IAI-3) High Density Polyethylene**	3 Hours	7.43	6.42 ± 1.32	< 1.70 ± 0.00
	24 Hours		2.73 ± 0.12	< 1.70 ± 0.00
1: R =  **Ph** ***Escherichia coli* (DH5α) Polystyrene**	3 Hours	7.71	2.27 ± 1.11	< 1.70 ± 0.00

2: R =  **Tol** ***Arthrobacter sp.* (IAI-3) Cotton (Fabric)**	3 Hours	8.11	6.94 ± 0.05	< 1.70 ± 0.00
	24 Hours		2.62 ± 0.05	< 1.70 ± 0.00
2: R =  **Tol** ***Escherichia coli* (DH5α) Polystyrene**	3 Hours	7.71	2.27 ± 1.11	< 1.70 ± 0.00
3: R =  **Mes** ***Arthrobacter sp.* (IAI-3) Polystyrene**	3 Hours	7.01	6.55 ± 0.06	< 1.70 ± 0.00
	24 Hours		4.96 ± 0.08	< 1.70 ± 0.00
3: R =  **Mes** ***Eschericia coli* (DH5α) High Density Polyethylene**	3 Hours	7.70	2.60 ± 0.16	< 1.70 ± 0.00
	24 Hours		< 1.70 ± 0.00	< 1.70 ± 0.00
3: R =  **Mes** ***Staphylococcus aureus* (Ryerson University) High Density Polyethylene**	3 Hours	5.92	3.95 ± 0.09	< 1.70 ± 0.00
	24 Hours		3.74 ± 0.40	< 1.70 ± 0.00
	3 Hours	7.43	6.42 ± 1.32	< 1.70 ± 0.00

4: R =  **Naph** ***Arthrobacter sp.* (IAI-3) High Density Polyethylene**	24 Hours		2.73 ± 0.12	< 1.70 ± 0.00
4: R =  **Naph** ***Escherichia coli* (DH5α) Polystyrene**	3 Hours	7.71	2.27 ± 1.11	< 1.70 ± 0.00
5: R =  **CF_3Ph** ***Arthrobacter sp.* (IAI-3) Polystyrene**	3 Hours	7.18	6.03 ± 0.15	< 1.70 ± 0.00
6: R =  **$(CF_3)_2Ph$** ***Arthrobacter sp.* (IAI-3) Polystyrene**	3 Hours	7.18	6.61 ± 0.01	< 1.70 ± 0.00
7: R =  **Et** ***Arthrobacter sp.* (IAI-3) Polystyrene**	3 Hours	7.60	6.17 ± 0.20	6.55 ± 0.22
	24 Hours		5.29 ± 0.47	5.97 ± 0.09
8: R =  **Bu** ***Arthrobacter sp.* (IAI-3) Polystyrene**	3 Hours	7.60	6.17 ± 0.20	6.26 ± 1.04
	24 Hours		5.29 ± 0.47	5.89 ± 1.75

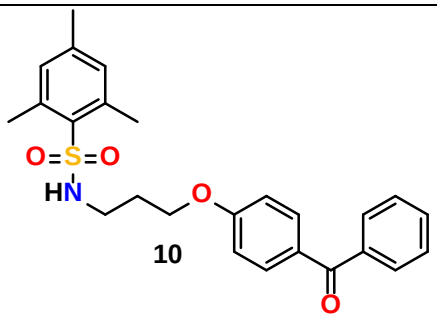
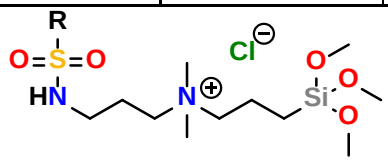
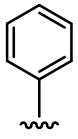
 **10**				
***Arthrobacter sp.* (IAI-3) Polystyrene**	3 Hours	7.01	6.55 ± 0.06	6.17 ± 0.08
	24 Hours		4.96 ± 0.08	4.87 ± 0.37

Table S 3. Tabulated large droplet inoculation (LDI) microbiology data. Microbiological testing was performed with triplicate treated and untreated controls. The inoculum load represents the quantity of viable cells placed onto each sample material, and was determined concurrently to sample data (± indicates standard deviation n = 3). A value of 1.70 log(cfu) represents the lowest number of detectable cells spot plated onto 3 g L^{-1} TSA (LOD: 50 cfu, 1 colony in 5 mL undiluted collection fluid).

		Average Data log(cfu)		
		Inoculum Load	**Control**	**Treated**
 **1-4b**				
1: R =  **Ph** ***Arthrobacter sp.* (IAI-3) Cotton (Fabric)**	3 Hours	7.79	6.38 ± 0.19	< 1.70 ± 0.00
	24 Hours		5.82 ± 0.05	< 1.70 ± 0.00
	3 Hours	7.61	4.98 ± 0.52	< 1.70 ± 0.00

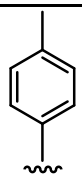
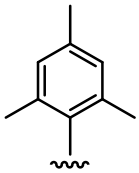
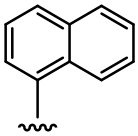
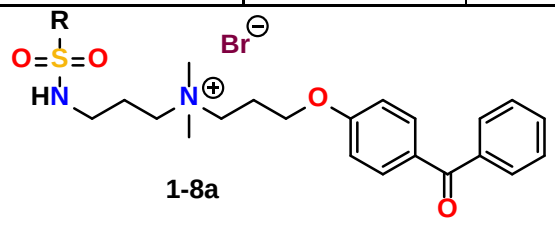
2: R =  **Tol** ***Arthrobacter sp.* (IAI-3) Cotton (Fabric)**	24 Hours		2.62 ± 1.54	< 1.70 ± 0.00
3: R =  **Mes** ***Arthrobacter sp.* (IAI-3) Cotton (Fabric)**	3 Hours	7.61	4.98 ± 0.52	< 1.70 ± 0.00
	24 Hours		2.62 ± 1.54	< 1.70 ± 0.00
4: R =  **Naph** ***Arthrobacter sp.* (IAI-3) Cotton (Fabric)**	3 Hours	7.79	6.38 ± 0.19	< 1.70 ± 0.00
	24 Hours		5.82 ± 0.05	< 1.70 ± 0.00

Table S 4. Tabulated liquid reservoir inoculation (LRI) planktonic microbiology data. Microbiological testing was performed with triplicate treated and untreated controls. Planktonic colony counts were collected prior to the collection of biofilm data. The inoculum load represents the quantity of viable cells placed onto each sample material, and was determined concurrently to sample data (± indicates standard deviation, n = 3). A value of 6.78 log(cfu ml^{-1}) represents the highest number of detectable cells spot plated onto 3 g L^{-1} TSA (LOD: 6.00 x 10^{-6} cfu ml^{-1}, 600 colonies in 3 mL collection fluid, diluted by a factor of 10^{3}). A value of 1.00 log(cfu ml^{-1}) represents the lowest number of detectable cells spot plated onto 3 g L^{-1} TSA (LOD: 10 cfu ml^{-1}, 1 colony in 3 mL undiluted collection fluid).

	Average Data log(cfu ml^{-1})		
	Inoculum Load	**Control**	**Treated**
 **1-8a**			

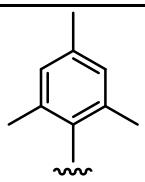
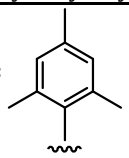
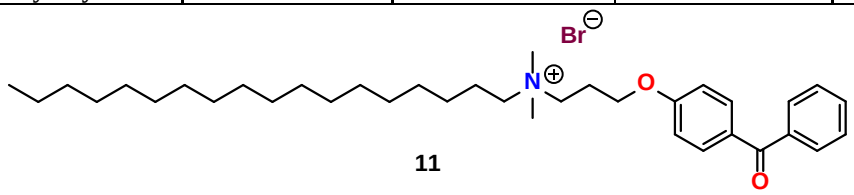
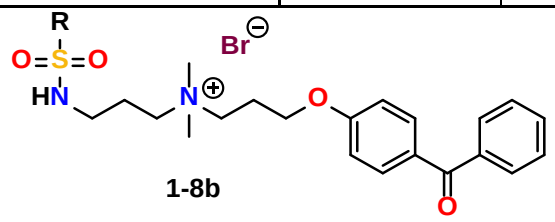
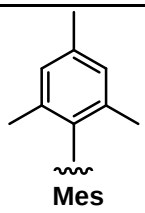
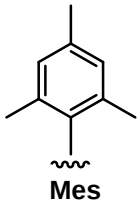
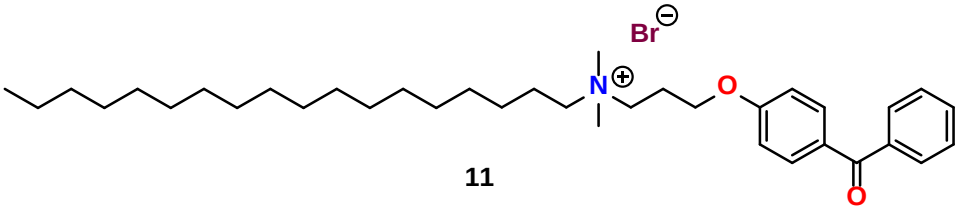
3: R =  Mes ***Arthrobacter sp.* (IAI-3)** **Low Density Polyethylene**	24 Hours	7.82	> 6.78 ± 0.00	4.73 ± 1.39
	48 Hours		> 6.78 ± 0.00	< 1.00 ± 0.00
3: R =  Mes ***Escherichia coli* (DH5α)** **Low Density Polyethylene**	24 Hours	7.74	> 6.78 ± 0.00	5.71 ± 0.25
	48 Hours		5.24 ± 0.04	4.12 ± 0.45
 **11**				
***Arthrobacter sp.* (IAI-3)** **Low Density Polyethylene**	24 Hours	7.02	6.49 ± 0.11	6.29 ± 0.08
	48 Hours		6.50 ± 0.04	6.05 ± 0.09

Table S 5. Tabulated liquid reservoir inoculation (LRI) biofilm microbiology data. Microbiological testing was performed with triplicate treated and untreated controls. Biofilm colony counts were collected subsequently to the collection of planktonic data. The inoculum load represents the quantity of viable cells placed onto each sample material, and was determined concurrently to sample data (± indicates standard deviation, n = 3). A value of 1.00 log(cfu) represents the lowest number of detectable cells spot plated onto 3 g L^{-1} TSA (LOD: 10 cfu, 1 colony in 1 mL undiluted collection fluid).

	Average Data log(cfu)		
	Inoculum Load	**Control**	**Treated**
 **1-8b**			

3: R =  **Mes** ***Arthrobacter sp.* (IAI-3)**	Biofilm at 48 Hours	7.82	7.00 ± 0.13	< 1.48 ± 0.00
3: R =  **Mes** ***Escherichia coli* (DH5α)**	Biofilm at 48 Hours	7.74	6.70 ± 0.04	4.66 ± 0.50
 **11**				
***Arthrobacter sp.* (IAI-3)**	Biofilm at 48 Hours	7.02	6.26 ± 0.08	5.92 ± 0.25
***Escherichia coli* (DH5α)**	Biofilm at 48 Hours	7.02	3.76 ± 0.25	2.56 ± 0.52

Synthetic Procedures

Precursors 4-(3-bromopropyoxy)benzophenone and diisopropyl(3-bromopropyl)phosphonate were synthesized according to published work and NMR spectra (^{1}H and ^{13}C) corresponded well with previously published NMR data.[23,51]

Method S1: General procedure for aromatic sulfonamide synthesis

To a flame dried, round bottom flask in an ice bath equipped with a stir bar containing an appropriate amount of anhydrous DCM, an adequate amount of respective sulfonyl chloride was added, followed by an equimolar amount of Et_3N and dropwise addition of a stoichiometric quantity of 3-(dimethylamino)propylamine. After 30 min. the reaction mixture was removed from the ice bath and allowed to stir at room temperature for the indicated time. The reaction was then transferred to a separatory funnel and extracted with an appropriate amount of distilled water. Volatiles and/or solvent were removed from the organic phase using a rotary evaporator followed by drying under high vacuum.

Method S2: General procedure for aliphatic sulfonamide synthesis

To a flame dried, round bottom flask in an ice bath equipped with a stir bar containing appropriate amount of anhydrous DCM a stoichiometric amount of 3-(dimethylamino)propylamine was added followed by the dropwise addition of the respective sulfonyl chlorides. The reaction mixture was removed from the ice bath and allowed to stir for the indicated time at room temperature. Upon completion, the reaction solvent was evaporated using a rotary evaporator. The resultant residue was then dissolved in an appropriate amount of potassium carbonate solution (0.05 M) and extracted using appropriate amount of DCM. Volatiles were removed *in vacuo*.

Method S3: General procedure for Menshutkin quaternization reaction

In an appropriately sized round bottom flask or scintillation/microwave vial, an appropriate amount of a tertiary amine-terminated sulfonamide and a trimethoxy silane, diallyl phosphonate or benzophenone alkyl halide starting material was dissolved in acetonitrile. The reaction mixture

was stirred at 110 °C for the indicated time. The crude material was purified by addition of Et_2O directly into the reaction mixture followed by decanting (Et_2O wash × 3) and dried *in vacuo*.

Synthesis of N-(3-(dimethylamino)propyl)benzenesulfonamide 1

This compound was synthesized according to **Method S1** with benzenesulfonyl chloride (1.4 mL, 11.32 mmol), triethylamine (2.4 mL, 16.99 mmol, 1.5 eqv.), and 3- (dimethylamino)propylamine (2.1 mL, 16.99 mmol, 1.5 eqv.) in DCM (30 mL) stirring for 4 hours, yielding a clear solution. The solution was then washed using distilled water (40 mL), and the organic layer was removed *in vacuo* to yield a green yellow coloured oil. The product was further dried under reduced pressure, yielding the desired product as a pale yellow coloured waxy solid. Yield: 98 % (2.69 g). ^{1}H NMR ($CDCl_3$, 400 MHz, δ): 7.68 (2H, d, $^3J_{H3\text{-}H2}$ = 8.3 Hz, H3), 7.35 (3H, m, H1 and H2), 2.86 (2H, t, $^3J_{H6\text{-}H7}$ = 5.8 Hz, H6), 2.11 (2H, t, $^3J_{H8\text{-}H7}$ = 5.9 Hz, H8), 1.98 (6H, s, H9), 1.41 (2H, m, $^3J_{H7\text{-}H6}$ = 9.0 Hz, $^3J_{H7\text{-}H8}$ = 3.1 Hz, H7) ppm; ^{13}C {^{1}H} NMR ($CDCl_3$, 101 MHz, δ): 140.20 (C4), 132.33 (C1), 128.99 (C2), 126.96 (C3), 59.13 (C8), 45.28 (C9), 44.05 (C6), 25.12 (C7) ppm. **HRMS-ESI-TOF** (*m/z*): [$M^+ + H^+$] calculated for $C_{11}H_{19}N_2O_2S$, 243.1162, found, 243.1170.

Synthesis of N-(3-(dimethylamino)propyl)-4-methylbenzenesulfonamide 2

This compound was synthesized according to **Method S1** with *p*-toluenesulfonyl chloride (10.505 g, 55.10 mmol), triethylamine (11.5 mL, 82.65 mmol, 1.5 eqv.), and 3-(dimethylamino)propylamine (10.4 mL, 82.65 mmol, 1.5 eqv.) in DCM (100 mL) stirred for 4 hours, yielding a milky white solution. The solution was then washed using distilled water (100

mL), and the volatile organic layer removed *in vacuo* to yield a pale yellow coloured oil. The product was further dried under reduced pressure, yielding the desired product as a pale white coloured waxy solid. Yield: 98 % (13.85 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.73 (2H, d, $^{3}J_{H4\text{-}H2}$ = 8.3 Hz, H4), 7.29 (2H, d, $^{3}J_{H2\text{-}H4}$ = 7.9 Hz, H2), 3.03 (2H, t, $^{3}J_{H7\text{-}H8}$ = 5.8 Hz, H7), 2.42 (3H, s, H1), 2.29 (2H, t, $^{3}J_{H9\text{-}H8}$ = 5.8 Hz, H9), 2.16 (6H, s, H10), 1.58 (2H, tt, $^{3}J_{H8\text{-}H7}$ = 9.2 Hz, $^{3}J_{H8\text{-}H9}$ = 2.5 Hz, H8) ppm; **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 142.83 (C5), 137.11 (C3), 129.44 (C2), 126.88 (C4), 58.76 (C9), 45.15 (C10), 43.65 (C7), 25.23 (C8), 21.32 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [$M^+ + H^+$] calculated for $C_{12}H_{21}N_2O_2S$, 257.1318, found, 257.1322.

Synthesis of N-(3-(dimethylamino)propyl)-2,4,6-trimethylbenzenesulfonamide 3

This compound was synthesized according to **Method S1** with 2,4,6-trimethylbenzene-1-sulfonyl chloride (1.99 g, 9.14 mmol), triethylamine (1.9 mL, 13.72 mmol, 1.5 eqv.), and 3-(dimethylamino)propylamine (1.7 mL, 13.72 mmol, 1.5 eqv.) in DCM (50 mL) for 3 hours yielding a clear solution. The solution was then washed using distilled water (75 mL), and the volatile organic layer removed *in vacuo* to yield a clear oil. The product was further dried under reduced pressure, yielding the desired product as a pale white coloured waxy solid. Yield 98.5 % (2.56 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.04 (1H, br s, H7), 6.93 (2H, s, H3), 2.94 (2H, t, $^{3}J_{H8\text{-}H9}$ = 5.7 Hz, H8), 2.61 (6H, s, H4), 2.32 (2H, t, $^{3}J_{H10\text{-}H9}$ = 5.6 Hz, H10), 2.27 (3H, s, H1), 2.18 (6H, s, H11), 1.62 (2H, tt, $^{3}J_{H9\text{-}H8}$ = 9.5 Hz, $^{3}J_{H9\text{-}H10}$ = 2.2 Hz, H9) ppm; **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 141.74 (C6), 139.07 (C2), 133.80 (C5), 131.87 (C3), 59.66 (C10), 45.48 (C11), 60 43.72 (C8), 24.99 (C9), 22.88 (C4), 20.95 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [$M^+ + H^+$] calculated for $C_{14}H_{25}N_2O_2S$, 285.1631, found, 285.1643.

Synthesis of N-(3-(dimethylamino)propyl)naphthalene-1-sulfonamide 4

This compound was synthesized according to **Method S1** with naphthalene-1-sulfonyl chloride (4 g, 18.04 mmol), triethylamine (3.8 mL, 27.06 mmol, 1.5 eqv.), and 3-(dimethylamino)propylamine (3.4 mL, 27.06 mmol, 1.5 eqv.) in DCM (50 mL) for 3 hours yielding a clear solution. The solution was then washed using distilled water (50 mL), and the organic layer was evaporated to yield a greenish yellow coloured oil. The product was further dried under reduced pressure, yielding the desired product as a pale white coloured waxy solid. Yield 99.7 % (5.27 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.67 (1H, d, $^{3}J_{H1\text{-}H2}$ = 8.5 Hz, H1), 8.25 (1H, d, $^{3}J_{H8\text{-}H7}$ = 6.2 Hz, H8), 8.05 (1H, d, $^{3}J_{H6\text{-}H7}$ = 8.2 Hz, H6), 7.95 (1H, d, $^{3}J_{H4\text{-}H3}$ = 7.8 Hz, H4), 7.65 (1H, m, H2), 7.59 (1H, m, H3), 7.52 (1H, m, H7), 2.95 (2H, t, $^{3}J_{H12\text{-}H13}$ = 5.6 Hz, H12), 2.21 (2H, t, $^{3}J_{H14\text{-}H13}$ = 5.6 Hz, H14), 2.12 (6H, s, H15), 1.55 (2H, m, H13) ppm; **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 134.85 (C9), 134.45 (C5), 133.96 (C4), 129.79 (C6), 129.16 (C2), 128.42 (C10), 128.21 (C3), 126.82 (C8), 124.76 (C7), 124.28 (C1), 59.80 (C14), 45.56 (C15), 44.77 (C12), 24.68 (C13) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br] calculated for $C_{15}H_{21}N_2O_2S$, 293.1318, found, 293.1319.

Synthesis of N-(3-(dimethylamino)propyl)-4-(trifluoromethyl)benzenesulfonamide 5

This compound was synthesized according to **Method S1**, with 4-(trifluoromethyl)benzenesulfonyl chloride (5.2 g, 20.44 mmol), triethylamine (3.30 mL, 22.48 mmol) and 3-(dimethylamino)-1-propylamine (2.98 mL, 22.48 mmol) in DCM (40 mL) for 21 hours, yielding a pale yellow solution. The solution was then washed with distilled water (120 mL), dried over $MgSO_4$ and the volatiles removed *in vacuo*, giving an off-white coloured powder.

From the powder, 0.100 g was taken and recrystallized in heptanes layered over ACN, giving small, cubic crystals. Yield: 89% (5.29 g). Mp = 69-70 °C. **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.01 (2H, d, $^{3}J_{H3-H4}$ = 8.1 Hz, H3), 7.80 (2H, d, $^{3}J_{H4-H3}$ = 8.2 Hz, H4), 3.11 (2H, t, $^{3}J_{H9-H8}$ = 5.74 Hz, H9), 2.39 (2H, t, $^{3}J_{H7-H8}$ = 5.69, H7), 2.23 (6H, s, H10), 1.69-1.63 (2H, m, H8) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 143.96 (s, C5), 134.01 (d, $^{2}J_{C-F}$ = 32.9 Hz, C2), 127.48 (s, C4), 126.12 (q, $^{3}J_{C-F}$ = 3.7 Hz, C3), 126.10 (q, J_{C-F} = 272.8 Hz, C1), 59.54 (s, C9), 45.22 (s, C10), 44.48 (s, C7), 24.61 (s, C8) ppm. **^{19}F {^{1}H} NMR** ($CDCl_3$, 376 MHz, δ): -63.05 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+] calculated for $C_{12}H_{17}F_3N_2O_2S$, 311.0996; found, 311.1035.

Synthesis of N-(3-(dimethylamino)propyl)-3,5-bis-(trifluoromethyl)benzenesulfonamide 6

This compound was synthesized according to **Method S1**, with 3,5-bis(trifluoromethyl)benzenesulfonyl chloride (4.37 g, 13.98 mmol), triethylamine (3 mL, 21.50 mmol) and 3-(dimethylamino)-1-propylamine (2.72 mL, 21.50 mmol) in DCM (25 mL) for 12 hours, yielding a pale-yellow solution. The solution was then washed with distilled water (150 mL), dried over $MgSO_4$ and the volatiles removed *in vacuo*, yielding the product as yellow-tinged coloured crystals. Yield: 77% (4.03 g). Mp = 93-94 °C. **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.30 (2H, s, H4), 8.05 (1H, s, H3), 3.12 (2H, t, $^{3}J_{H9-H8}$ = 5.66 Hz, H9), 2.41 (2H, t, $^{3}J_{H7-H8}$ = 5.66 H7), 2.21 (6H, s, H10), 1.69-1.63 (2H, m, H8) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 143.39 (C5), 132.79 (q, $^{2}J_{C-F}$ = 34.5 Hz, C2), 127.23 (q, $^{3}J_{C-F}$ = 3.1 Hz, C4), 125.77 (m, C3), 122.54 (q, J_{C-F} = 272.5 Hz, C1), 59.77 (C9), 45.13 (C10), 44.83 (C7), 24.19 (C8) ppm. **^{19}F {^{1}H} NMR** (376 MHz, $CDCl_3$, δ): -62.94 ppm. **HRMS DART** (*m/z*): [M^+] calculated for $C_{13}H_{16}F_6N_2O_2S$, 379.0870; found, 379.0914.

Synthesis of N-(3-(dimethylamino)propyl)ethanesulfonamide 7

This compound was synthesized according to **Method S2**, with ethanesulfonyl chloride (0.7 mL, 7.78 mmol) and 3-(dimethylamino)propylamine (1.5 mL, 11.67 mmol, 1.5 eq.) in DCM (50 mL) for 4 hours. The solution was washed with K_2CO_3 (0.05 M, 50 mL), and the volatile organic layer was removed *in vacuo* yielding in clear oil. Yield: 61 % (0.92 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 3.19 (2H, t, $^3J_{H4\text{-}H5}$ = 5.8 Hz, H4), 3.0 (2H, q, $^3J_{H2\text{-}H1}$ = 7.4 Hz, H2), 2.42 (2H, t, $^3J_{H6\text{-}H5}$ = 5.8 Hz, H6), 2.22 (6H, s, H7), 1.70 (2H, m, H5), 1.34 (3H, t, $^3J_{H1\text{-}H2}$ = 7.4 Hz, H1) ppm; **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 59.33 (C6), 46.05 (C2), 45.41 (C7), 44.11 (C4), 25.91 (C5), 8.35 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [$M^+ + H^+$] calculated for $C_9H_{23}N_2O_2S$, 223.1475, found, 223.1480.

Synthesis N-(3-(dimethylamino)propyl)butane-1-sulfonamide 8

This compound was synthesized according to **Method S2**, with butanesulfonyl chloride (1.7 mL, 12.77 mmol) and 3-(dimethylamino)propylamine (2.4 mL, 19.15 mmol, 1.5 equiv) in DCM (50 mL) for 4 hours. The solution was washed with K_2CO_3 (0.05 M, 50 mL), and the volatile organic layer was removed *in vacuo* yielding in a clear oil. Yield: 81 % (2.31 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 3.15 (2H, t, $^3J_{H6\text{-}H7}$ = 5.9 Hz, H6), 2.94 (2H, t, $^3J_{H4\text{-}H3}$ = 7.9 Hz, H4), 2.38 (2H, t, $^3J_{H8\text{-}H7}$ = 5.9 Hz, H8), 2.18 (6H, s, H9), 1.78-1.61 (4H, m, H3 and H7), 1.48-1.34 (2H, m, H2), 0.91 (3H, t, $^3J_{H1\text{-}H2}$ = 7.3 Hz, H1) ppm; **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 59.08 (C8), 51.56 (C4), 45.38 (C9), 43.83 (C6), 26.05 (C3), 25.70 (C7), 21.54 (C2), 13.63 (C1) ppm. **HRMS ESI-TOF** (*m/z*): [$M^+ + H^+$] calculated for $C_7H_{10}N_3O_2S$, 210.1271, found, 210.1276.

Synthesis of N-(3-bromopropyl)-2,4,6-trimethylbenzenesulfonamide 9

This compound was synthesized according to **Method S1** with 2,4,6-trimethylbenzene-1-sulfonyl chloride (4.89 g, 9.14 mmol), triethylamine (7.79 mL, 55.88 mmol, 2.5 eqv.), and 3-bromopropylamine hydrobromide (7.34 g, 33.53 mmol, 1.5 eqv.) in DCM (50 mL) for 3 hours yielding a clear solution. The reaction mixture was then extracted using two aliquots of distilled water (25 mL), which were then discarded. The collected organic phase was then gravity filtered through magnesium sulfate to remove excess moisture and evaporated overnight to obtain 7.39 g of crude, off-white semi-crystalline product. The crude product was packed onto silica and purified by flash column chromatography (4.5 cm × 5.0 cm frit, 40 g silica) by eluting with DCM (120 mL) to afford 4.86 g of the desired product, as confirmed using TLC. The resulting white semi-crystalline solid was recrystallized from minimal DCM to yield clear, colourless crystals. Yield: 68.0% (4.86 g). Mp = 93-94˚C; ^{1}H NMR ($CDCl_3$, 400 MHz, δ) 6.97 (s, 2H, H3), 4.60 (s, 1H, H10), 3.40 (t, $^{3}J_{H9\text{-}H8}$ = 6.3 Hz, 2H, H9), 3.08 (q, $^{3}J_{H7\text{-}H8}$ = 6.5 Hz, 2H, H7), 2.65 (s, 6H, H5), 2.31 (s, 3H, H1), 2.01 (8, p, $^{3}J_{H8\text{-}H7}$ = 6.5 Hz, $^{3}J_{H8\text{-}H9}$ = 6.3 Hz, 2H, H8) ppm. ^{13}C {^{1}H} NMR (CDCl3, 101 MHz, δ) 142.39 (C2), 139.06 (C4), 133.49 (C5), 132.07 (C3), 40.86 (C7), 32.25 (C8), 30.29 (C9), 22.96 (C3), 20.93 (C1) ppm; HRMS-DART (m/z): [M^+] calculated for $C_{12}H_{18}BrNO_2S$, 320.03199; found, 320.03249.

Synthesis of N-(3-(4-benzoylphenoxy)propyl)-2,4,6-trimethylbenzenesulfonamide 10

A round bottom flask was charged with 1,3-dibromopropane, K_2CO_3 and MeCN. A solution of 4-hydroxybenzophenone in MeCN was prepared and added dropwise to the previous mixture under reflux. The resultant yellow mixture was heated at reflux until a colourless solution was obtained or until thin layer chromatography showed the disappearance of starting material 4-hydroxybenzophenone. Excess salt was filtered through diatomaceous earth and washed with

acetone. The solution was evaporated under reduced pressure to give the crude product, which was packed onto silica and purified by dry column chromatography, first by pre-eluting with 5% ethyl acetate/hexanes then eluting acetone to retrieve the purified product. The resulting yellow oil was recrystallized from 20% ethyl acetate/hexanes to yield translucent yellow crystals. Yield: 95.9% (5.24 g). Mp = 75-76 °C. ^{1}H NMR ($CDCl_3$, 400 MHz, δ) 7.80 (d, $^{3}J_{H12\text{-}H11}$ = 8.7 Hz, 2H, H12), 7.75 (d, $^{3}J_{H16\text{-}H17}$ = 7.4 Hz, 2H, H16), 7.57 (t, $^{3}J_{H18\text{-}H17}$ = 7.5 Hz, 1H, H18), 7.48 (t, $^{3}J_{H17\text{-}H16}$ = 7.4 Hz, $^{3}J_{H17\text{-}H18}$ = 7.5 Hz, 2H, H17), 6.92 (s, 2H, H3), 6.87 (d, $^{3}J_{H11\text{-}H12}$ = 8.7 Hz, 2H, H11), 4.04 (t, $^{3}J_{H9\text{-}H8}$ = 5.7 Hz, 2H, H9), 3.16 (t, $^{3}J_{H7\text{-}H18}$ = 6.3 Hz, 2H, H7), 2.63 (s, 6H, H5), 2.27 (s, 3H, H1), 2.08 – 1.87 (m, 2H, H8). ^{13}C {^{1}H} NMR ($CDCl_3$, 101 MHz) δ 195.51 (C14), 162.09 (C10), 142.24 (C6), 139.03 (C4), 138.19 (C15), 133.53 (C2), 132.51 (C12), 131.99 (C3), 131.98 (C18), 130.40 (C13), 129.72 (C16), 128.22 (C17), 113.93 (C11), 65.70 (C9), 39.97 (C7), 29.07 (C8), 22.93 (C5), 20.91 (C1). HRMS-ESI-TOF (m/z): [M^+ - Br^-] calculated for $C_{25}H_{28}NO_4S$, 438.17390; found, 438.17442.

Synthesis of 3-(4-benzoylphenoxy)-N,N-dimethyl-N-(3-(phenylsulfonamido)propyl)propan-1-aminium bromide 1a

This compound was synthesized according to **Method S3**, using *N*-(3-(dimethylamino)propyl)phenylsulfonamide (0.921 g, 3.8 mmol) and 4-(3-bromopropoxy)benzophenone (1.29 g, 4.0 mmol) in ACN (10 mL) for 48 hours; yielding in viscous pale yellow solution. The product was obtained as fluffy pale yellow-coloured powder after purification. Yield: 82% (1.74 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.93 (2H, m, H3), 7.82 (1H, m, H5), 7.74 ‑ 7.62 (4H, m, H15 & H19), 7.53 (1H, m, H21), 7.49 ‑ 7.37 (5H, m, (H1, H2, & H20)), 6.89 (2H, d, $^{3}J_{H14\text{-}H15}$ = 8.9 Hz, H14), 4.11 (2H t, $^{3}J_{H12\text{-}H11}$ = 5.3 Hz, H12), 3.79 ‑ 3.56

(4H, m, H8 & H10), 3.27 (6H, s, H9), 3.01 (2H, m, H6), 2.29 (2H, m, H11), 2.10 (2H, m, H7) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.58 (C17), 161.80 (C13), 139.64 (C1), 137.99 (C4), 132.71 (C18), 132.51 (C15), 132.19 (C21), 130.60 (C16), 139.75 (C2), 129.32 (C19), 128.35 (C20), 127.22 (C3), 114.31 (C14), 64.68 (C12), 62.44 (C8), 62.06 (C10), 39.98 (C6), 23.08 (C11), 22.75 (C7) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{27}H_{33}N_2O_4S$, 481.2156; found 481.2155.

Synthesis of 3-(4-benzoylphenoxy)-N,N-dimethyl-N-(3-(4-methylphenylsulfonamido)propyl)propan-1- aminium bromide 2a

This compound was synthesized using N-(3-(dimethylamino)propyl)-4-methylphenyl)sulfonamide (1.05 g, 4.1 mmol) and 4-(3-bromopropoxy)benzophenone (1.417 g, 4.44 mmol) in ACN (10 mL) for 48 hours; yielding in viscous pale yellow solution. The product was obtained as fluffy white coloured powder after purification. Yield: 80 % (1.88 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.80 (2H, d, $^{3}J_{H4\text{-}H2}$ = 8.2 Hz, H4), 7.73 – 7.65 (4H, m, H16 & H20), 7.56 – 7.59 (1H, m, H22), 7.42 (2H, t, $^{3}J_{H22\text{-}H21}$ = 7.2 Hz, H22), 7.21 (2H, d, $^{3}J_{H2\text{-}H4}$ = 8.2 Hz, H2), 6.89 (2H, d, $^{3}J_{H15\text{-}H16}$ = 8.8 Hz, H15), 4.12 (2H, t, $^{3}J_{H13\text{-}H12}$ = 5.4 Hz, H13), 3.79 – 3.59 (4H, m, H9 & H11), 3.29 (6H, s, H10), 3.07 – 2.90 (2H, m, H7), 2.35 – 2.23 (5H, m, H1 & H12), 2.19 – 2.03 (2H, m, H8) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.57 (C18), 161.82 (C14), 143.50 (C3), 138.05 (C5), 136.53 (C19), 132.54 (C16), 132.19 (C22), 130.69 (C17), 129.90 (C20), 129.80 (C2), 128.36 (C21), 127.34 (C4), 114.32 (C15), 64.71 (C13), 62.53 (C9), 62.11 (C11), 51.62 (C10), 40.01 (C7), 23.15 (C12), 22.75 (C8), 21.57 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{28}H_{35}N_2O_4S$, 495.2312; found 495.2319.

Synthesis of 3-(4-benzoylphenoxy)-N,N-dimethyl-N-(3-(2,4,6-trimethylphenylsulfonamido)propyl)propan-1-aminium bromide 3a

This compound was synthesized according to **Method S3**, using *N*-(3-(dimethylamino)propyl)-2,4,6- trimethylphenyl)sulfonamide (0.853 g, 3.0 mmol) and 4-(3-bromopropoxy)benzophenone (1.0 g, 3.13 mmol) in ACN (10 mL) for 48 hours; yielding in viscous pale yellow solution. The product was obtained as fluffy white-coloured powder after purification. Yield: 67 % (1.20 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.76 (2H, d, $^{3}J_{H17\text{-}H16}$ = 8.7 Hz, H17), 7.72 (d, 2H, $^{3}J_{H21\text{-}H22}$ = 7.2 Hz, H21), 7.56 (2H, t, $^{3}J_{H23\text{-}H22}$ = 7.4 Hz, H23), 7.56 (2H, m, H22), 7.22 (1H, t, $^{3}J_{H7\text{-}H8}$ = 6.2 Hz, H7), 6.94 (2H, t, $^{3}J_{H16\text{-}H17}$ = 6.0 Hz, H16), 6.90 (2H, s, H3), 4.21 (2H, t, $^{3}J_{H14\text{-}H13}$ = 5.4 Hz, H14), 3.85 (2H, m, H10), 3.75 (2H, m, H12), 3.37 (6H, s, H11), 3.04 (2H, m, H8), 2.63 (6H, s, H4), 2.38 (2H, m, H13), 2.25 (3H, s, H1), 2.20 (2H, m, H9) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.63 (C19), 161.81 (C15), 142.40 (C5), 139.24 (C2), 138.15 (20), 133.41 (C6), 132.66 (C17), 132.22 (C23), 132.18 (C3), 130.91 (C18), 129.90 (C21), 128.39 (C22), 64.72 (C14), 62.68 (C10), 62.29 (C12), 51.77 (C11), 39.36 (C8), 23.42 (C4), 23.27 (C13), 23.05 (C9), 21.03 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{30}H_{39}N_2O_4S$, 523.2625; found 523.2636.

Synthesis of 3-(4-benzoylphenoxy)-N,N-dimethyl-N-(3-(naphthalene-1-sulfonamido)propyl)propan-1-aminium bromide 4a

This compound was synthesized according to **Method S3**, using *N*-(3-(dimethylamino)propyl)naphthalene-1-sulfonamide (0.584 g, 2.0 mmol) and 4-(3-bromopropoxy)benzophenone (0.702 g, 2.2 mmol) in ACN (10 mL) for 48 hours; yielding in viscous pale yellow solution. The product was obtained as fluffy white coloured powder after purification. Yield: 82 % (1.0 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.80 (1H, d, $^{3}J_{H1\text{-}H2}$ = 8.7 Hz, H1), 8.15 (1H, d, $^{3}J_{H8\text{-}H7}$ = 7.3 Hz, H8), 7.96 (1H, s, H11), 7.91 (1H, d, $^{3}J_{H6\text{-}H7}$ = 8.3 Hz, H6), 7.78

(1H, d, $^{3}J_{H4\text{-}H3}$ = 8.2 Hz, H4), 7.70 – 7.55 (4H, m, (H2, H25, & H21)), 7.51 (2H, t, $^{3}J_{H27\text{-}H26}$ = 7.4 Hz, H27), 7.46 – 7.34 (4H, m, (H3, H26, & H7), 6.77 (2H, d, $^{3}J_{H20\text{-}H21}$ = 8.7 Hz, H20), 3.92 (2H, m, H18), 3.59 – 3.37 (4H, m, H14 & H16), 3.19 – 2.91 (8H, m, H15 & H12), 2.04 (2H, m, H17), 1.91 (2H, m, H13) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.59 (C23), 161.77 (C19), 138.04 (C24), 134.85 (C9), 134.21 (C6), 132.50 (C25), 132.20 (C27), 130.56 (C10), 129.80 (C2), 129.36 (C8), 129.05 (C4), 128.76 (C21), 128.37 (C7), 128.00 (C22), 127.18 (C3), 125.20 (C1), 124.52 (C26), 114.25 (C20), 64.59 (C18), 62.42 (C14), 62.10 (C16), 51.42 (15), 39.83 (C12), 22.92 (C17+C13) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{31}H_{35}N_2O_4S$, 531.2312; found 531.2328.

Synthesis of 3-(4-benzoylphenoxy)-N-(3-((4-(trifluoromethyl)phenyl)sulfonamido) propyl)-N,N-dimethylpropan-1-aminium bromide 5a

This compound was synthesized according to **Method S3**, using *N*-(3-(dimethylamino)propyl)-4-(trifluoromethyl)benzenesulfonamide (2.40 g, 8.06 mmol) and 4-(3-bromopropoxy)benzophenone (2.52 g, 8.06 mmol) in ACN (25 mL) for 48 hours. The product was yielded as an off-white coloured powder after purification. Yield: 86% (4.38 g). Mp = 111-113°C. **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.14 (2H, d, $^{3}J_{H4\text{-}H3}$ = 7.45 Hz , H4), 7.76-7.72 (m, 6H, H3 + H16 + H20 overlap), 7.57 (t, $^{3}J_{H22\text{-}H21}$ = 6.67 Hz, 1H, H22), 7.47 (t, $^{3}J_{H21\text{-}H22}$ = 6.77 Hz, $^{3}J_{H21\text{-}H20}$ = 7.29 Hz, H21), 6.96 (2H, d, $^{3}J_{H15\text{-}H16}$ = 8.81 Hz, H15), 4.18 (2H, t, $^{3}J_{H13\text{-}H12}$ = 5.35 Hz, H13), 3.83 (2H, t, $^{3}J_{H11\text{-}H12}$ = 7.79 Hz, H11), 3.71 (2H, t, $^{3}J_{H9\text{-}H8}$ = 7.85 Hz, H9), 3.35 (6H, s, H10), 3.08 (2H, m, H7), 2.36 (2H, m, H12), 2.19 (2H, m, H8) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.53 (C18), 161.59 (C14), 142.92 (C5), 137.86 (C19), 134.23 (q, $^{2}J_{C\text{-}F}$ = 32.93 Hz, C2), 132.50 (C16), 132.20 (C22), 130.80 (C17), 129.71 (C20), 128.94 (C21), 127.79, (C4) 126.33 (q, $^{3}J_{C\text{-}F}$ = 3.58 Hz, C3), 123.23 (q, $J_{C\text{-}F}$ = 272.96

Hz, C1), 114.17 (C15), 64.48 (C13), 62.44 (C11), 62.20 (C9), 51.59 (C10), 39.91 (C7), 23.08 (C12), 22.76 (C8) ppm. **^{19}F {^{1}H} NMR** ($CDCl_3$, 376 MHz, δ): -61.32 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+] - Br^- calculated for $C_{28}H_{32}F_3N_2O_4S$, 549.2029; found, 549.203.

Synthesis of 3-(4-benzoylphenoxy)-N-(3-((3,5-bistrifluoromethyl)phenyl)sulfonamido)propyl-N,N-dimethylpropan-1-aminium bromide 6a

This compounds was synthesized according to **Method S3**, using *N*-(3-(dimethylamino)propyl)-3,5-bis-(trifluoromethyl)benzenesulfonamide (2.99 g, 7.93 mmol), 4-(3-bromopropoxy)benzophenone (3.28 g, 10.31 mmol), and ACN (20 mL) for 60 hours. The volatiles were removed *in vacuo*, giving a white coloured powder. A small portion (0.1 g) was taken from the batch, dissolved in ACN (10 mL), and passed through a 45 nm PTFE syringe filter into a 100 mL beaker which was left in the fumehood overnight, resulting in the growth of off-white coloured crystals. The product was insoluble in MeOD, $CDCl_3$, and D_2O. Yield: 88% (4.84 g). Mp = 180-182 °C. **^{1}H NMR** (DMSO-d_6, 400 MHz, δ): 8.55 (1H, s, H3), 8.39 (2H, s, H4), 8.26 (1H, m, H6), 7.77 (2H, d, $^{3}J_{H16\text{-}H15}$ = 8.86 Hz, H16), 7.69-7.65 (m, 3H, H20 + H22 overlap), 7.56 (2H, t, $^{3}J_{H21\text{-}H22}$ = 7.43 Hz, $^{3}J_{H21\text{-}H20}$ = 7.52 Hz, H21), 7.11 (2H, d, $^{3}J_{H15\text{-}H16}$ = 8.87 Hz, H15), 4.17 (2H, t, $^{3}J_{H13\text{-}H12}$ = 5.86 Hz, H13), 3.47 (2H, t, $^{3}J_{H11\text{-}H12}$ = 7.60 Hz, H11), 3.36 (2H, m, H9), 3.07 (6H, s, H10), 2.90 (2H, m, H7), 2.20 (2H, quint, ^{3}J = 6.83 Hz, H12), 1.89 (2H, quint, ^{3}J = 6.97 Hz, H8) ppm. **^{13}C {^{1}H} NMR** (DMSO-d_6, 101 MHz, δ): 194.89 (C18), 162.33 (C14), 143.11 (C5), 138.15 (C19), 132.67 (C16), 132.63 (C22), 131.96 (q, $^{2}J_{C\text{-}F}$ = 33.84 Hz, C2), 130.12 (C17), 129.71 (C21), 128.94 (C20), 127.79 (q, $^{3}J_{C\text{-}F}$ = 3.12 Hz, C4), 127.25 (m, C3), 123.07 (q, $J_{C\text{-}F}$ = 273.27 Hz, C1), 114.87 (C15), 65.56 (C13), 61.16 (C11), 61.04 (C9), 50.46 (C10), 22.99 (C12), 22.56 (C8)

ppm. **^{19}F {^{1}H} NMR** (DMSO-d_6, 376 MHz, δ): -61.32 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{29}H_{31}F_6N_2O_4S$, 549.2029; found, 549.203.

Synthesis of 3-(4-benzoylphenoxy)-N-(3-(ethylsulfonamido)propyl)-N,N-dimethylpropan-1-aminium bromide 7a

This compound was synthesized according to **Method S3** using *N*-(3-(dimethylamino)propyl)ethanesulfonamide (0.250 g, 1.29 mmol) and 4-(3-bromopropoxy)benzophenone (0.411 g, 1.29 mmol) in ACN (10 mL) for 48 hours; yielding in viscous pale yellow solution. The product was obtained as fluffy pale yellow coloured powder after purification. Yield: 77% (0.52 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.78 (2H, d, $^{3}J_{H13\text{-}H12}$ = 8.7 Hz, H13), 7.72 (2H, d, $^{3}J_{H17\text{-}H18}$ = 7.4 Hz, H17), 7.56 (2H, t, $^{3}J_{H19\text{-}H18}$ = 7.4 Hz, H19), 7.50 – 7.40 (2H, m, H18), 7.12 (1H, t, $^{3}J_{H3\text{-}H4}$ = 6.0 Hz, H3), 6.98 (2H, d, $^{3}J_{H12\text{-}H13}$ = 8.8 Hz, H12), 4.21 (2H, t, $^{3}J_{H10\text{-}H9}$ = 5.3 Hz, H10), 3.80 (2H, m, H6), 3.71 (2H, m, H8), 3.35 (6H, s, H7), 3.31-3.22 (2H, m, H4), 3.07 (2H, q, $^{3}J_{H2\text{-}H3}$ = 7.3 Hz, H2), 2.37 (2H, m, H9), 2.20 (2H, m, H5), 1.34 (3H, t, $^{3}J_{H1\text{-}H2}$ = 7.4 Hz, H1) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.55 (C15), 161.66 (C11), 137.94 (C16), 132.55 (C13), 132.16 (C19), 130.83 (C14), 129.78 (C17), 128.29 (C18), 114.22 (C12), 64.57 (C10), 62.46 (C6), 62.17 (C8), 51.61 (C7), 46.44 (C2), 39.95 (C4), 23.64 (C5), 23.11 (C9), 8.27 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{23}H_{33}N_2O_4S$, 433.2156; found 433.2153.

Synthesis of 3-(4-benzoylphenoxy)-N-(3-(butylsulfonamido)propyl)-N,N-dimethylpropan-1-aminium bromide 8a

This compound was synthesized **Method S3** using *N*-(3-(dimethylamino)propyl)butane-1-sulfonamide (0.324 g, 1.46 mmol) and 4-(3-bromopropoxy)benzophenone (0.466 g, 1.46 mmol) in ACN (10 mL) for 48 hours; yielding a viscous pale yellow solution. The product was obtained as fluffy pale yellow coloured powder after purification. Yield: 73% (0.58 g) **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.74 (2H, d, $^{3}J_{H15\text{-}H14}$ = 8.7 Hz, H15), 7.69 (2H, d, $^{3}J_{H19\text{-}H20}$ = 7.1 Hz, H19), 7.54 (1H, t, $^{3}J_{H21\text{-}H20}$ = 7.4 Hz, H21), 7.44 (2H, m, H20), 7.10 (1H, t, $^{3}J_{H5\text{-}H6}$ = 5.6 Hz, H5), 6.96 (2H, d, $^{3}J_{H14\text{-}H15}$ = 8.8 Hz, H14), 4.18 (1H, t, $^{3}J_{H12\text{-}H11}$ = 5.2 Hz, H12), 3.79‑3.61 (2H, m, H8 & H10), 3.33 (6H, s, H9), 3.24 (2H, m, H6), 3.02 (2H, m, H4), 2.33 (2H, m, H11), 2.18 (2H, m, H7), 1.73 (2H, m, H3), 1.38 (2H, m, H2), 0.87 (3H, t, $^{3}J_{H1\text{-}H2}$ = 7.3 Hz, H1) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 195.56 (C17), 161.17 (C13), 137.89 (C18), 132.50 (C15), 132.16 (C21), 130.62 (C16), 129.71 (C19), 128.29 (C20), 114.27 (C14), 64.67 (C12), 62.30 (C8), 61.96 (C10), 51.79 (C4), 51.56 (C9), 25.37 (C3), 23.55 (C7), 23.05 (C11), 21.51 (C2), 13.64 (C1) ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Br^-] calculated for $C_{25}H_{37}N_2O_4S$, 461.2469; found 461.2458.

Synthesis of N,N-dimethyl-3-(phenylsulfonamido)-N-(3-(trimethoxysilyl)propyl)propan-1-aminium chloride 1b

This compound was synthesized according to **Method S3**, with *N*-(3-(dimethylamino)propyl)benzenesulfonamide (1.0 g, 4.13 mmol) and (3-chloropropyl)trimethoxysilane (1.1 mL, 6.19 mmol, 1.5 eq.) in ACN (3 mL) for 4 hours resulting in viscous golden yellow brown solution. The product was purified using Et_2O (10 mL × 3) and obtained as clear golden brown coloured gummy oil. Yield: 97.5 % (1.77 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.39 (1H, br s, H5), 7.96 (d, 2H, H3), 7.54 ‑ 7.341 (3H, m, H1 & H2), 3.66 (2H, m,

H8), 3.51 (9H,s, H13), 3.34 (2H, m, H10), 3.21 (6H, s, H9), 3.00 (2H, m, H6), 2.06 (2H, m, H7), 1.75 (2H, m, H11), 0.59 (2H, t, $^{3}J_{H12\text{-}H11}$ = 7.8 Hz, H12) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 139.86 (C4), 132.41 (C1), 129.14 (C2), 127.20 (C3), 65.94 (C10), 62.45 (C8), 51.10 (C9), 50.72 (C13), 39.93 (C6), 22.61 (C7), 16.45 (C11), 5.57 (C12) ppm. **^{29}Si {^{1}H} NMR** ($CDCl_3$, 79.4 MHz, δ): -44.41 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Cl^-] calculated for $C_{17}H_{33}N_2O_5SSi$, 405.1874, found, 405.8166.

Synthesis of N,N-dimethyl-3-(4-methylphenylsulfonamido)-N-(3-(trimethoxysilyl)propyl)propan-1-aminium chloride 2b

This compound was synthesized according to **Method S3,** with *N*-(3-(dimethylamino)propyl)-4-methylbenzenesulfonamide (1.0 g, 3.9 mmol) and (3-chloropropyl)trimethoxysilane (1.1 mL, 5.85 mmol, 1.5 eq.) in ACN (3 mL) for 3.5 hours resulting in viscous golden yellow brown coloured solution. The product was purified using Et_2O (10 mL × 3) and obtained as clear golden brown gummy oil. Yield: 97 % (1.67 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.18 (1H, br s, H6), 7.85 (2H, d, $^{3}J_{H4\text{-}H2}$ = 7.9 Hz, H4), 7.29 (2H, d, $^{3}J_{H2\text{-}H4}$ = 7.7 Hz, H2), 3.69 (2H, m, H9), 3.55 (9H, s, H14), 3.37 (2H, m, H11), 3.25 (6H, s, H10), 3.01 (2H, m, H7), 2.40 (3H, s, H1), 2.10 (2H, m, H8), 1.79 (2H, m, H12), 0.63 (2H, t, $^{3}J_{H13\text{-}H12}$ = 7.7 Hz, H13) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 143.08 (C5), 136.85 (C3), 129.70 (C2), 127.85 (C4), 65.82 (C11), 62.45 (C9), 51.10 (C14), 50.70 (C10), 39.91 (C7), 22.66 (C1), 21.46 (C8), 16.44 (C12), 5.57 (C13) ppm. **^{29}Si {^{1}H} NMR** ($CDCl_3$, 79.4 MHz, δ): -44.37 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Cl^-] calculated for $C_{18}H_{35}N_2O_5SSi$, 419.2030, found, 419.2026.

Synthesis N,N-dimethyl-3-(trimethoxysilyl)-N-(3-(2,4,6-trimethylphenylsulfonamido)propyl)propan-1-aminium chloride 3b

This compound was synthesized according to **Method S3,** with *N*-(3-(dimethylamino)propyl)-2,4,6- trimethylbenzenesulfonamide (2.0 g, 7.03 mmol) and (3-chloropropyl)trimethoxysilane (1.9 mL, 10.55 mmol, 1.5 eq.) in ACN (3 mL) for 4.5 hours resulting in viscous golden yellow brown solution. The product was purified using Et_2O (10 mL × 3) and obtained as clear golden brown coloured gummy oil. Yield: 92.6 % (3.27 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.74 (1H, t, $^3J_{H7\text{-}H8}$ = 6.0 Hz, H7), 6.90 (2H, s, H3), 3.70 (2H, m, H8), 3.53 (9H, s, H15), 3.37 (2H, m, H12), 3.25 (6H, s, H11), 2.98 (2H, m, H10), 2.62 (6H, br s, H4), 2.25 (3H, s, H1), 2.09 (2H, m, H9), 1.78 (2H, m, H13), 0.62 (2H, t, $^3J_{H14\text{-}H13}$ = 7.9 Hz, H14) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 142.01 (C6), 139.22 (C5), 133.83 (C2), 132.01 (C3), 66.06 (C12), 62.51 (C10), 51.22 (C11), 50.81 (C15), 39.33 (C8), 23.28 (C4), 22.88 (C1), 20.95 (C9), 16.57 (C13), 5.70 (C14) ppm. **^{29}Si {^{1}H} NMR** ($CDCl_3$, 79.4 MHz, δ): -44.43 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Cl^-] calculated for $C_{20}H_{39}N_2O_5SSi$, 447.2343, found, 447.2357.

Syntehsis of N,N-dimethyl-3-(naphthalene-1-sulfonamido)-N-(3-(trimethoxysilyl)propyl)propan-1-aminium chloride 4b

This compound was synthesized according to **Method S3** using *N*-(3-(dimethylamino)propyl)naphthalene-1-sulfonamide (0.5 g, 2.21mmol) and (3-chloropropyl)trimethoxysilane (0.6 mL, 3.31 mmol, 1.5 eq.) in ACN (3 mL) for 5 hours resulting in viscous golden yellow brown solution. The product was purified using Et_2O (10 mL × 3) and obtained as clear golden brown coloured gummy oil. Yield: 78.8 % (0.85 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 8.83 (1H, d, $^3J_{H8\text{-}H7}$ = 8.6 Hz, H8), 8.47 (1H, t, $^3J_{H11\text{-}H12}$ = 5.7 Hz, H11), 8.20 (1H, d, $^3J_{H6\text{-}H7}$ = 7.3 Hz, H6), 7.99 (1H, d, $^3J_{H1\text{-}H2}$ = 8.1 Hz, H1), 7.87 (1H, d, $^3J_{H4\text{-}H3}$ = 8.1 Hz, H4), 7.69 (1H, m, H7), 7.55 ‑ 7.46 (2H, m, H3 & H2), 3.49 (11H, br s, H14 & H19), 3.20 (2H, m, H16),

3.06 (8H, br s, H12 & H15), 1.98 – 1.86 (2H, m, H13), 1.68 – 1.54 (2H, m, H17), 0.51 (2H, t, $^{3}J_{H18\text{-}H17}$ = 7.8 Hz, H18) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 135.12 (C9), 134.16 (C5), 133.91 (C1), 129.07 (C6), 128.8 (C4), 128.56 (C7), 128.12 (C10), 127.02 (C3), 125.30 (C8), 124.31 (C2), 65.84 (C16), 62.32 (C14), 50.92 (C15), 50.69 (C19), 39.79 (C12), 22.81 (C13), 16.33 (C17), 5.48 (C18) ppm. **^{29}Si {^{1}H} NMR** ($CDCl_3$, 79.4 MHz, δ): -44.49 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Cl^-] calculated for $C_{21}H_{35}N_2O_2SSi$, 455.2030, found, 455.2018.

Synthesis of 3-(ethylsulfonamido)-N,N-dimethyl-N-(3-(trimethoxysilyl)propyl)propan-1-aminium chloride 7b

This compound was synthesized according to **Method S3** with *N*-(3-(dimethylamino)propyl)ethanesulfonamide (1.0 g, 5.15 mmol) and (3-chloropropyl)trimethoxysilane (1.4 mL, 7.72 mmol, 1.5 eq.) in ACN (3 mL) for 5 hours resulting in viscous golden yellow brown solution. The product was purified using Et_2O (10 mL × 3) and obtained as clear golden brown coloured gummy oil. Yield: 86.0 % (1.73 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.63 (1H, s, H3), 3.66 (2H, m, H6), 3.53 (9H, m, H11), 3.36 (2H, m, H8), 3.25 – 3.15 (8H, m, H7 & H4), 3.03 (2H, m, H2), 2.12 (2H, m, H5), 1.78 (2H, m, H9), 1.31 (3H, m, H1), 0.62 (2H, t, $^{3}J_{H10\text{-}H9}$ = 7.8 Hz, H10) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 65.89 (C8), 62.40 (C6), 51.18 (C7), 50.81 (C11), 46.37 (C2), 40.09 (C4), 23.58 (C5), 16.54 (C9), 8.28 (C1), 5.73 (C10) ppm. **^{29}Si {^{1}H} NMR** ($CDCl_3$, 79.4 MHz, δ): -44.51 ppm.

Synthesis of 3-(butylsulfonamido)-N,N-dimethyl-N-(3-(trimethoxysilyl)propyl)propan-1-aminium chloride 8b

This compound was synthesized according to **Method S3** with *N*-(3-(dimethylamino)propyl)butanesulfonamide (1.0 g, 4.50 mmol) and (3-

chloropropyl)trimethoxysilane (1.2 mL, 6.75 mmol, 1.5 eq.) in ACN (3 mL) for 5 hours resulting in viscous golden yellow brown solution. The product was purified using Et_2O (10 mL × 5) and obtained as clear golden brown coloured gummy oil. Yield: 60.0 % (1.13 g). **^{1}H NMR** ($CDCl_3$, 400 MHz, δ): 7.62 (1H, br s, H5), 3.64 (2H, m, H8), 3.51 (9H, s, H13), 3.34 (2H, m, H4), 3.24 - 3.12 (8H, m, H9 and H6), 2.98 (2H, m, H4), 2.09 (2H, m, H7), 1.83 - 1.66 (4H, m, H11 & H3), 1.38 (2H, m, H2), 0.86 (3H, m, H1), 0.60 (2H, t, $^{3}J_{H12\text{-}H11}$ = 7.3 Hz, H12) ppm. **^{13}C {^{1}H} NMR** ($CDCl_3$, 101 MHz, δ): 65.82 (C10), 51.81 (C4), 51.12 (C9), 50.74 (C13), 40.04 (C6), 25.38 (C3), 23.50 (C7), 21.58 (C2), 16.50 (C11), 13.62 (C1), 5.68 (C12) ppm. **^{29}Si {^{1}H} NMR** ($CDCl_3$, 79.4 MHz, δ): -44.50 ppm. **HRMS-ESI-TOF** (*m/z*): [M^+ - Cl^-] calculated for $C_{15}H_{37}N_2O_5SSi$, 385.2187, found, 385.2185.

NMR Spectra of Synthesized Compounds

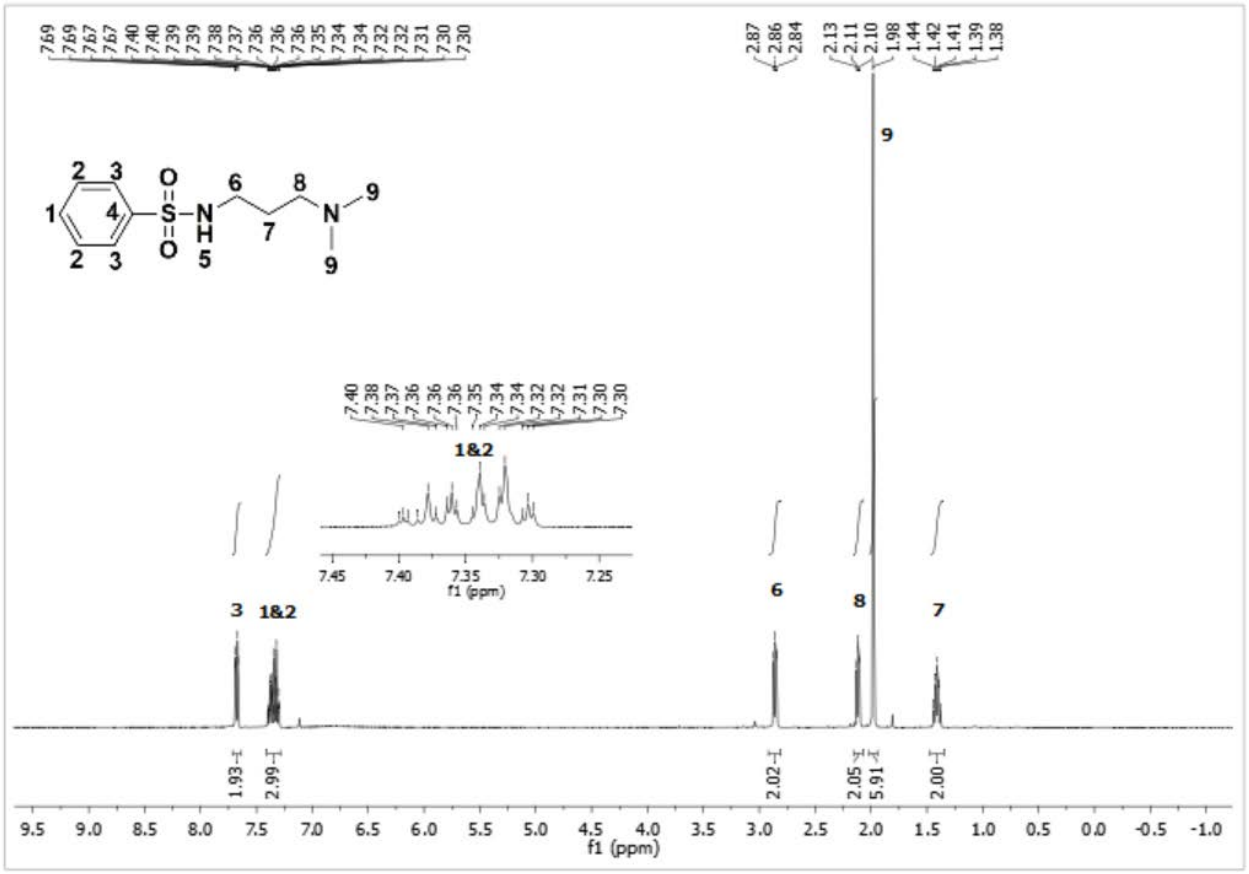


Figure S 19. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **1**.

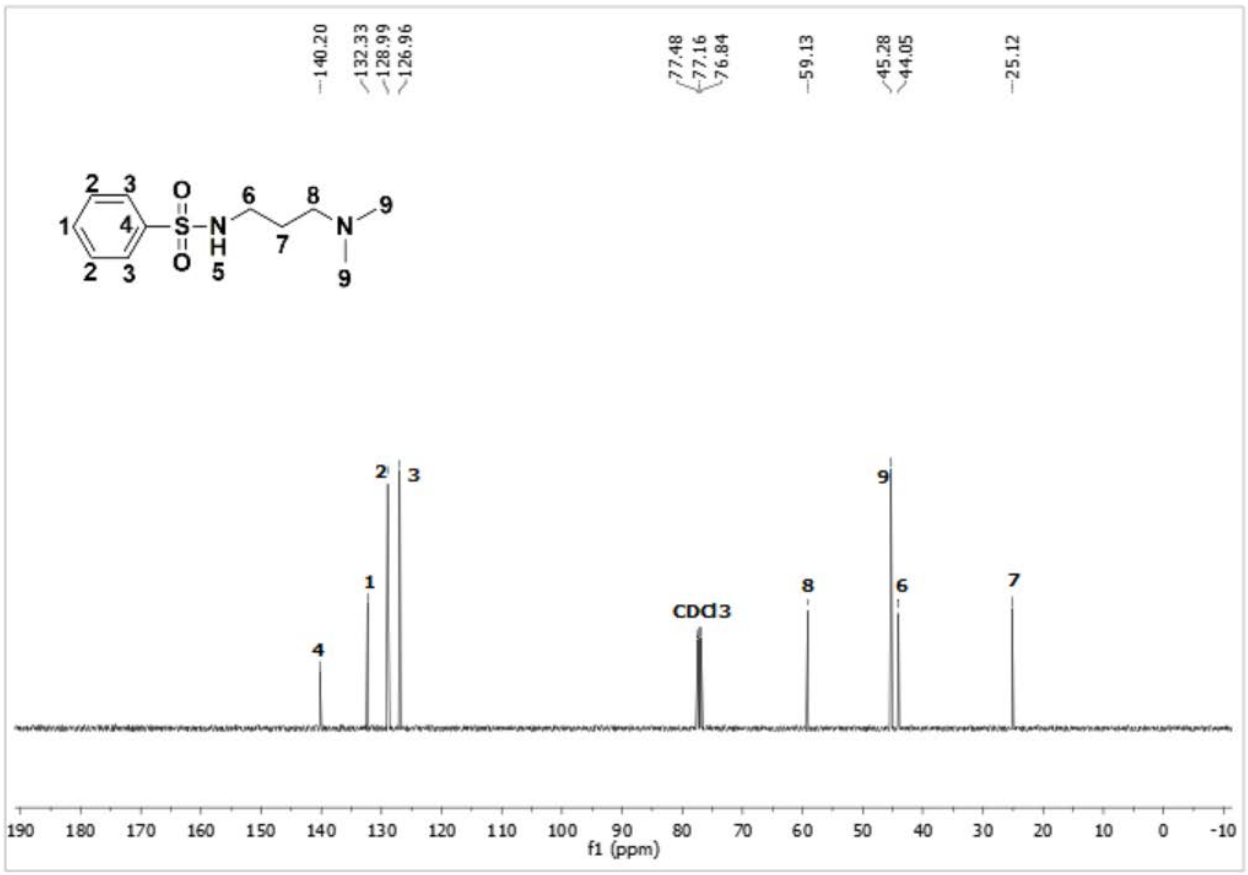


Figure S 20. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **1**.

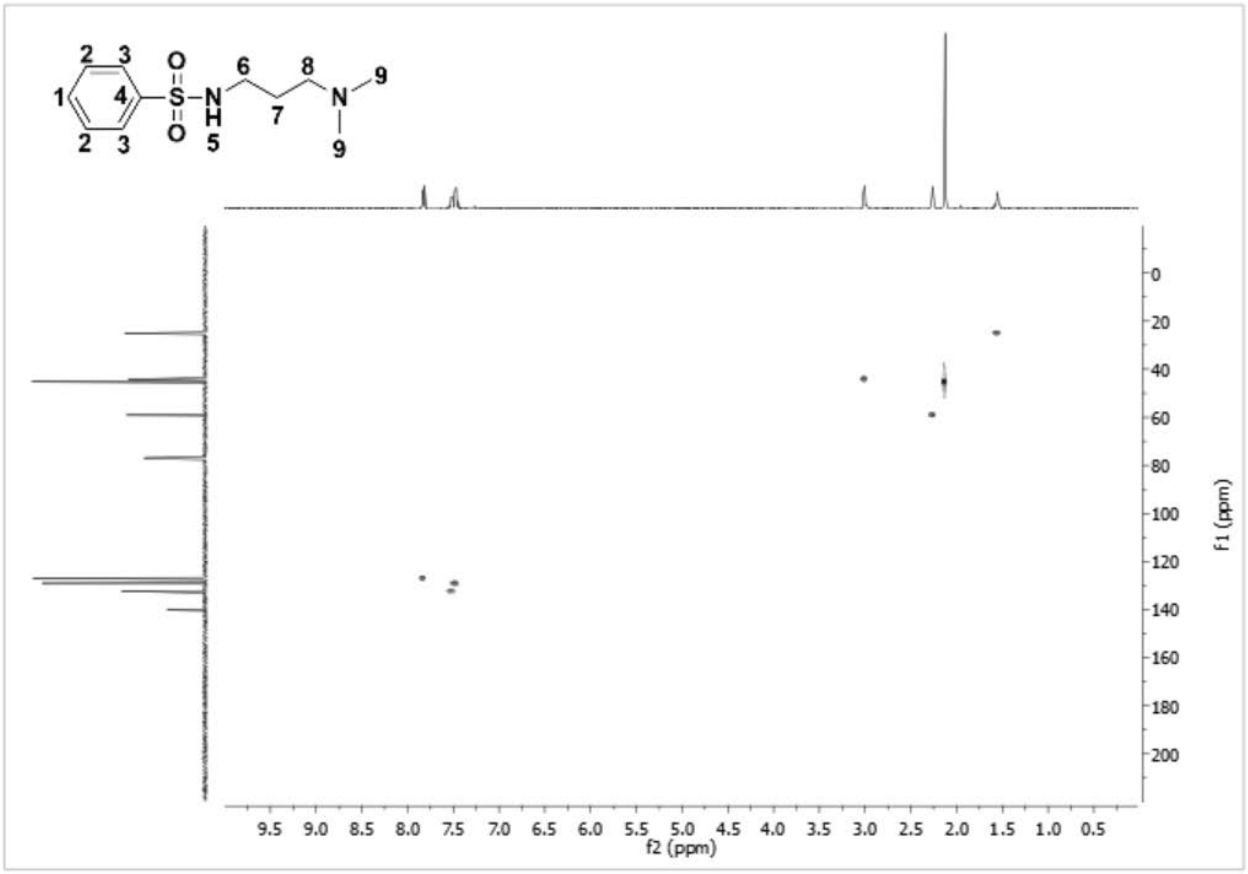


Figure S 21. COSY 2D NMR ($CDCl_3$) spectrum of **1**.

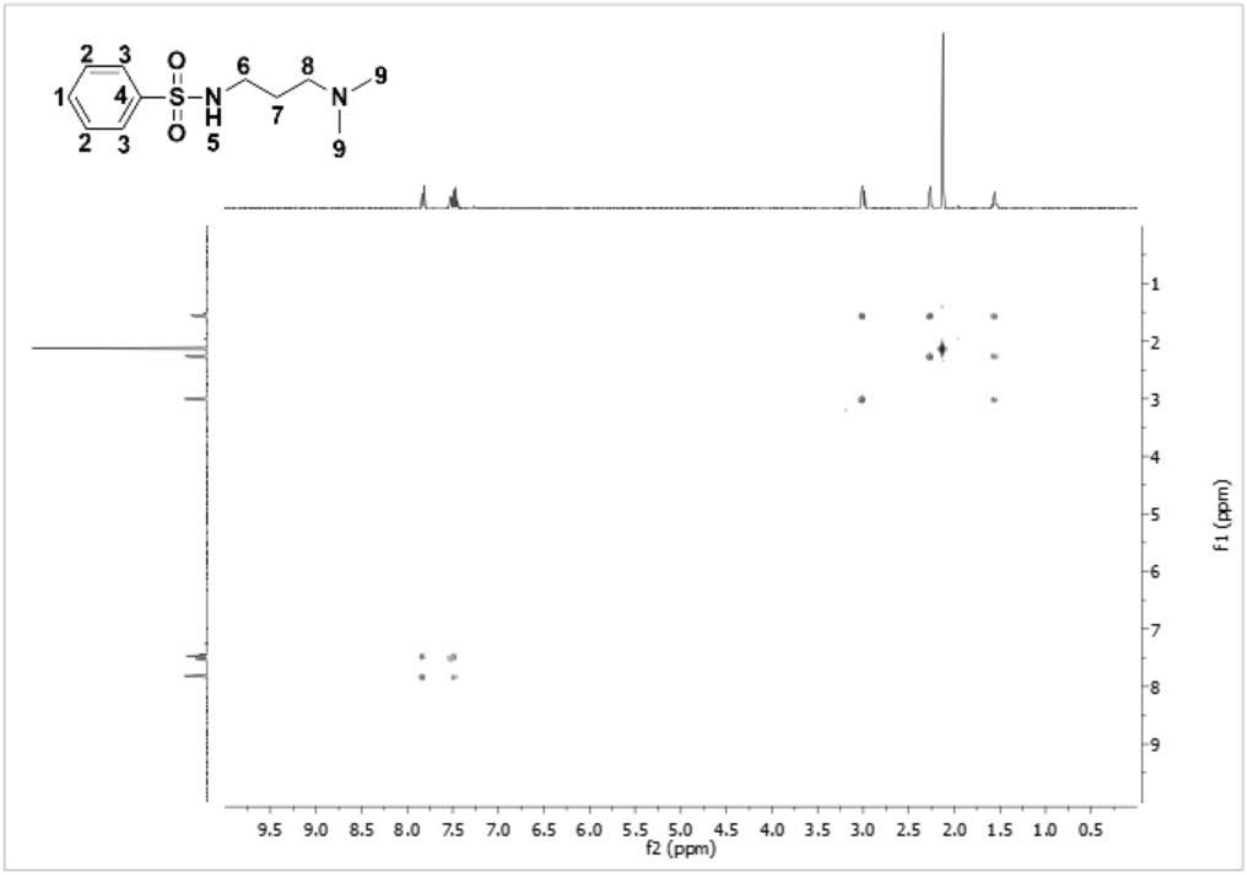


Figure S 22. HSQC 2D NMR ($CDCl_3$) spectrum of **1**.

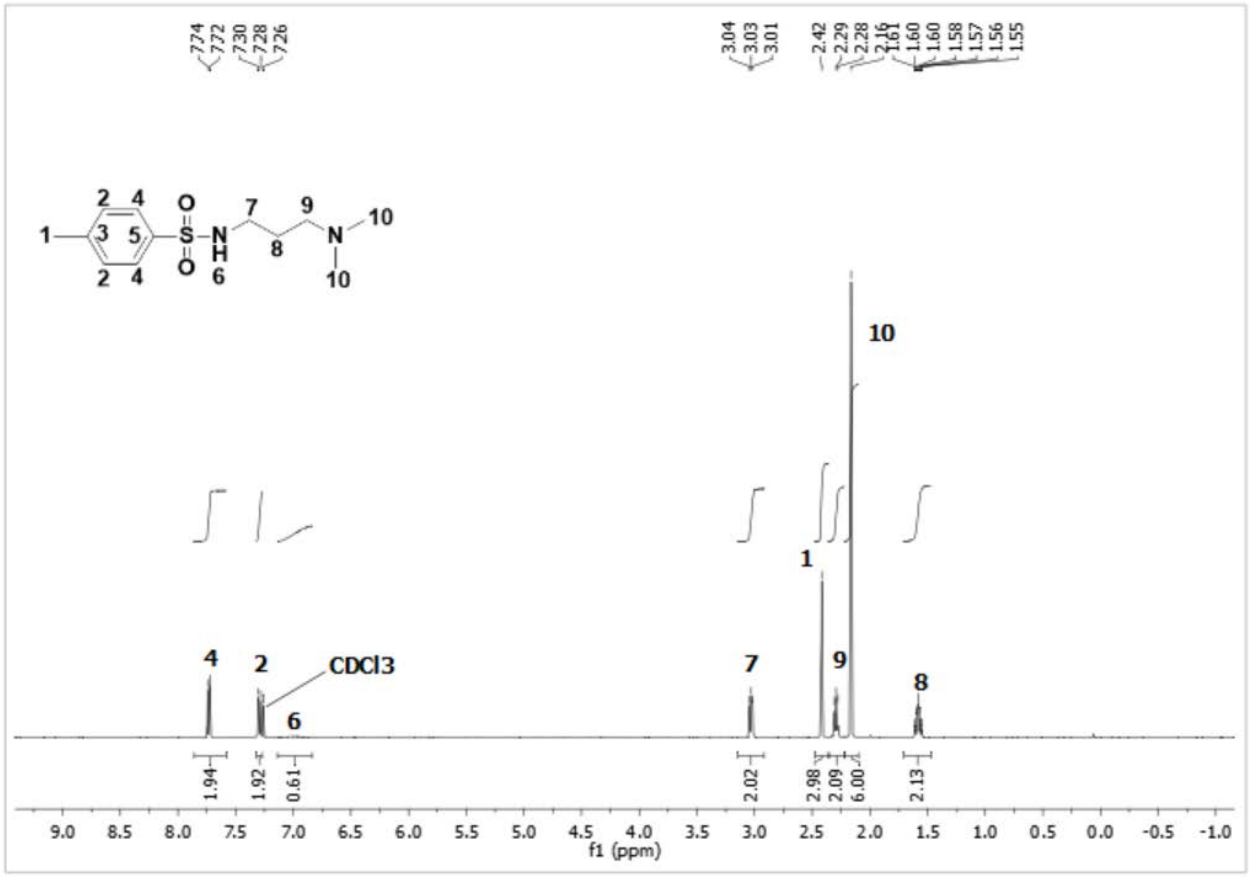


Figure S 23. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **2**.

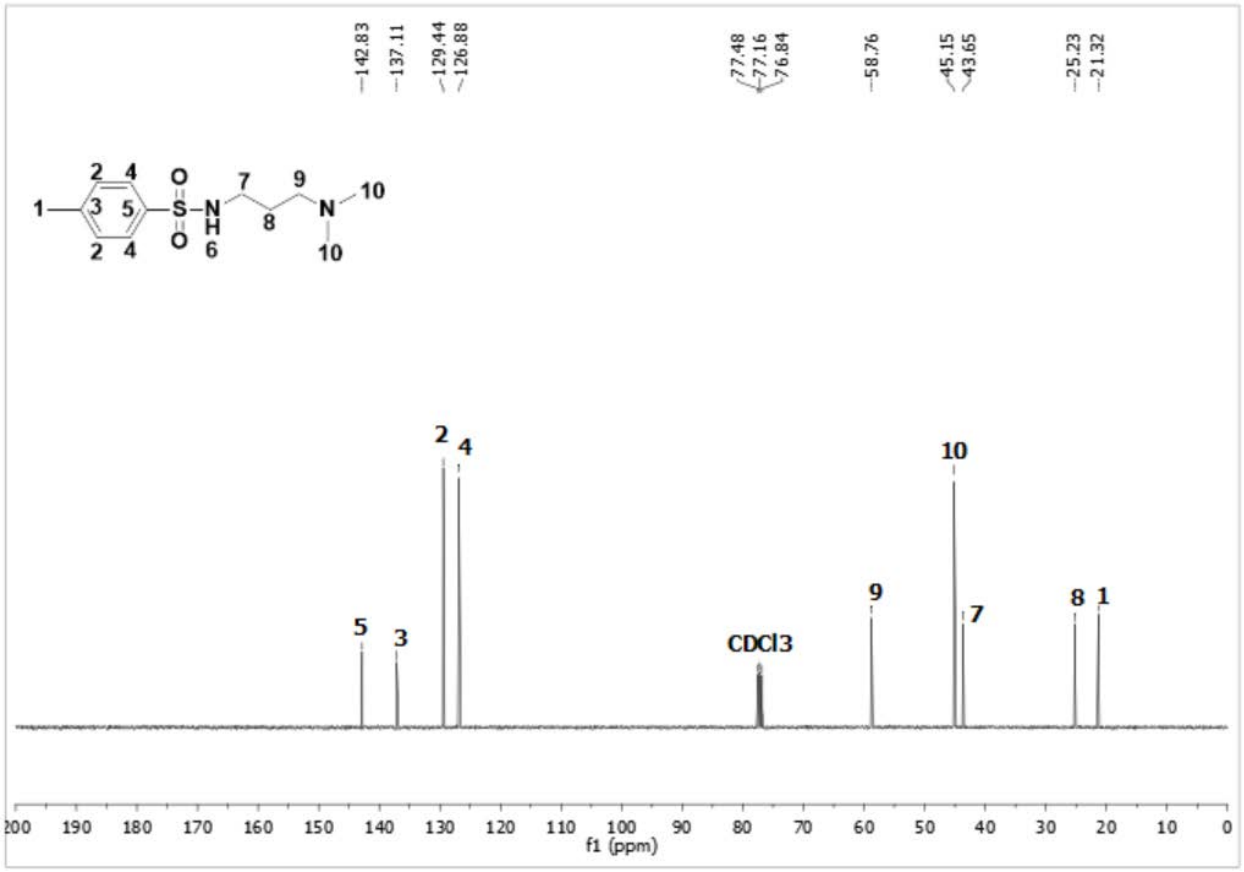


Figure S 24. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **2**.

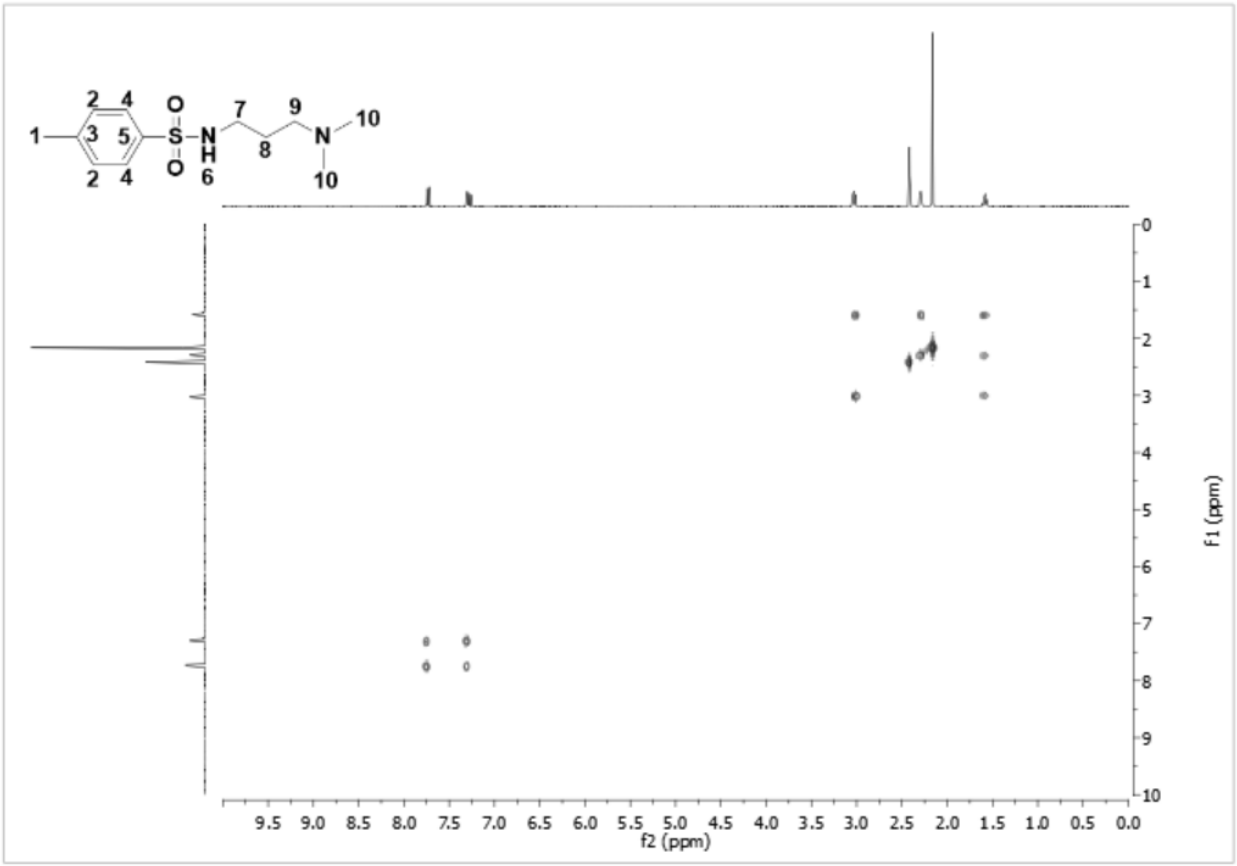


Figure S 25. COSY 2D NMR ($CDCl_3$) spectrum of **2**.

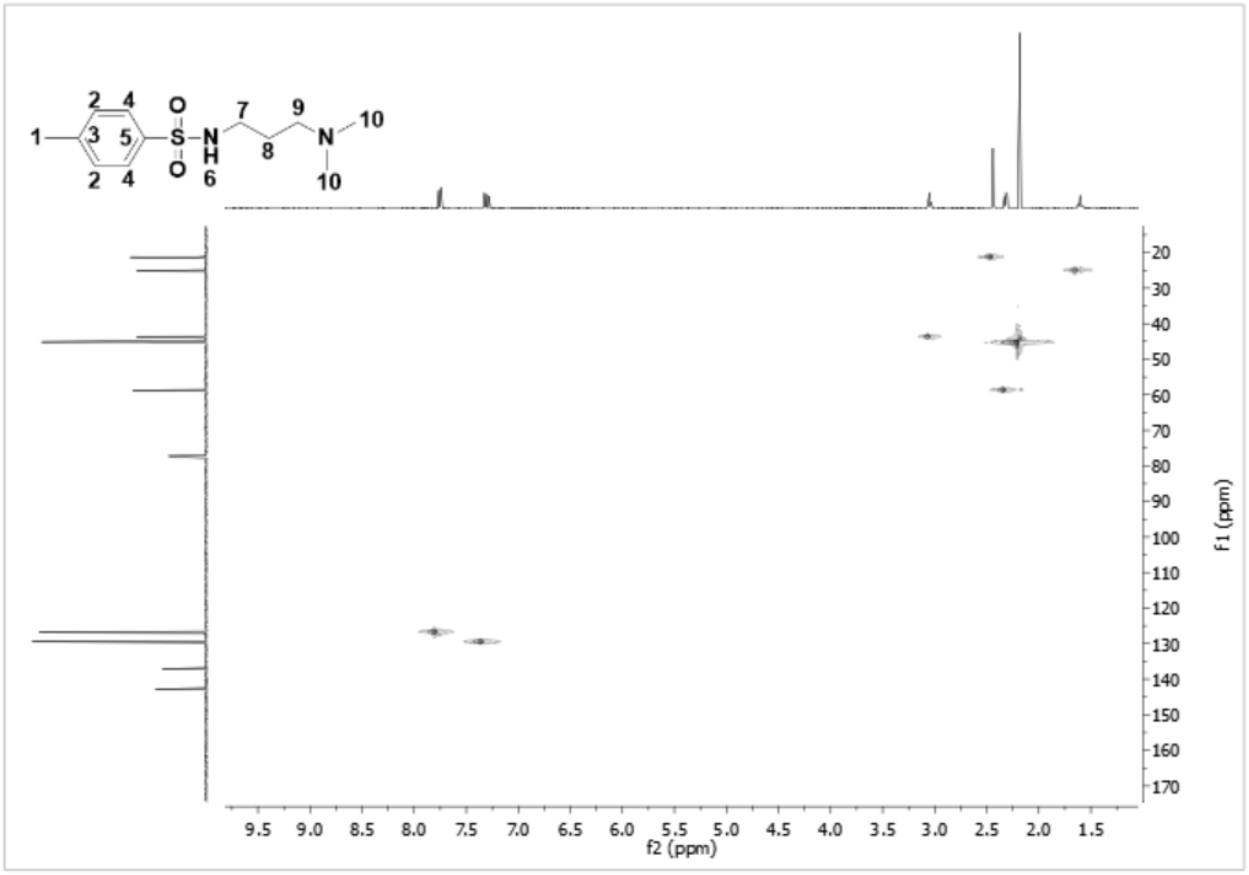


Figure S 26. HSQC 2D NMR ($CDCl_3$) spectrum of **2.**

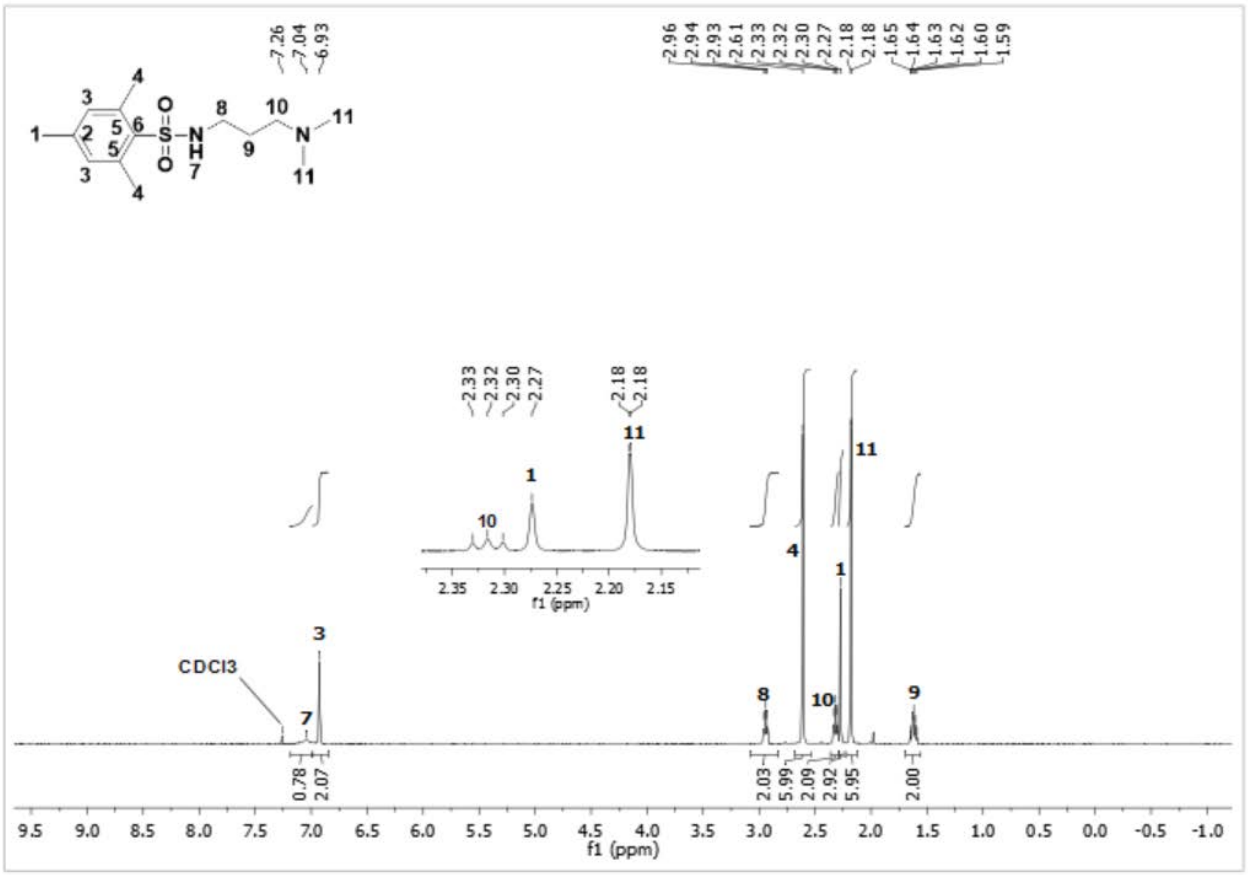


Figure S 27. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **3.**

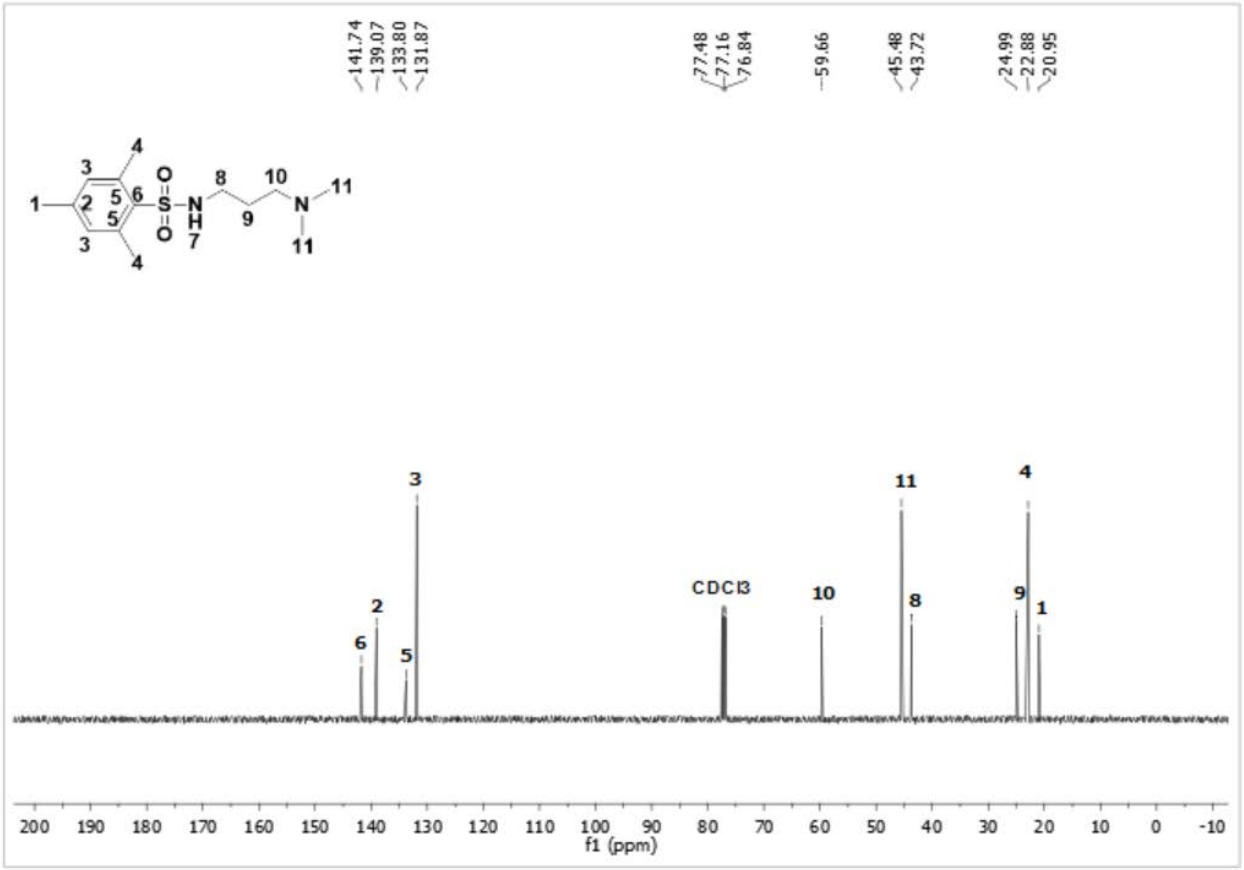


Figure S 28. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **3**.

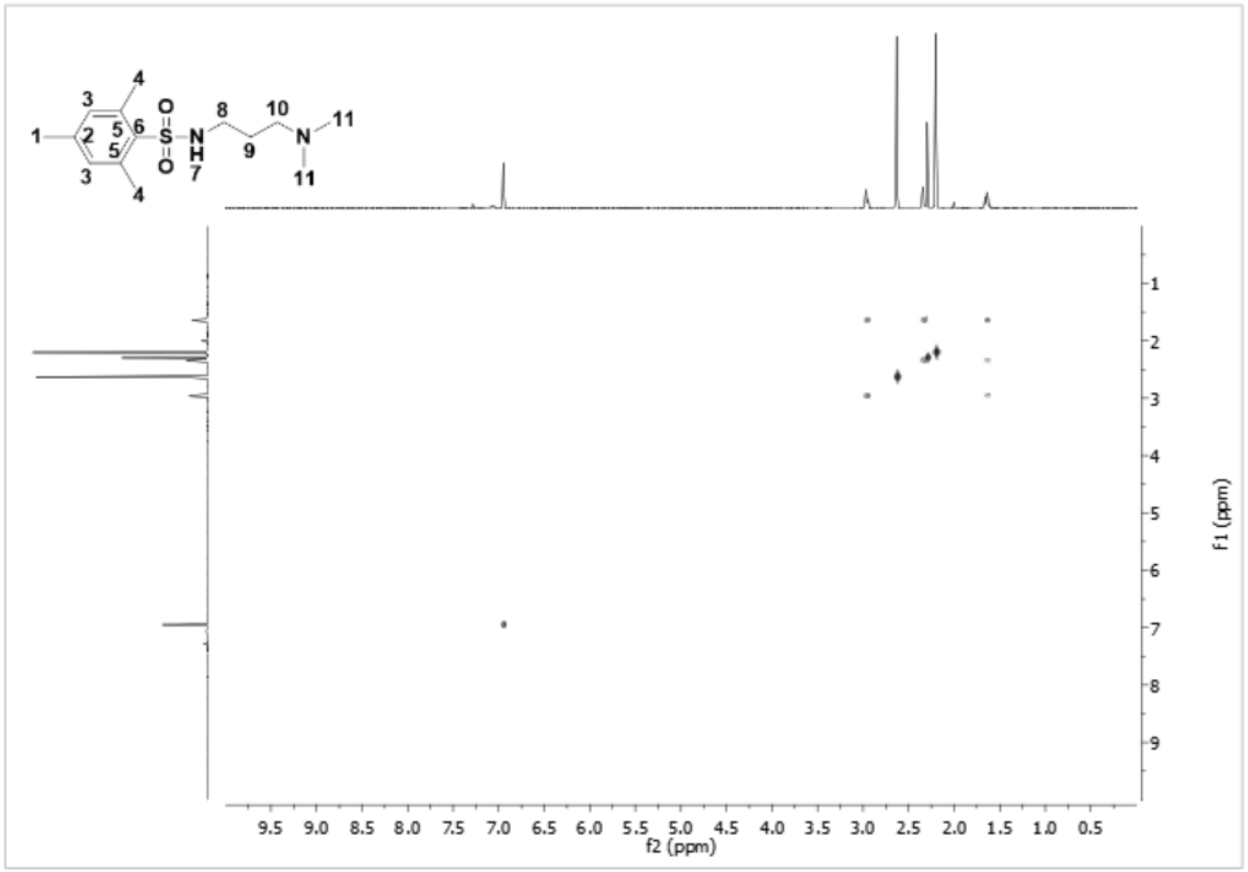


Figure S 29. COSY 2D NMR ($CDCl_3$) spectrum of **3.**

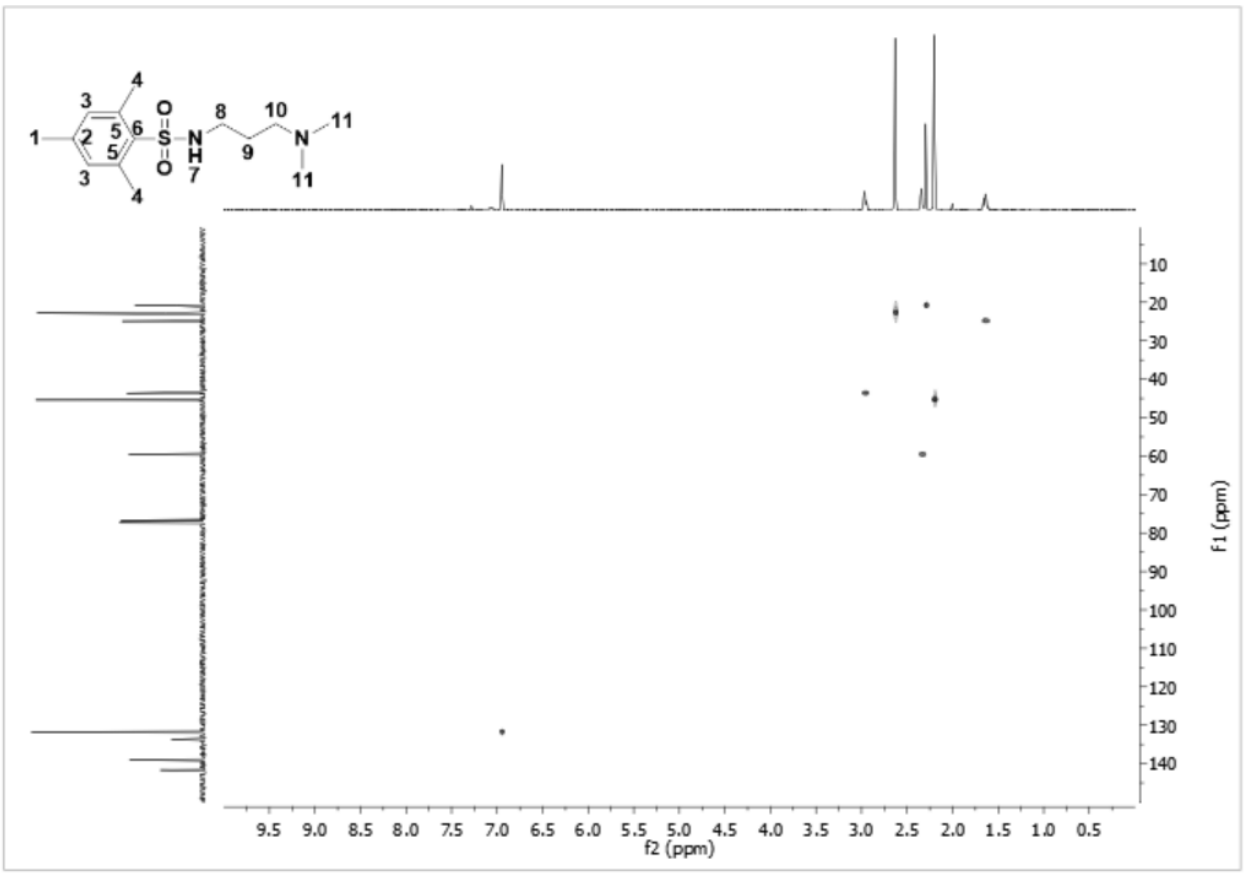


Figure S 30. HSQC 2D NMR ($CDCl_3$) spectrum of **3**.

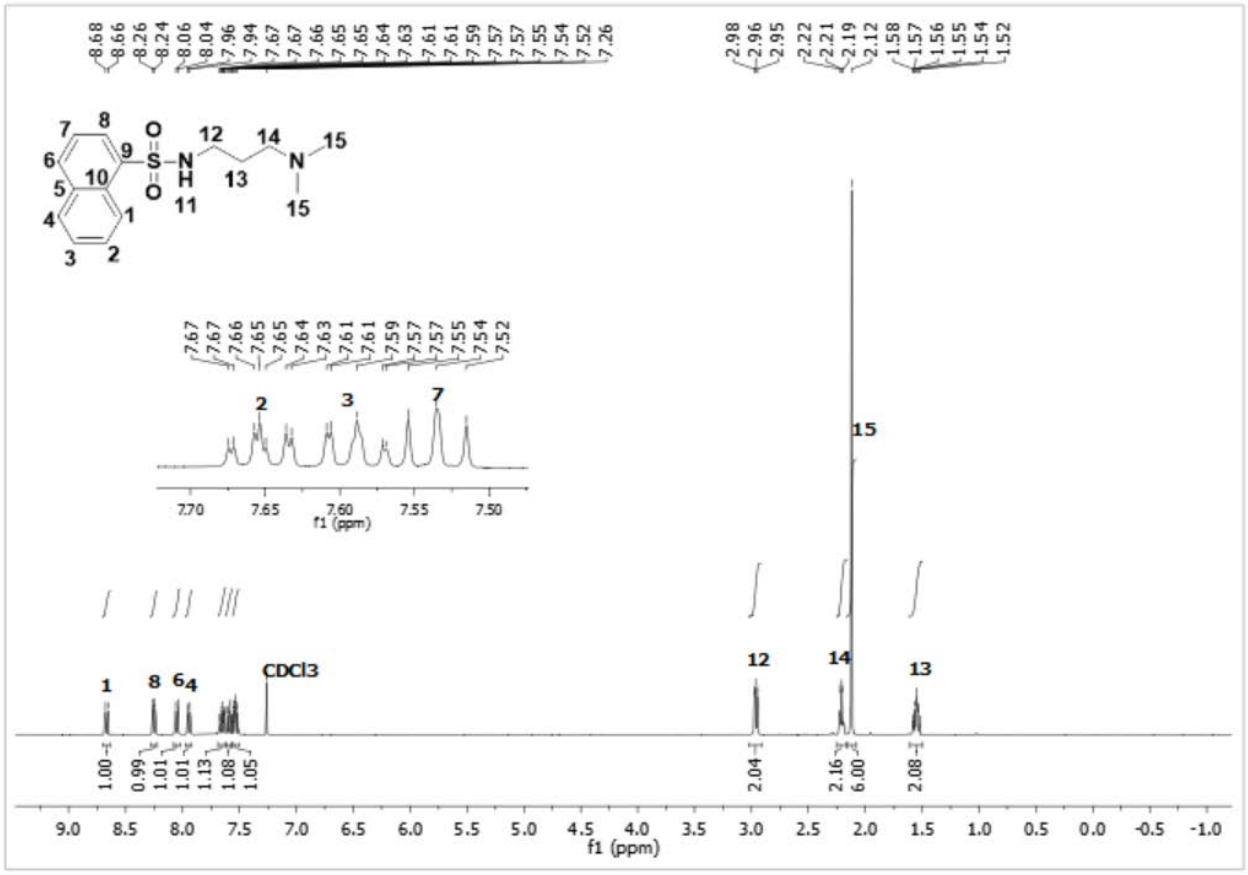


Figure S 31. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **4**.

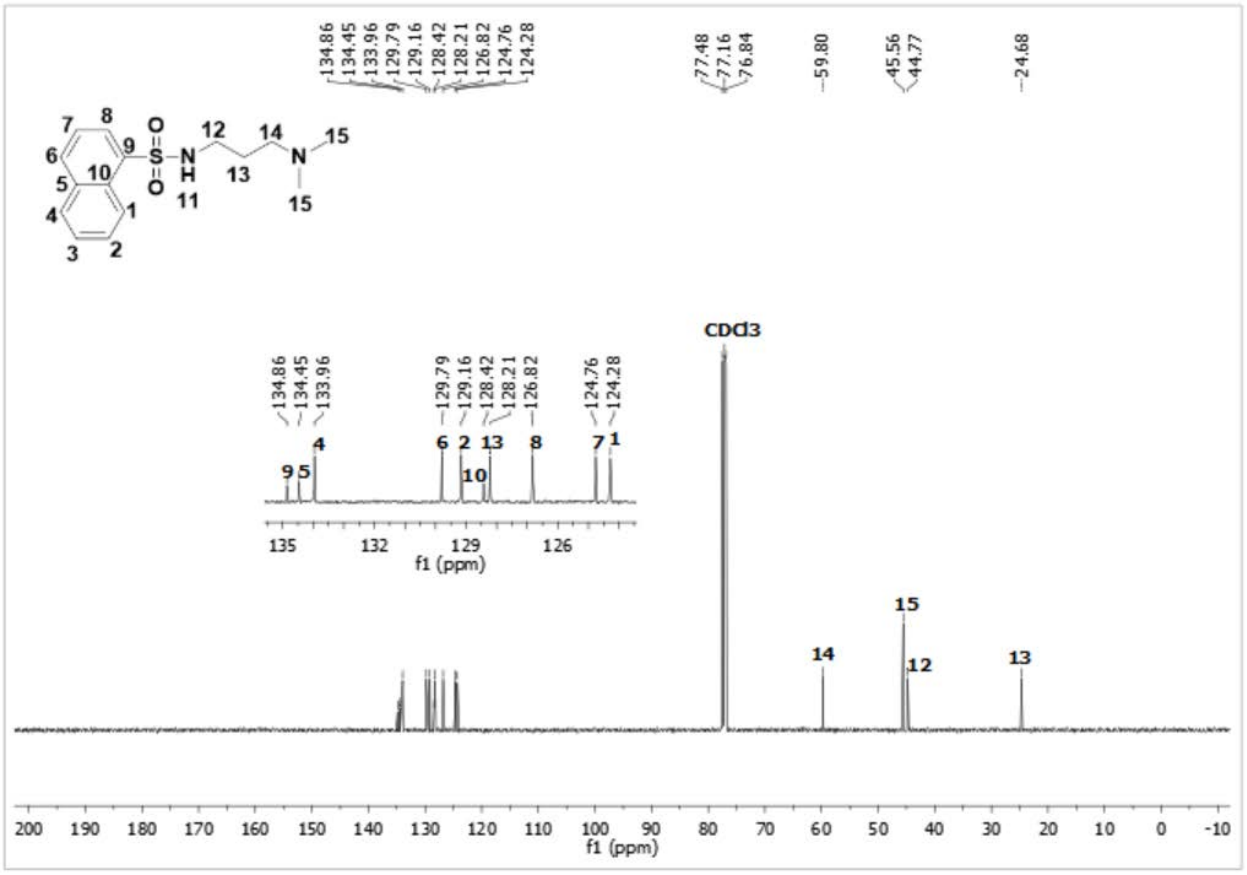


Figure S 32. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **4**.

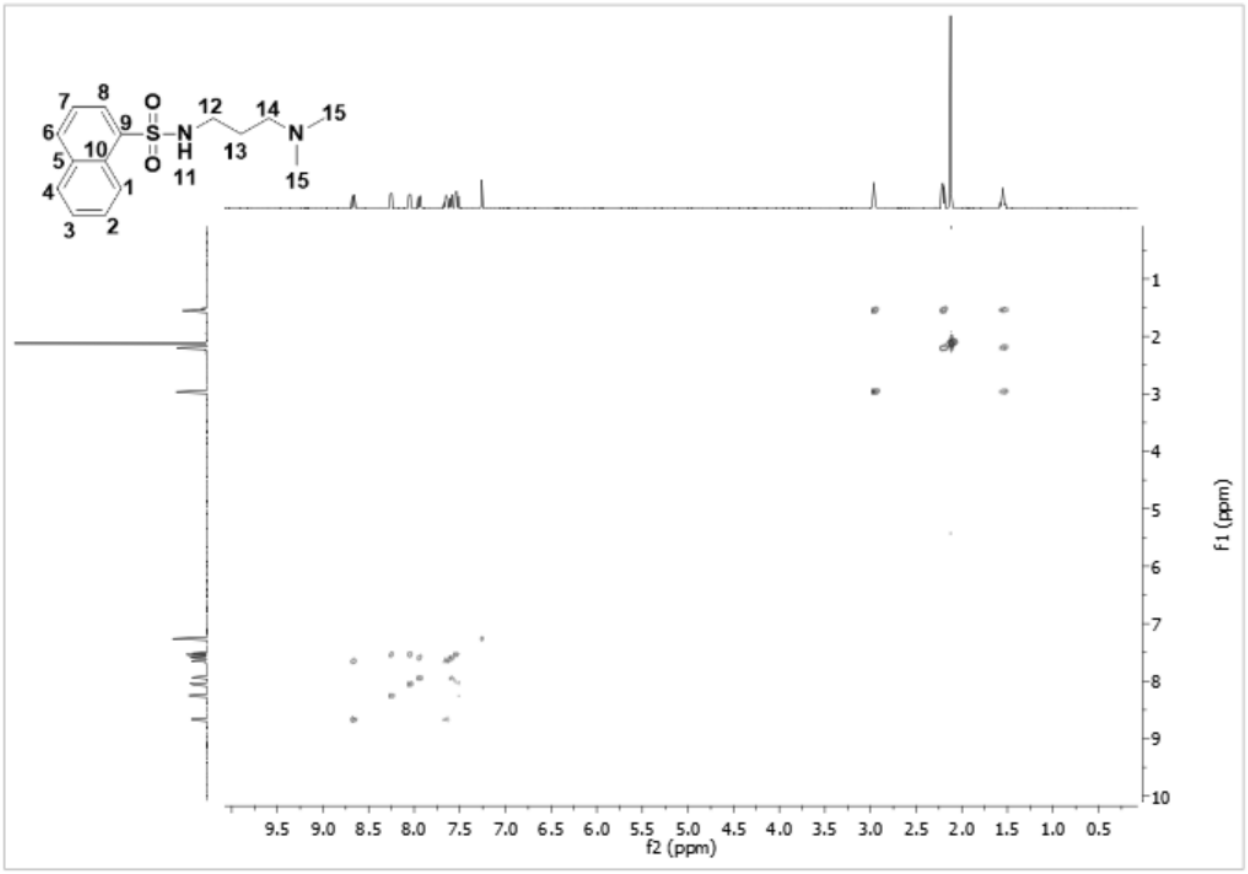


Figure S 33. COSY 2D NMR ($CDCl_3$) spectrum of **4**.

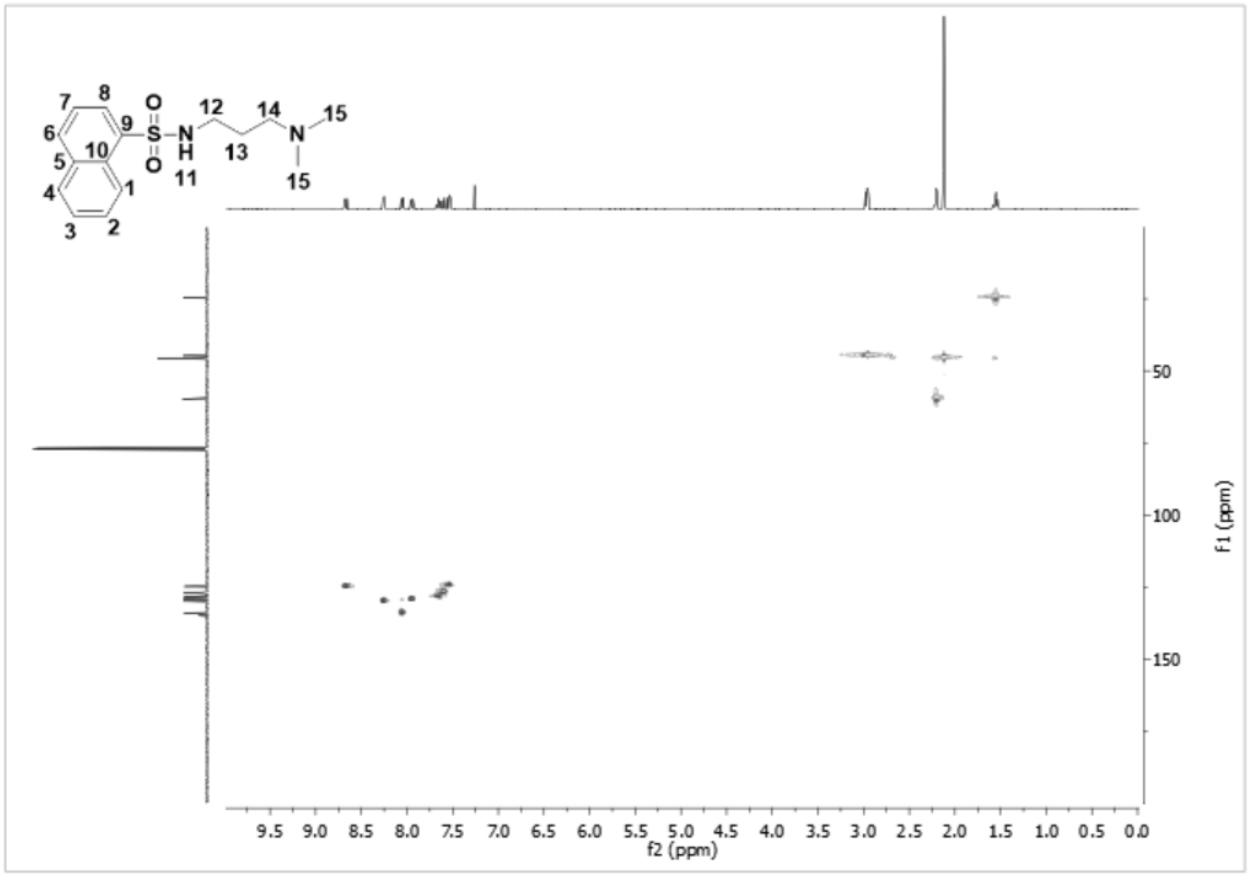


Figure S 34. HSQC 2D NMR ($CDCl_3$) spectrum of **4**.

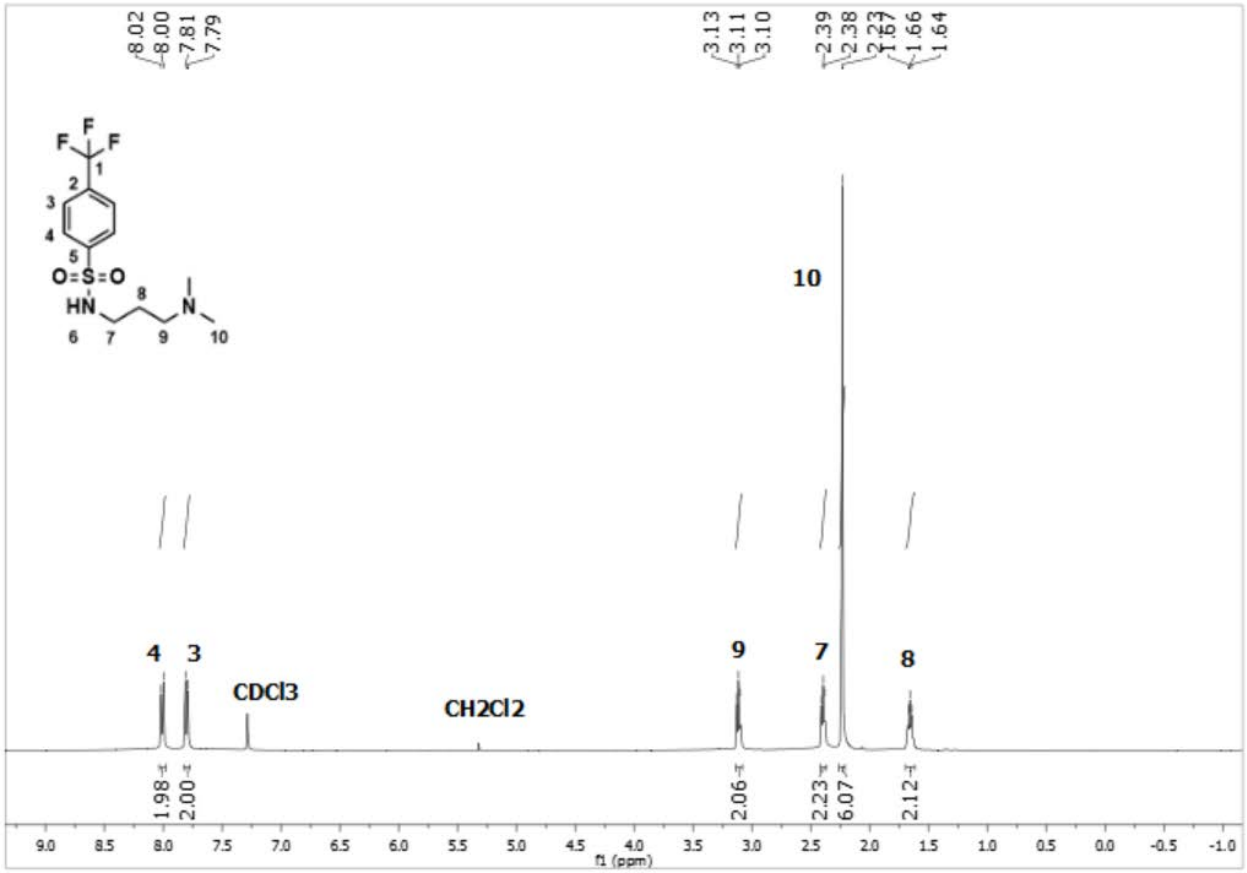


Figure S 35. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **5**.

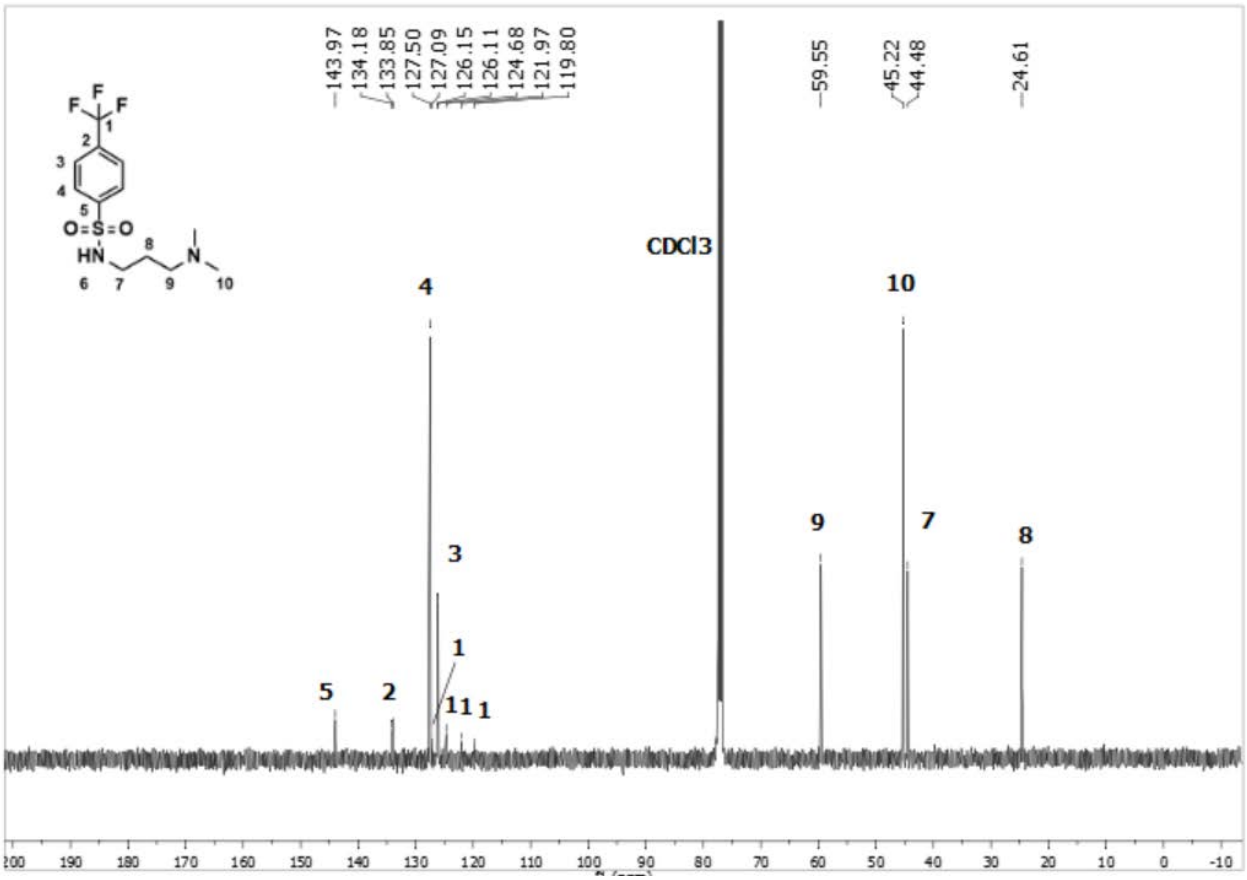


Figure S 36. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **5**.

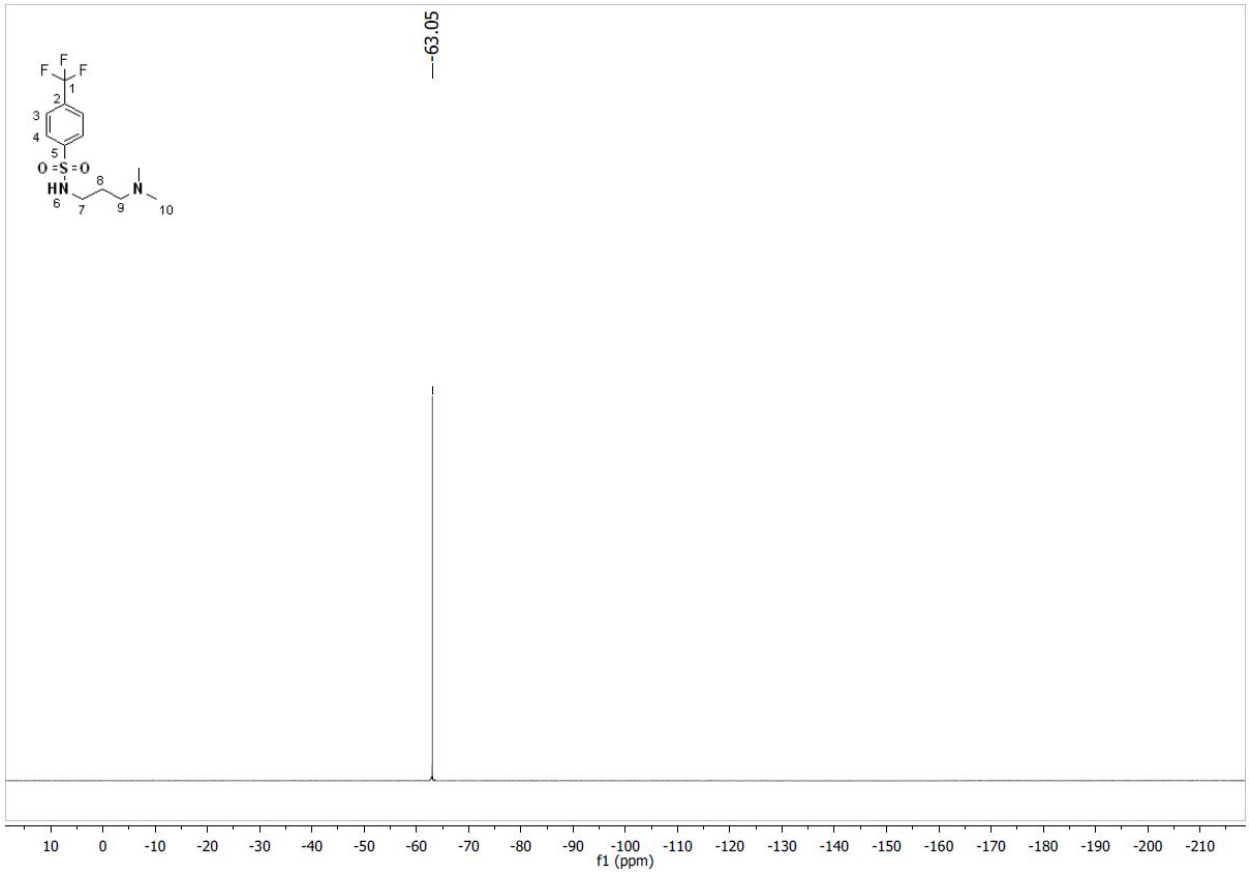


Figure S 37. ^{19}F NMR (376 MHz, $CDCl_3$) spectrum of **5**.

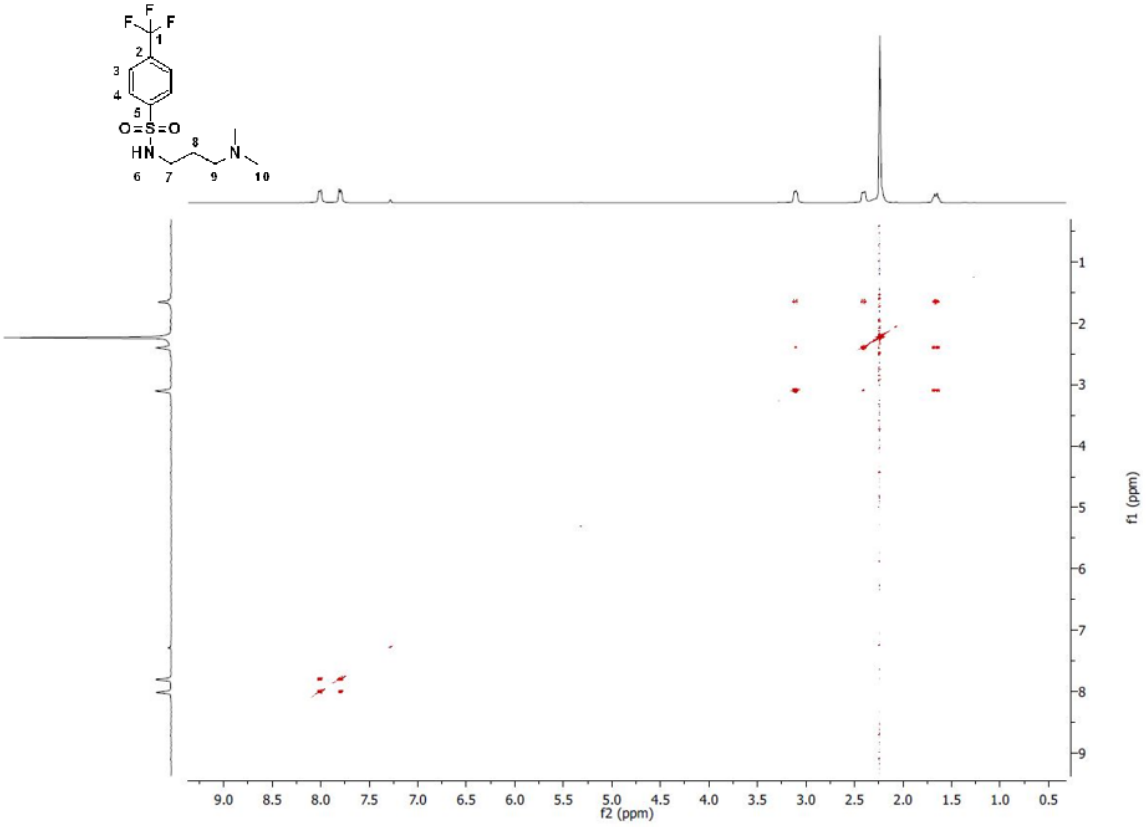


Figure S 38. COSY 2D NMR ($CDCl_3$) spectrum of **5**.

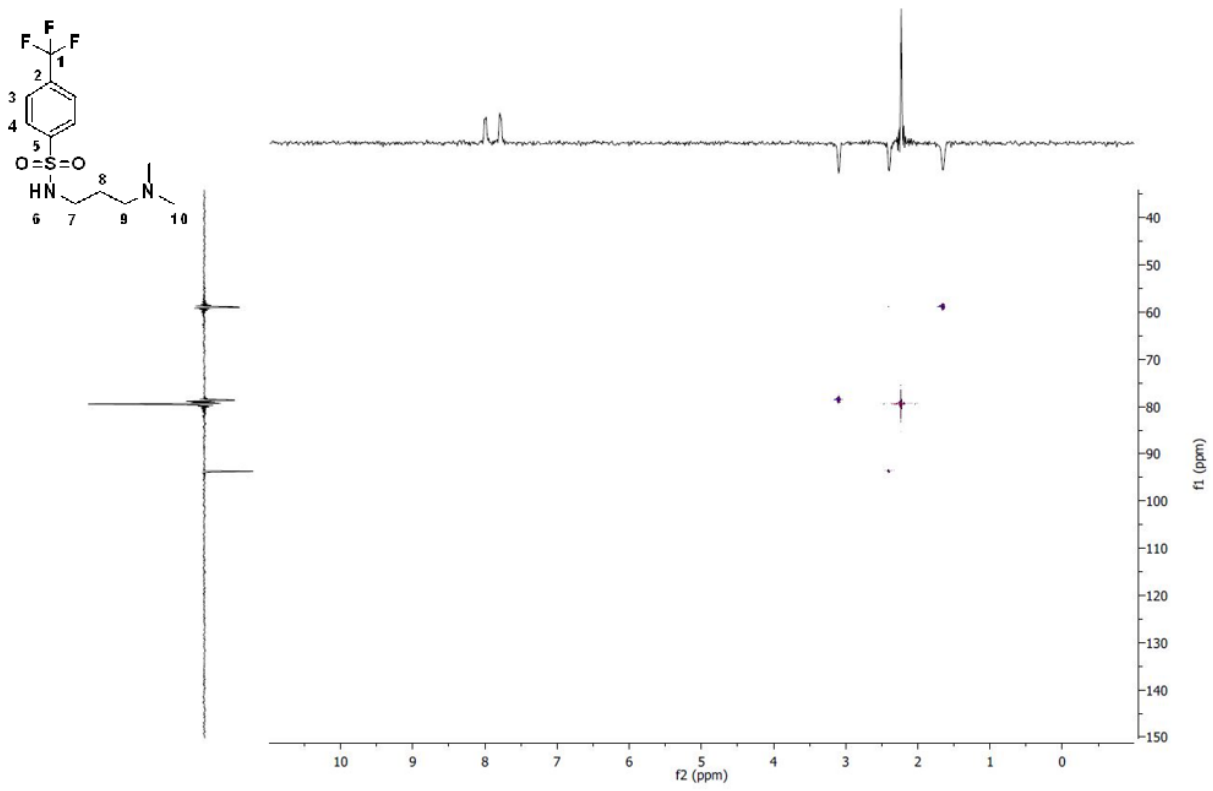


Figure S 39. HSQC 2D NMR ($CDCl_3$) spectrum of **5**.

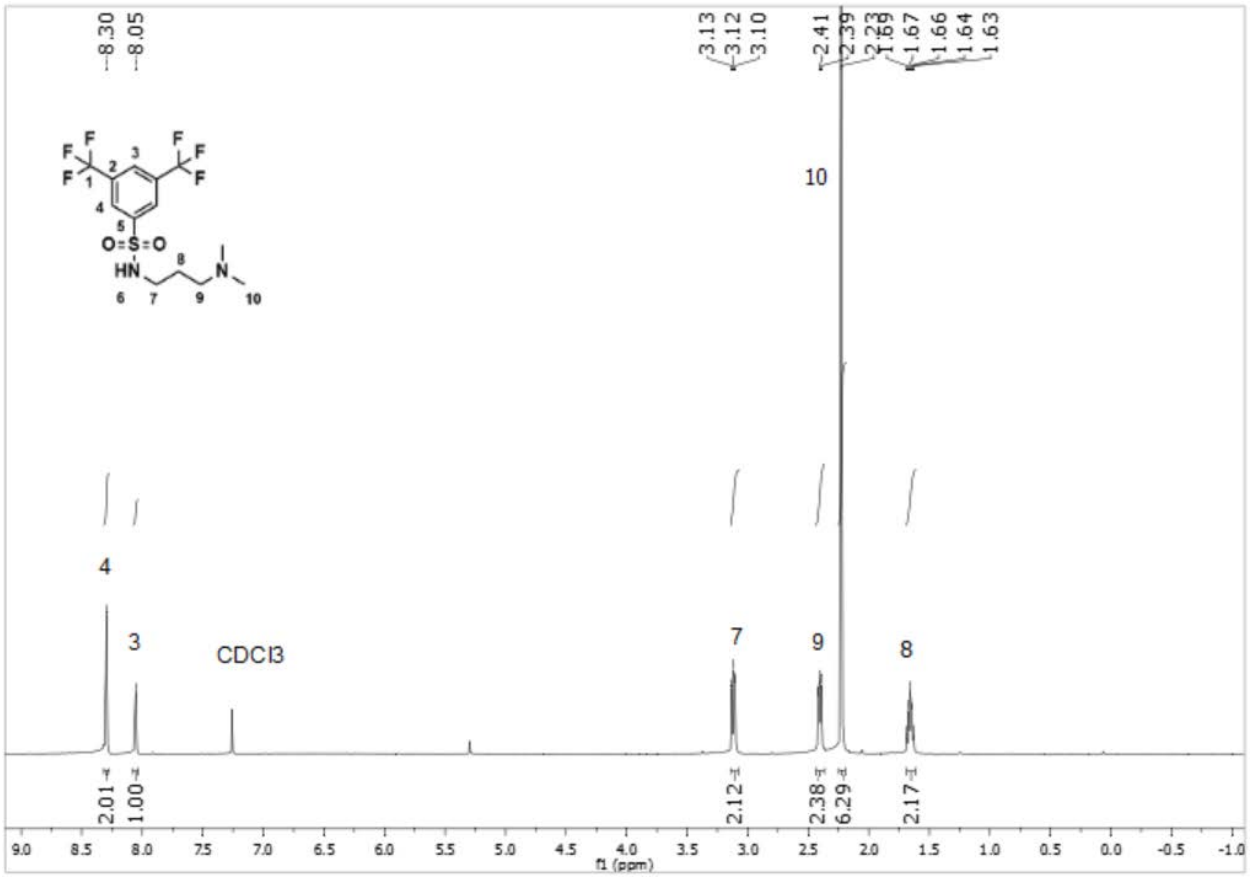


Figure S 40. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **6**.

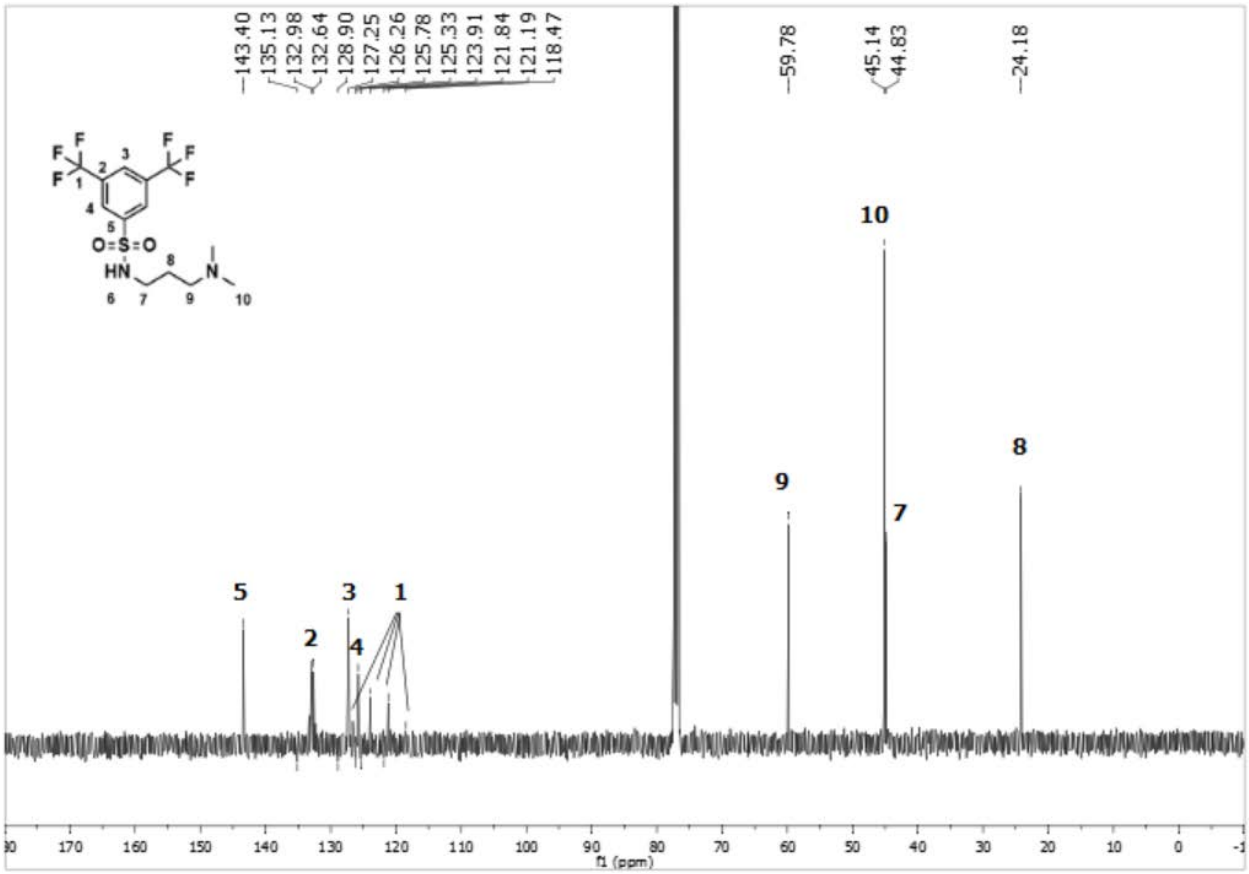


Figure S 41. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **6**.

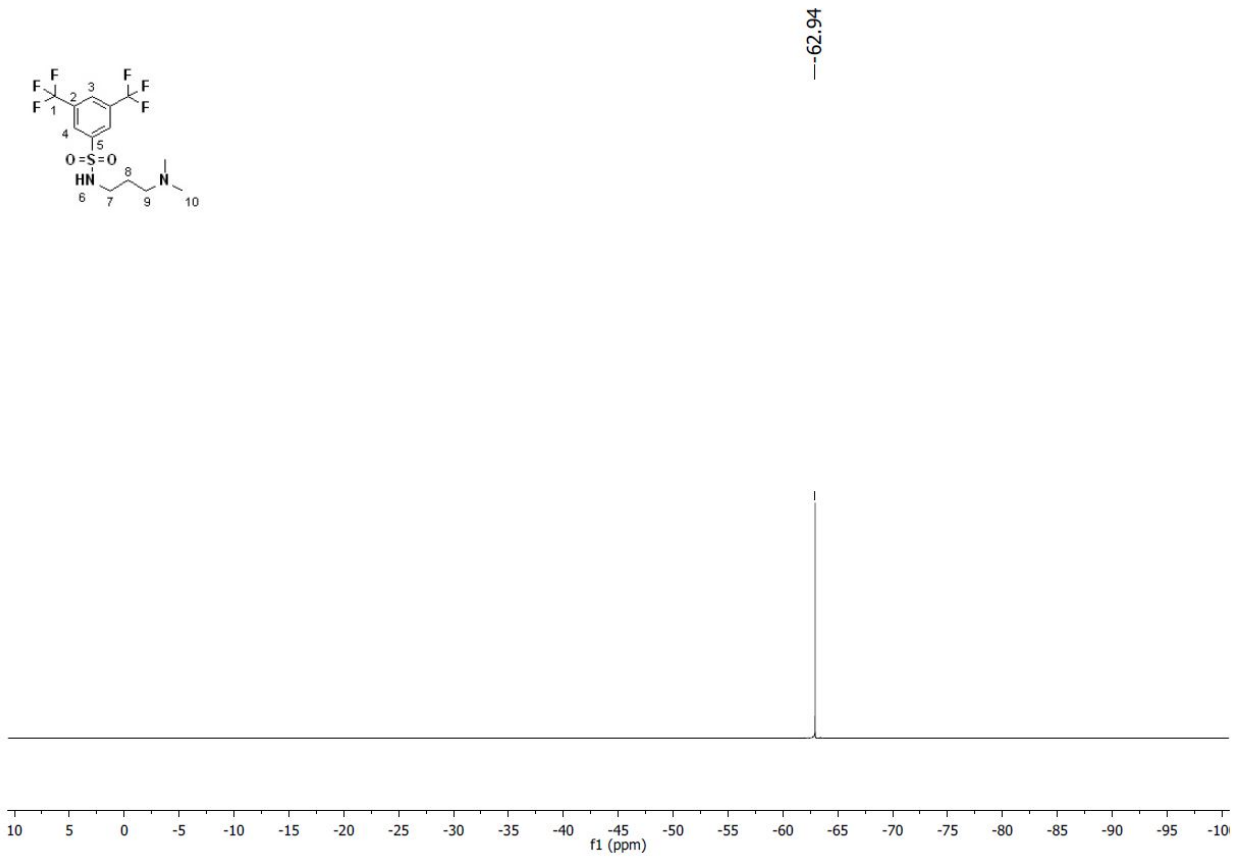


Figure S 42. ^{19}F NMR (376 MHz, $CDCl_3$) spectrum of **6**.

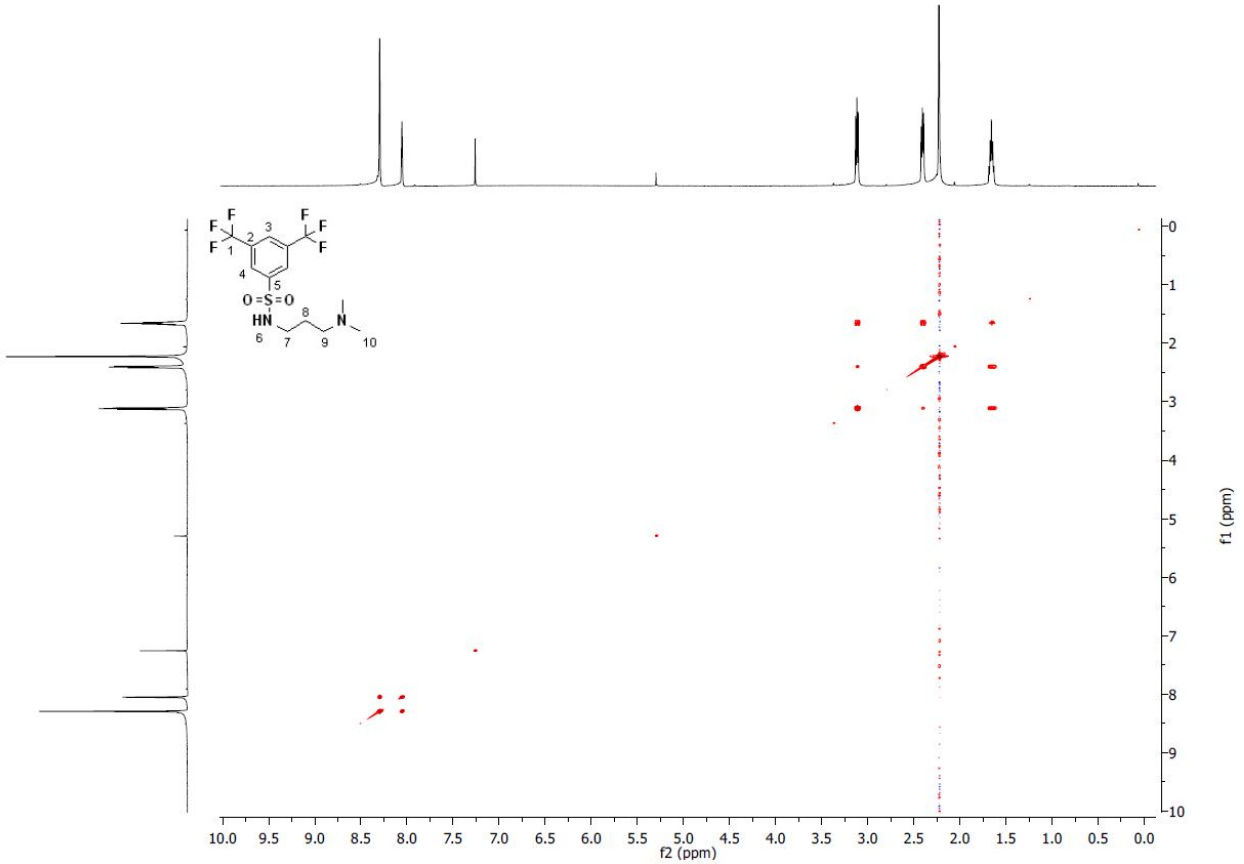


Figure S 43. COSY 2D NMR ($CDCl_3$) spectrum of **6**.

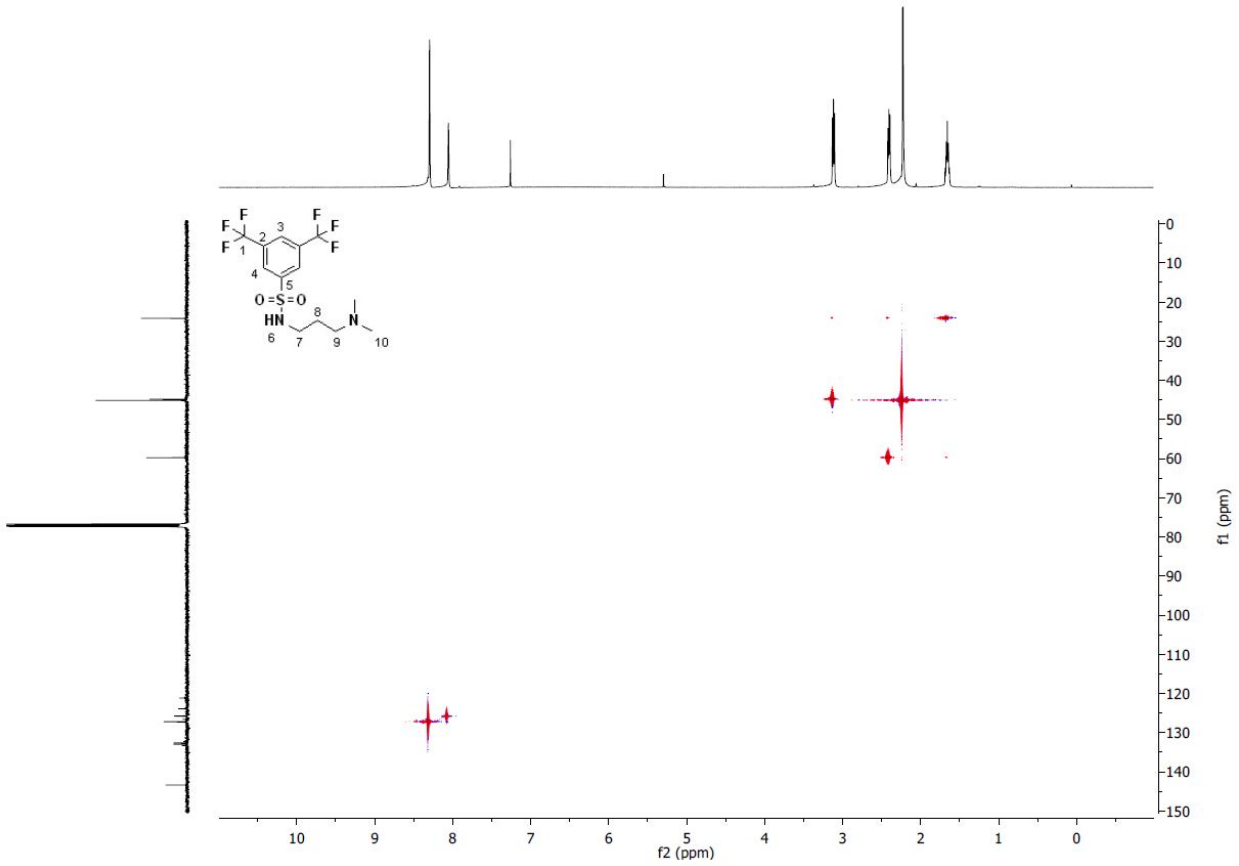


Figure S 44. HSQC 2D NMR ($CDCl_3$) spectrum of **6**.

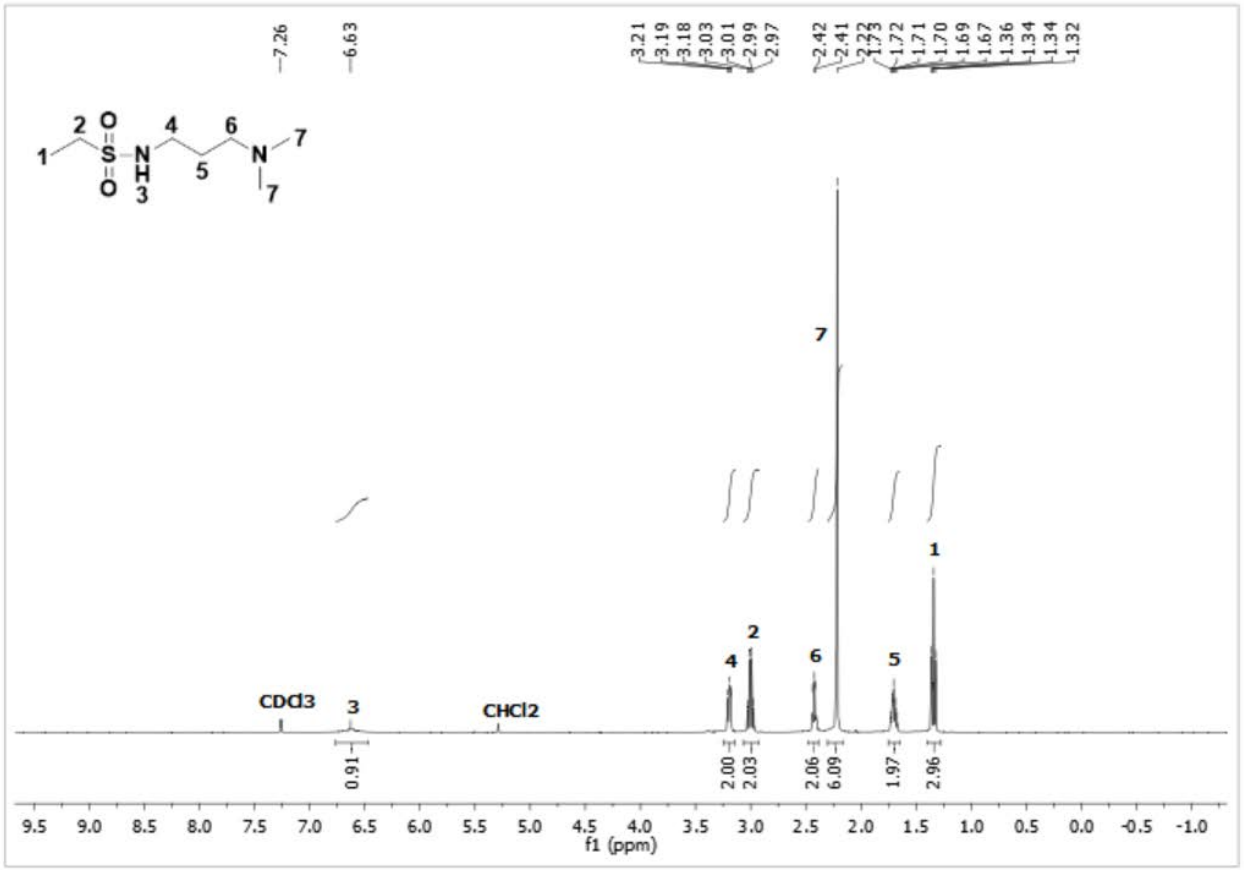


Figure S 45. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **7**.

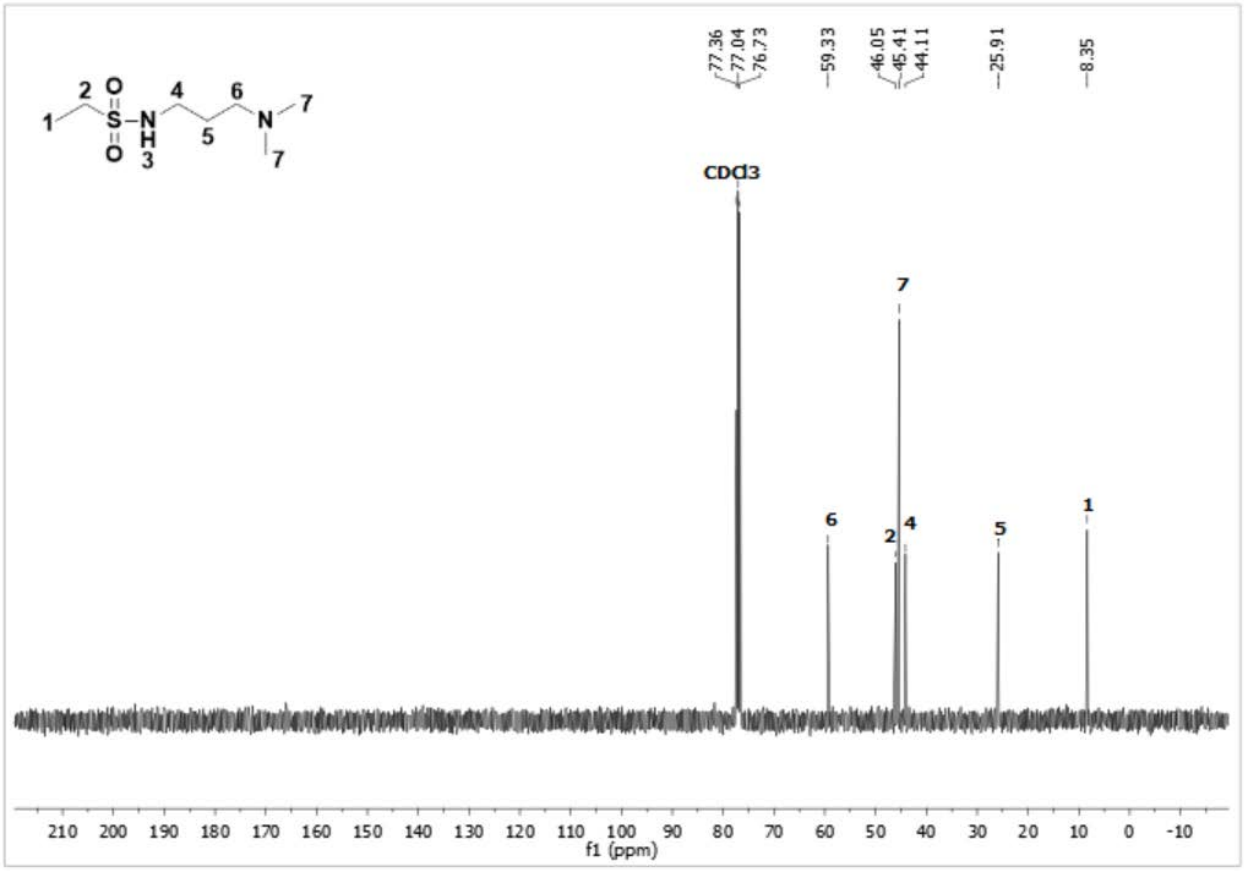


Figure S 46. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **7**.

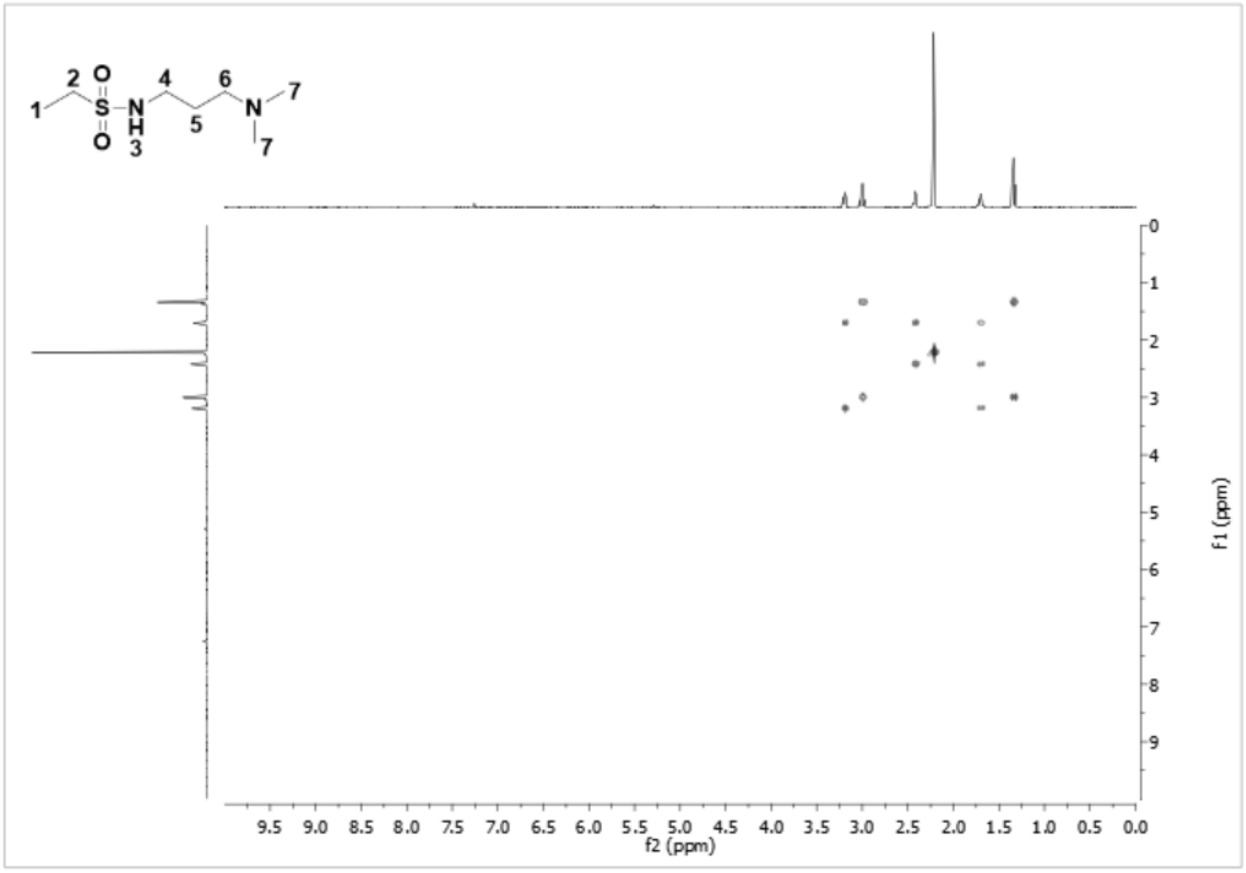


Figure S 47. COSY 2D NMR ($CDCl_3$) spectrum of **7**.

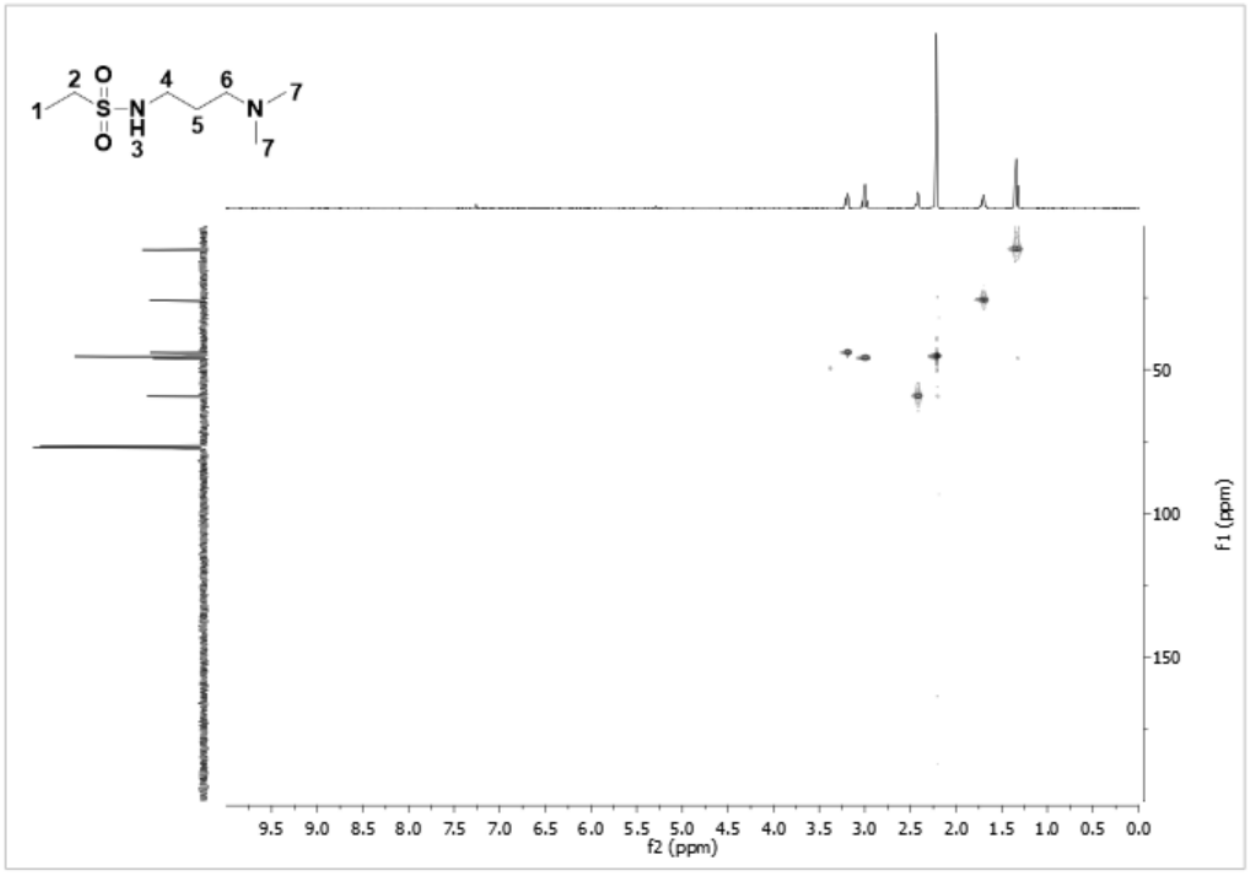


Figure S 48. HSQC 2D NMR ($CDCl_3$) spectrum of **7**.

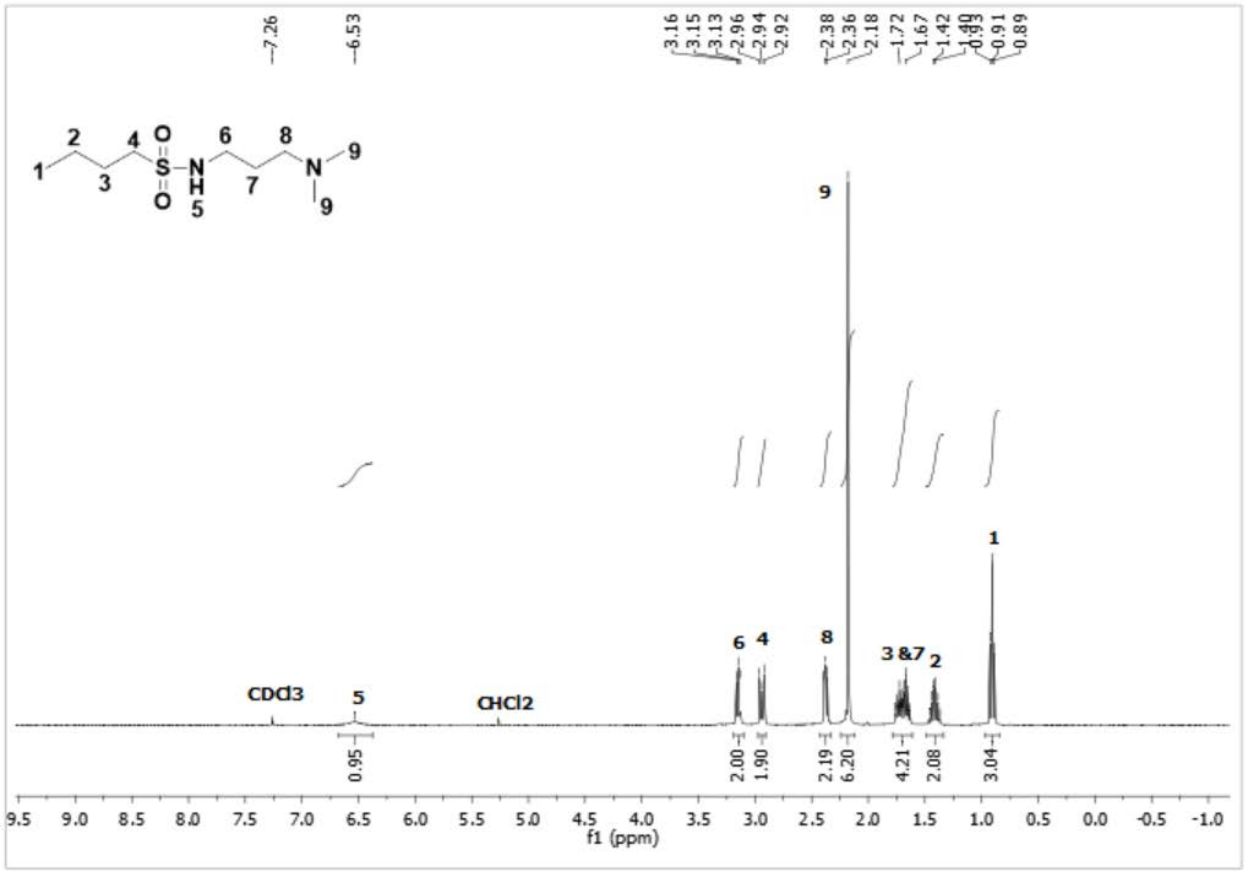


Figure S 49. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **8**.

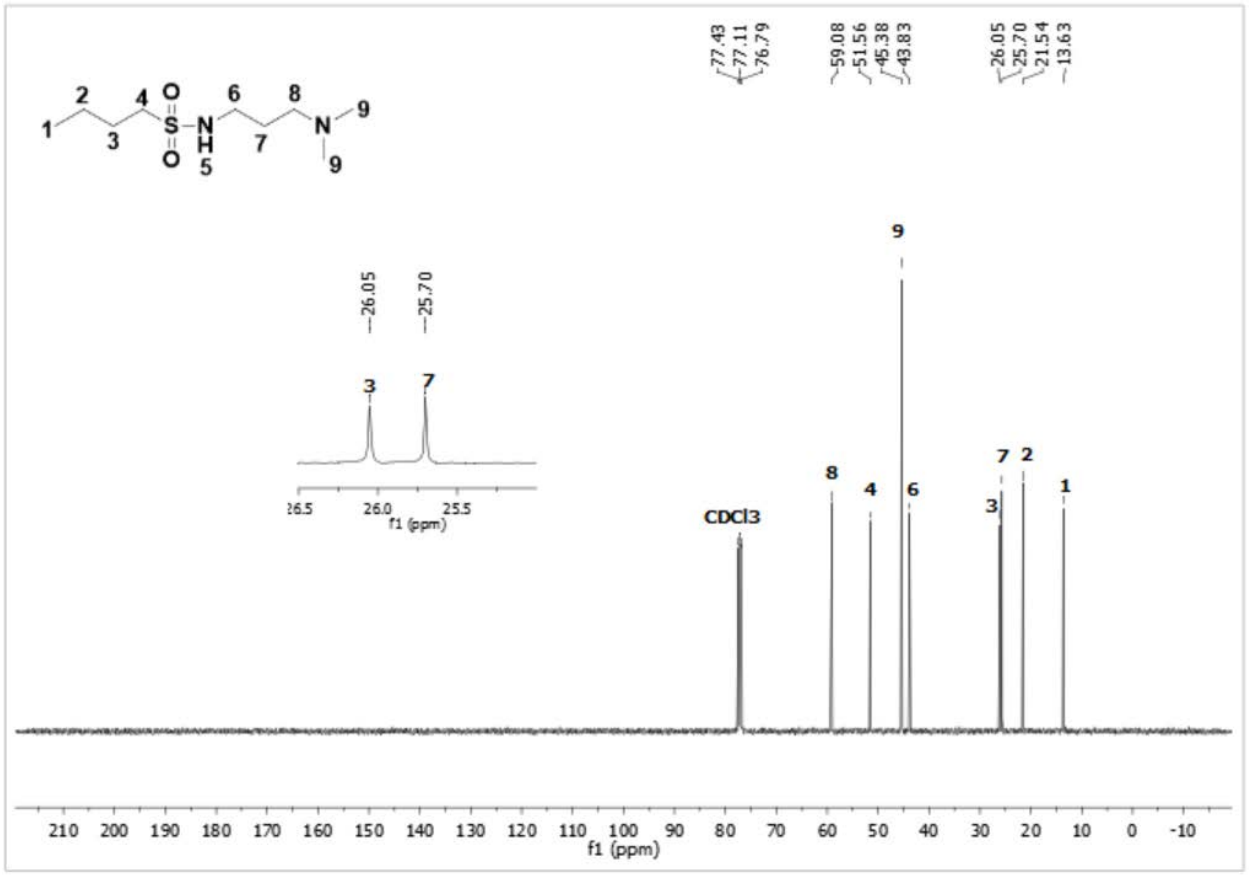


Figure S 50. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **8**.

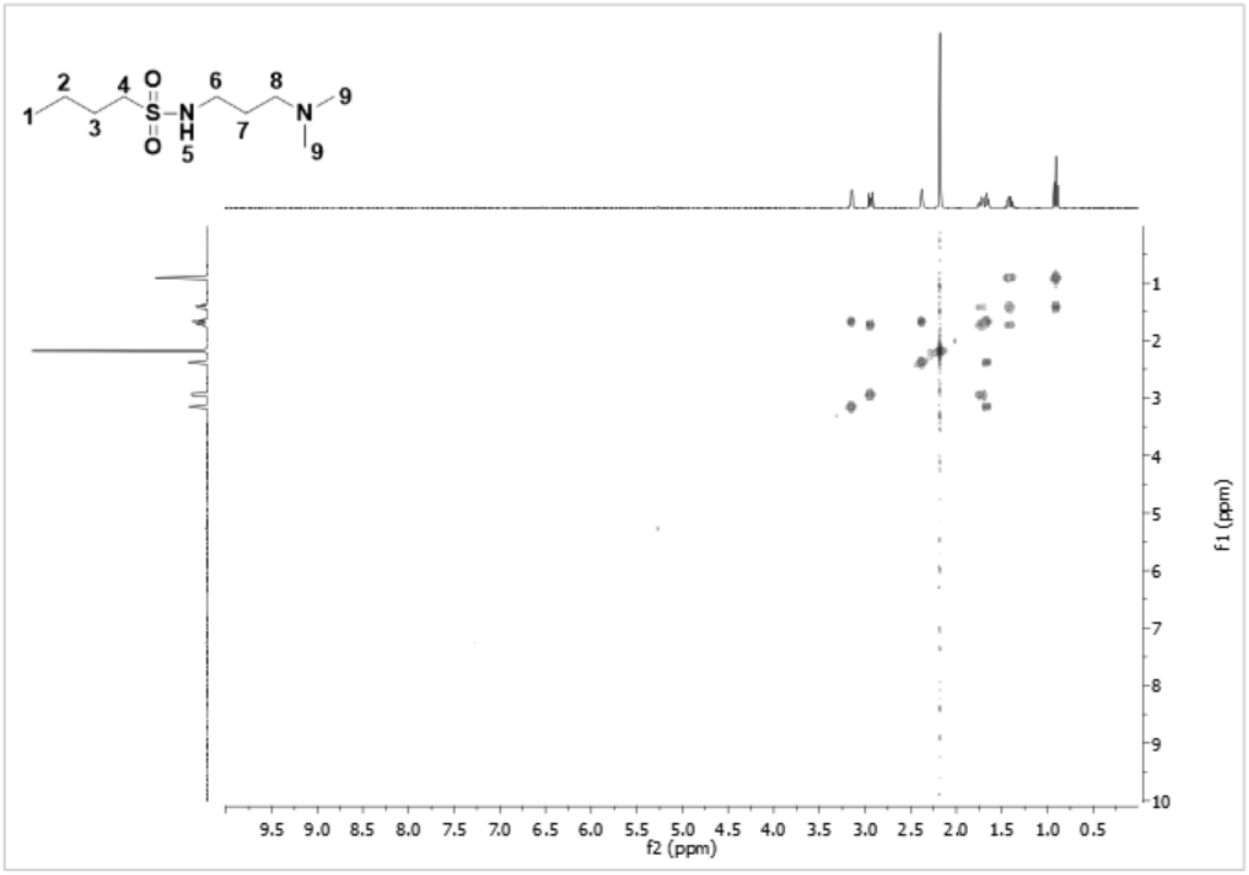


Figure S 51. COSY 2D NMR ($CDCl_3$) spectrum of **8.**

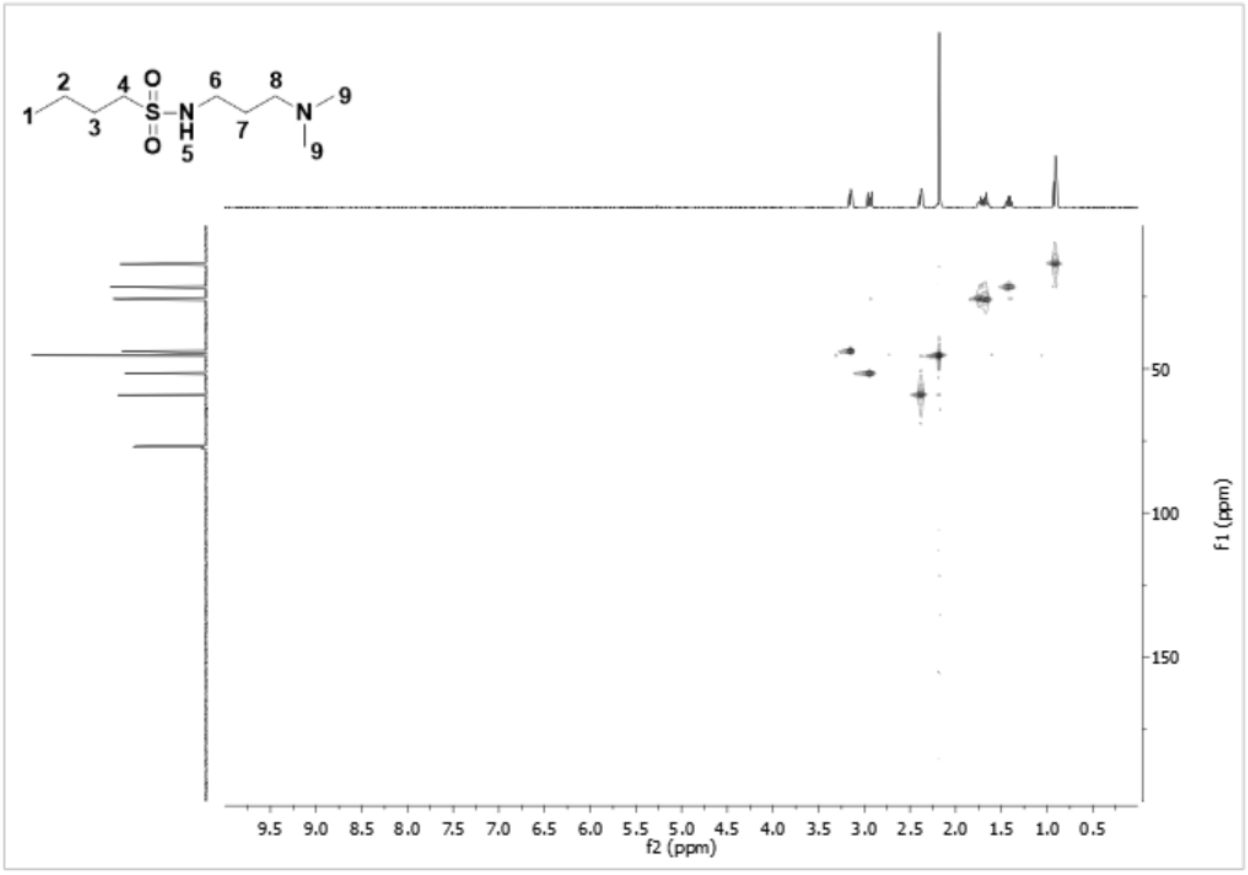


Figure S 52. HSQC 2D NMR ($CDCl_3$) spectrum of **8**.

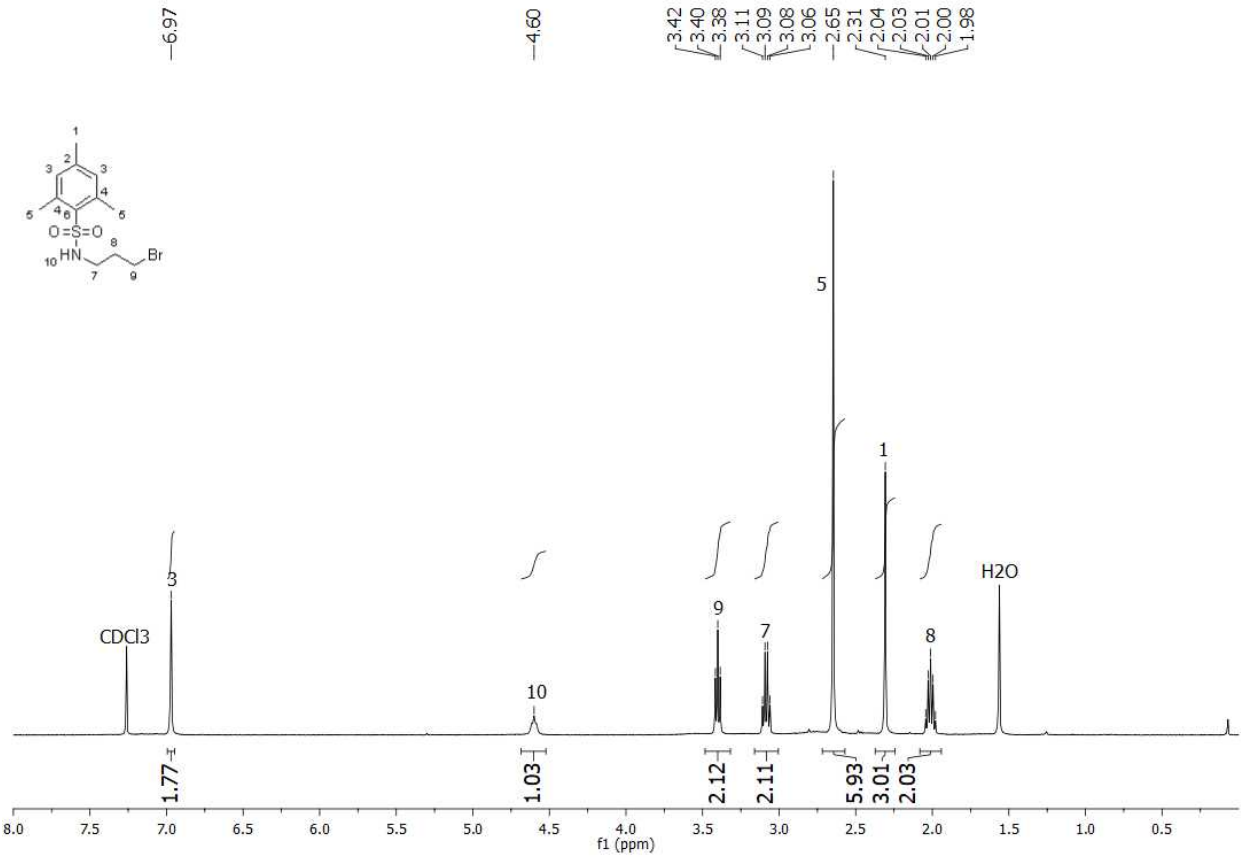


Figure S 53. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **9**.

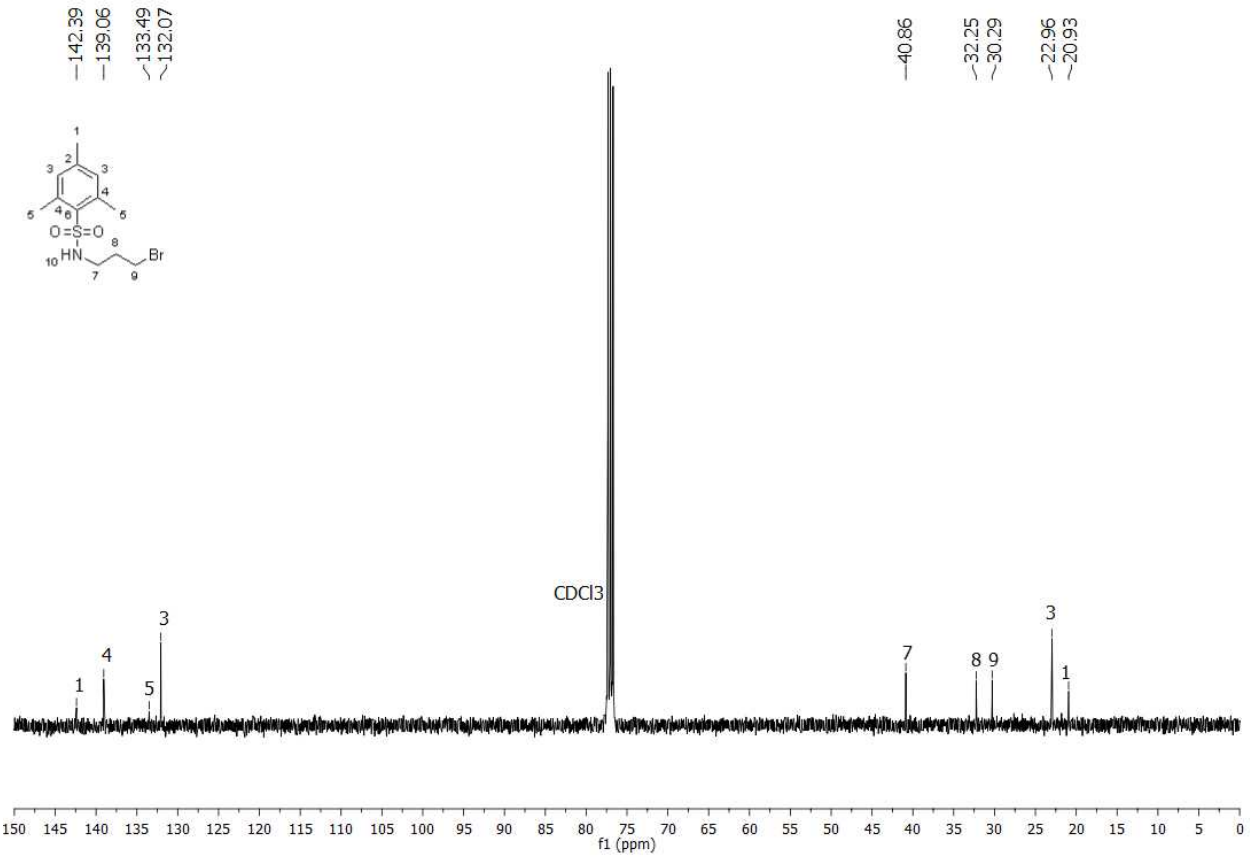


Figure S 54. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **9**.

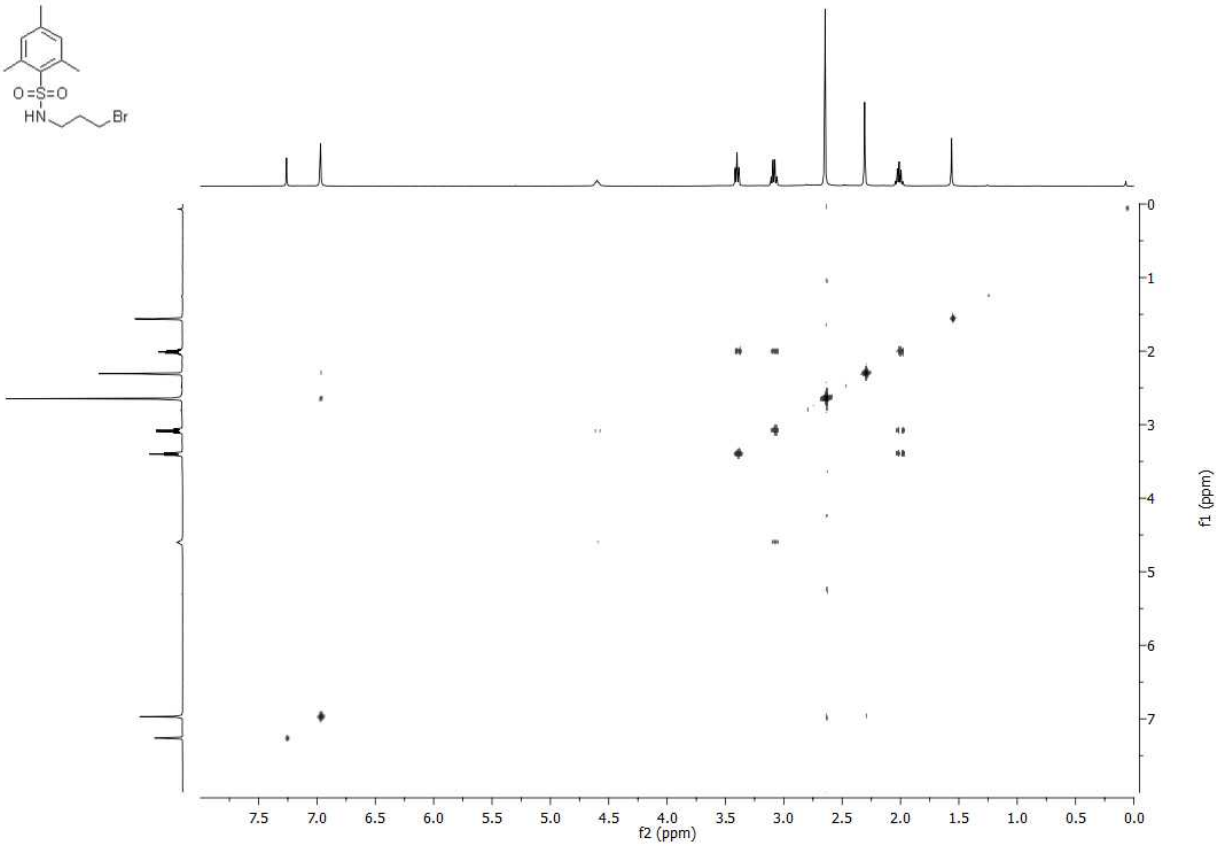


Figure S 55. COSY 2D NMR ($CDCl_3$) spectrum of **9**.

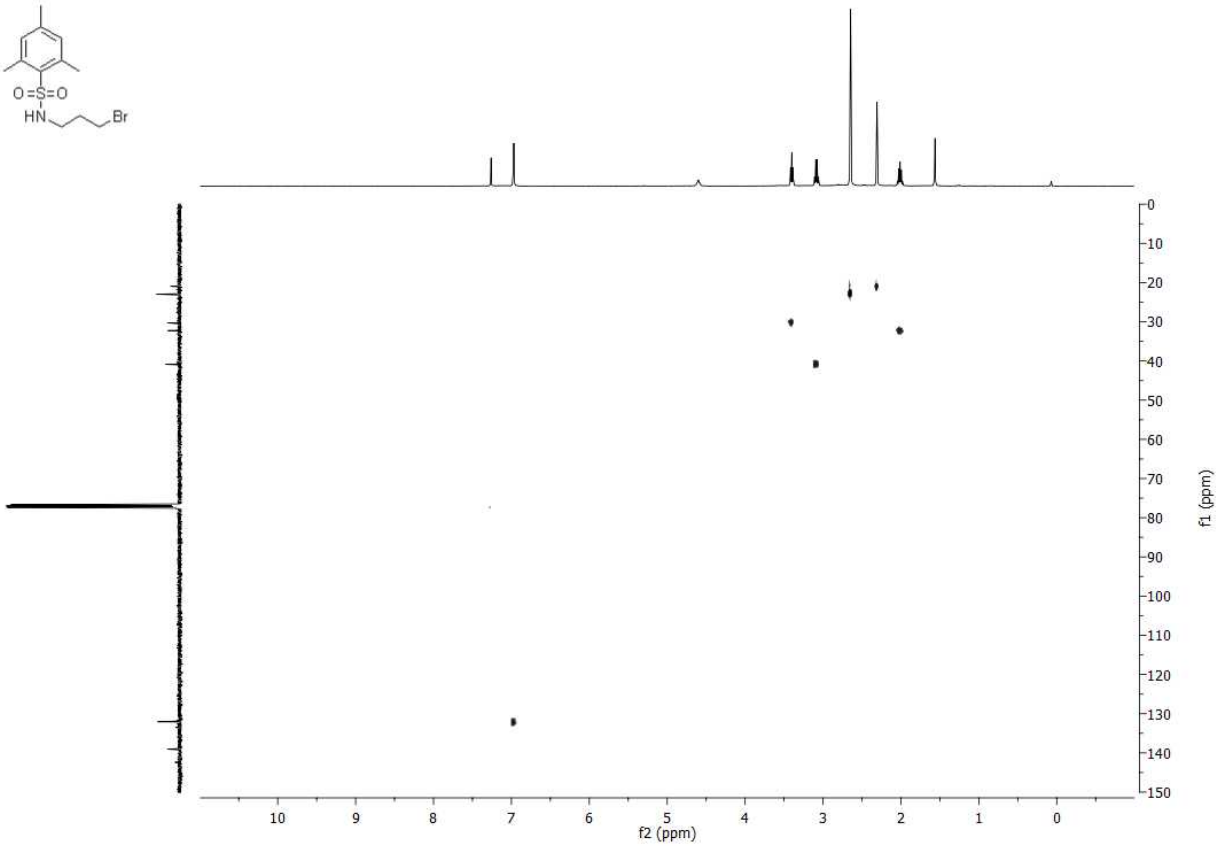


Figure S 56. HSQC 2D NMR ($CDCl_3$) spectrum of **9**.

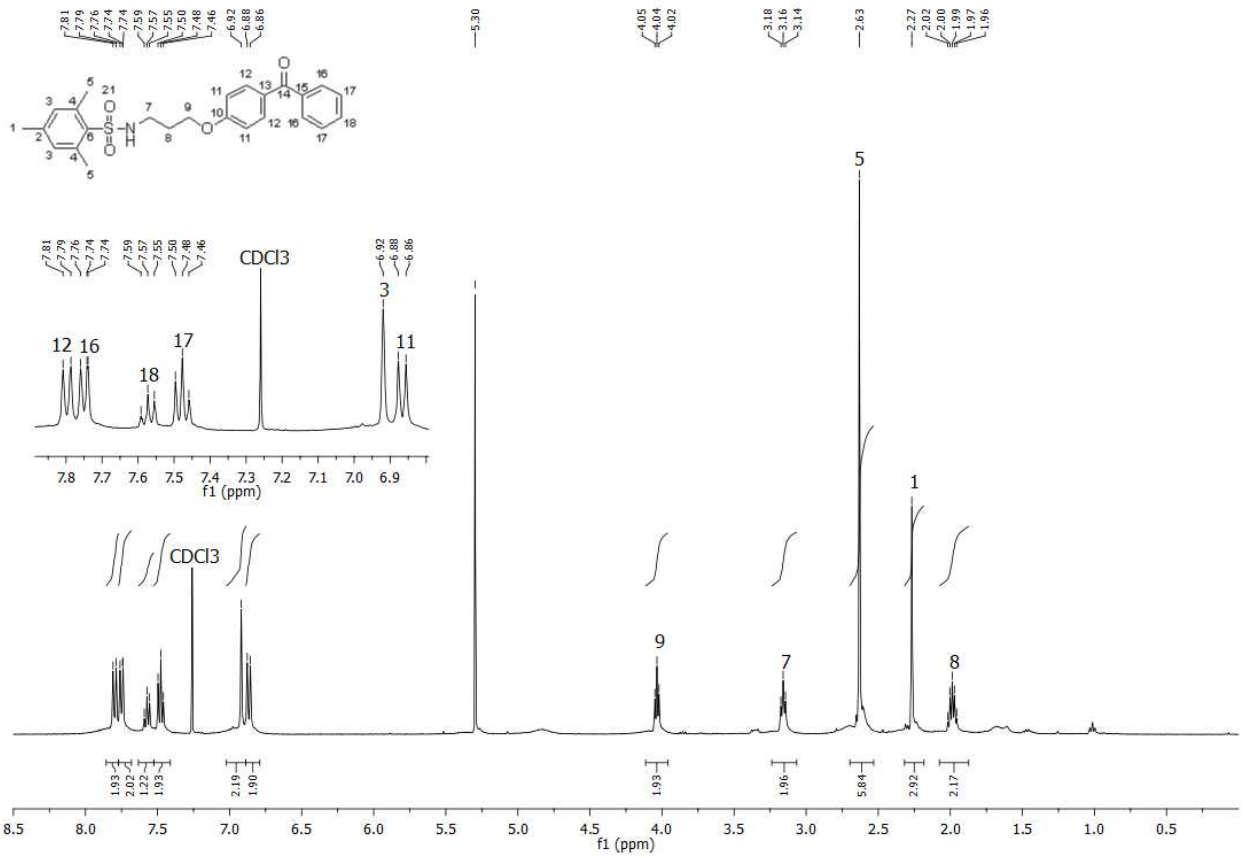


Figure S 57. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **10**.

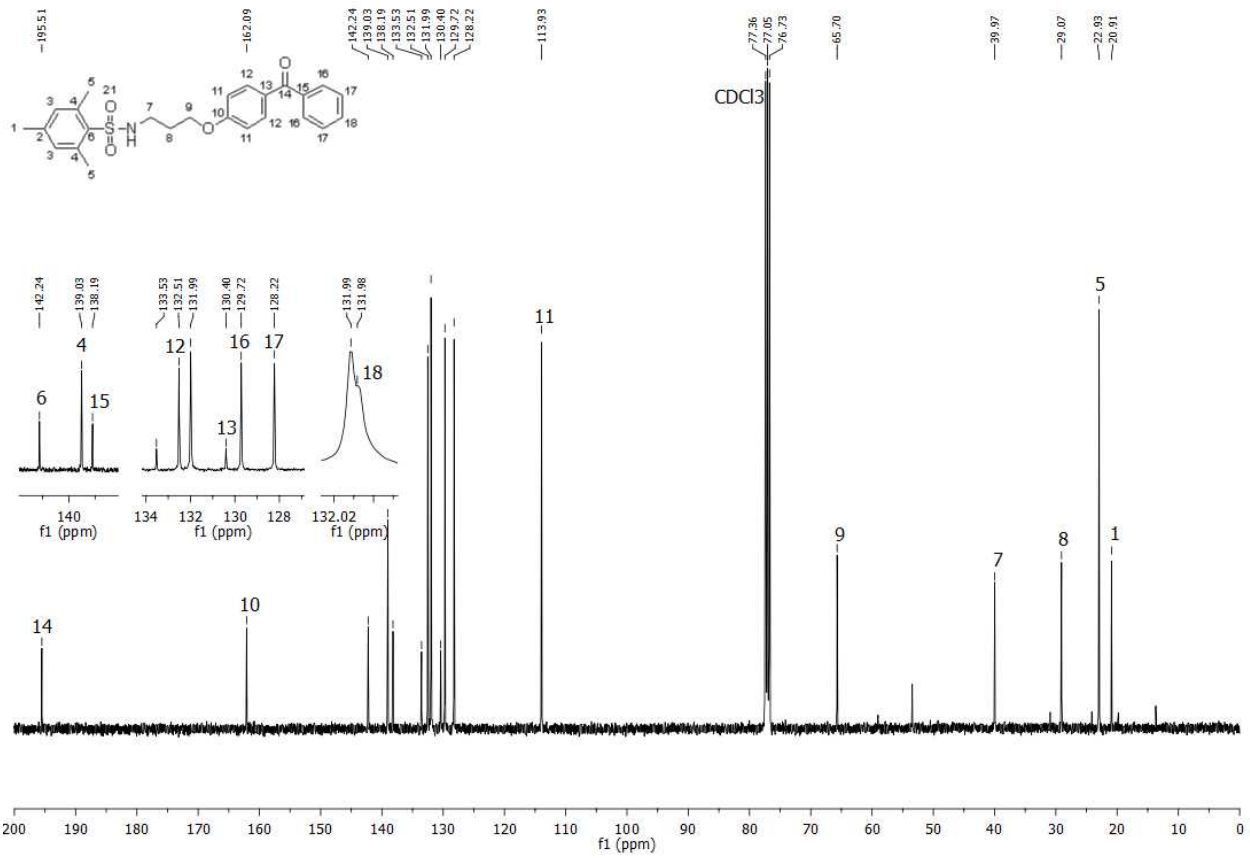


Figure S 58. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **10**.

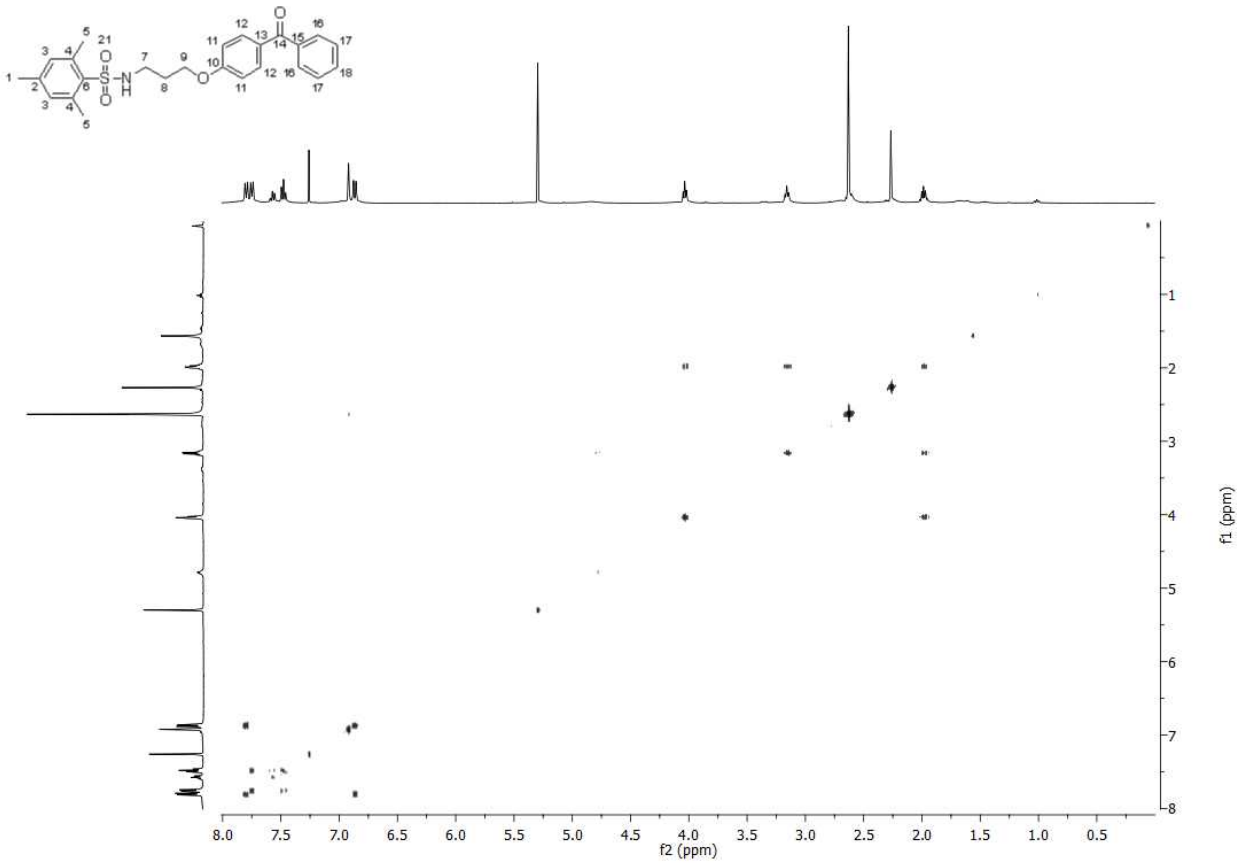


Figure S 59. COSY 2D NMR ($CDCl_3$) spectrum of **10**.

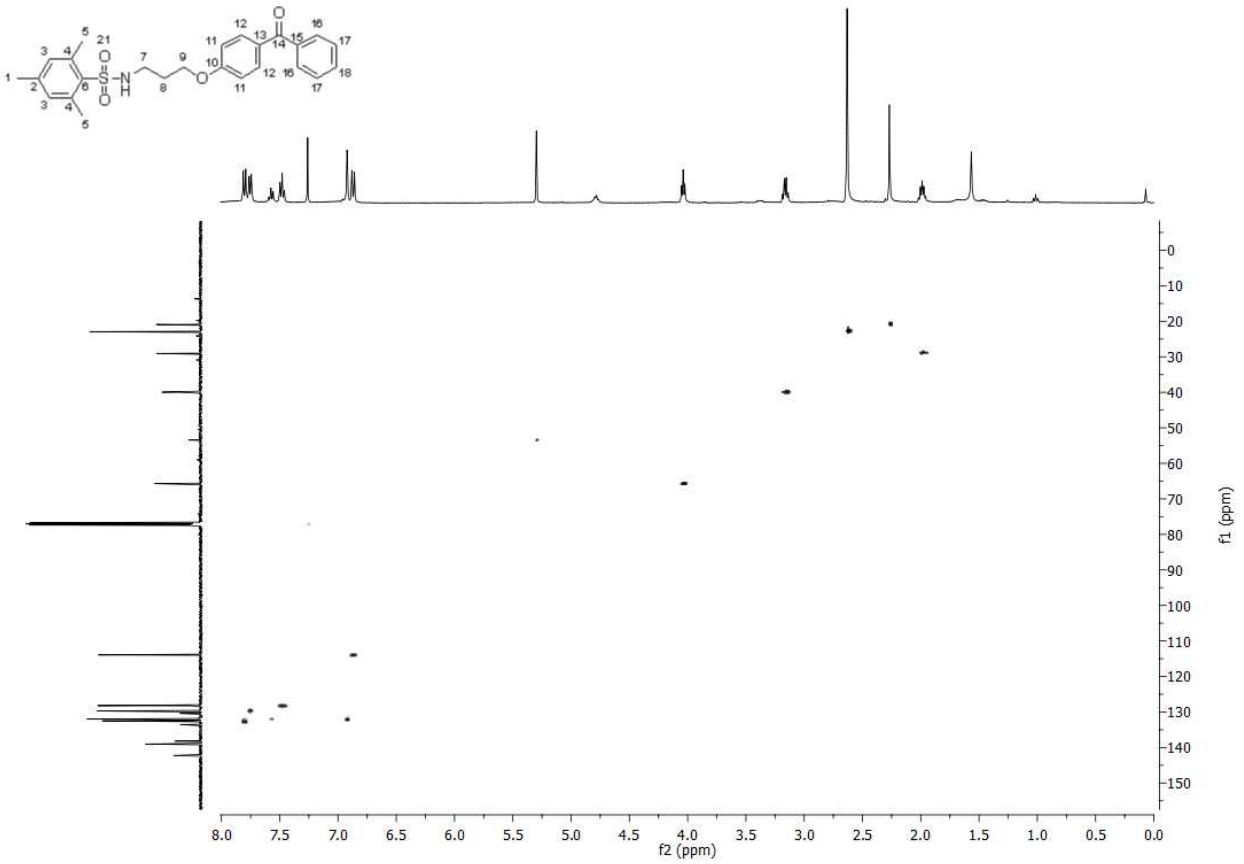


Figure S 60. HSQC 2D NMR ($CDCl_3$) spectrum of **10**.

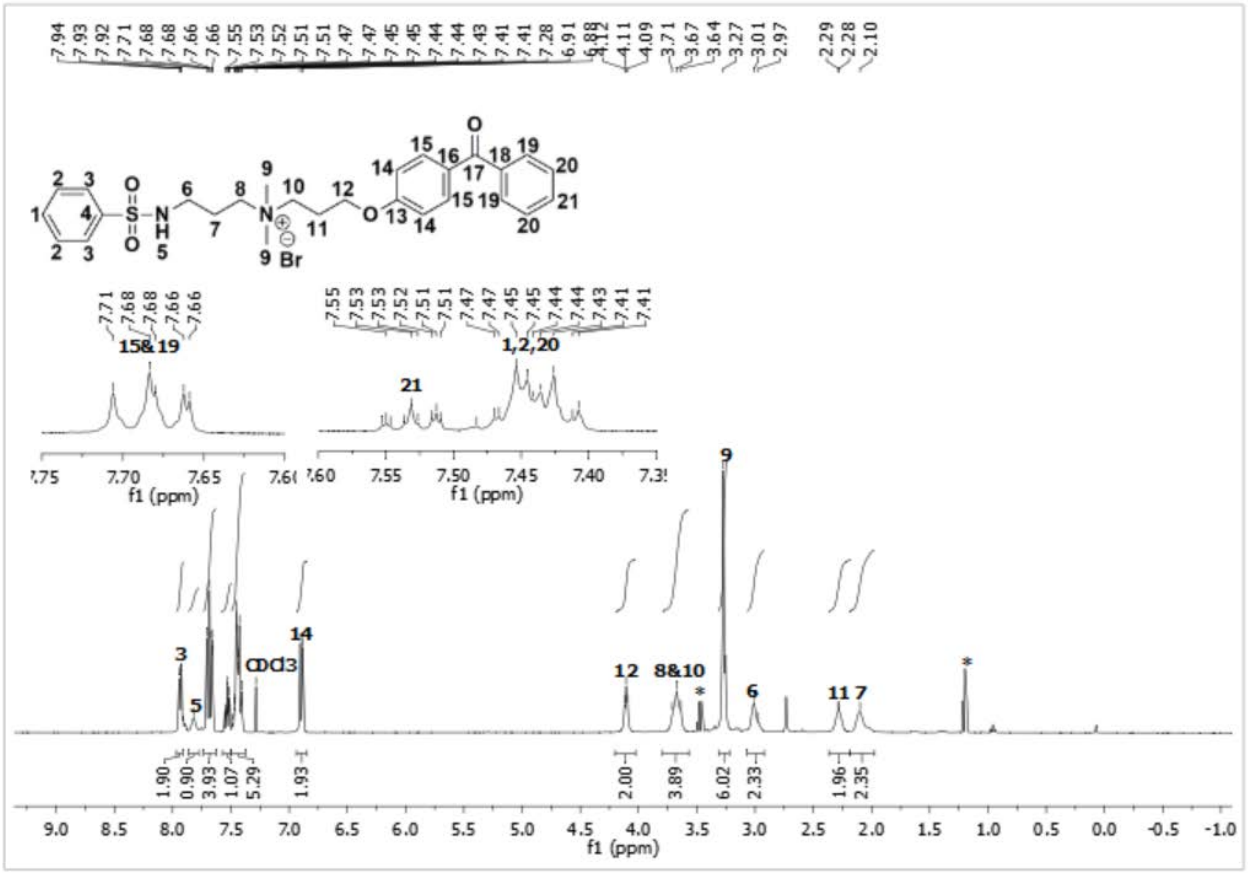


Figure S 61. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **1a**.

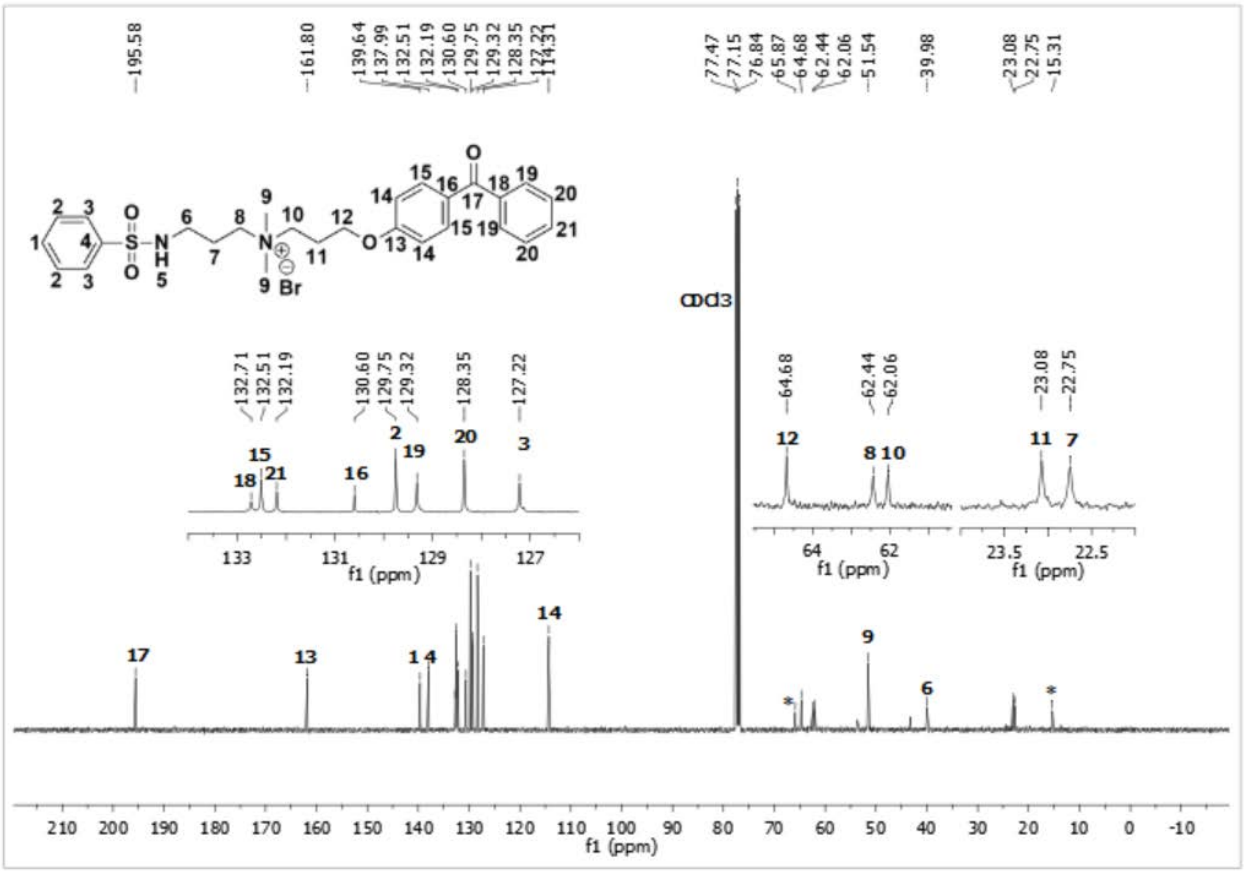


Figure S 62. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **1a**.

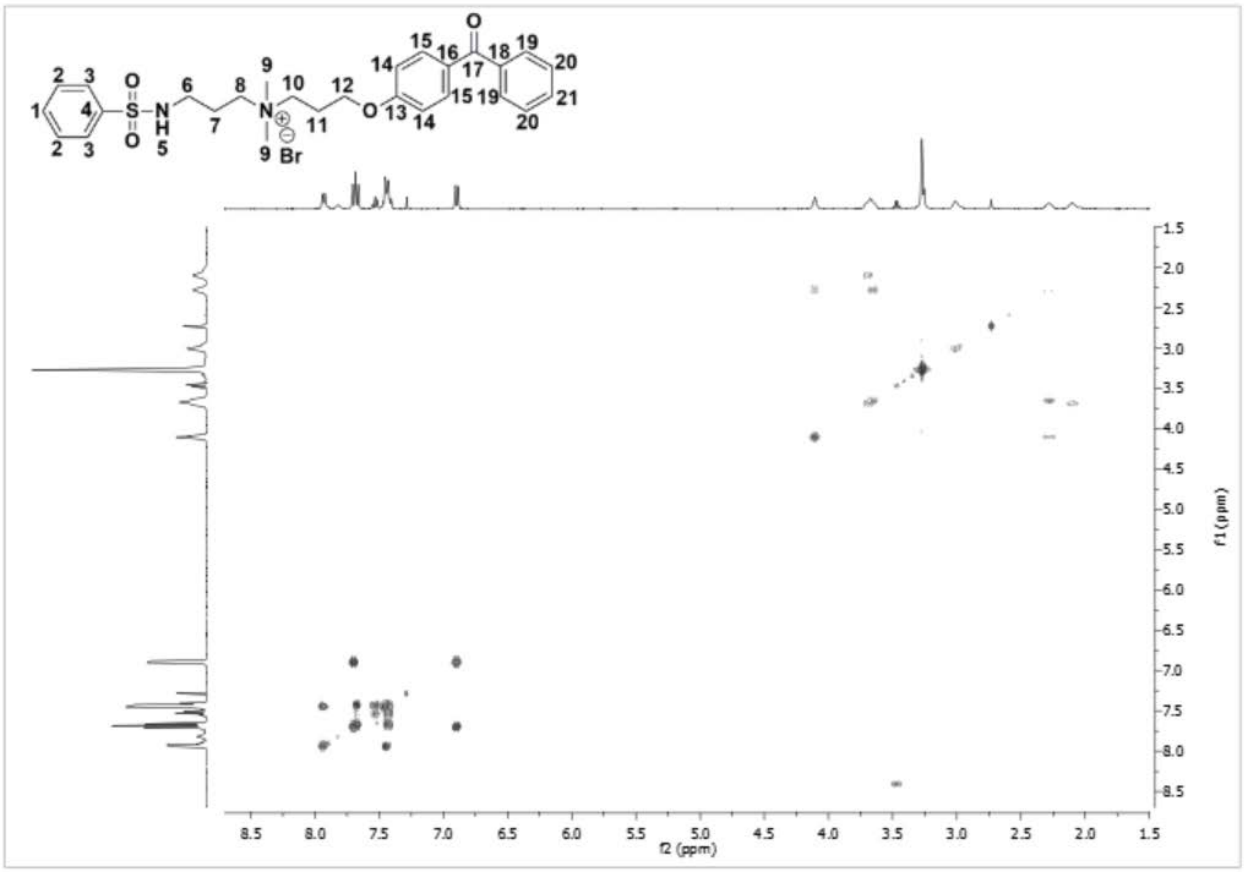


Figure S 63. COSY 2D NMR ($CDCl_3$) spectrum of **1a**.

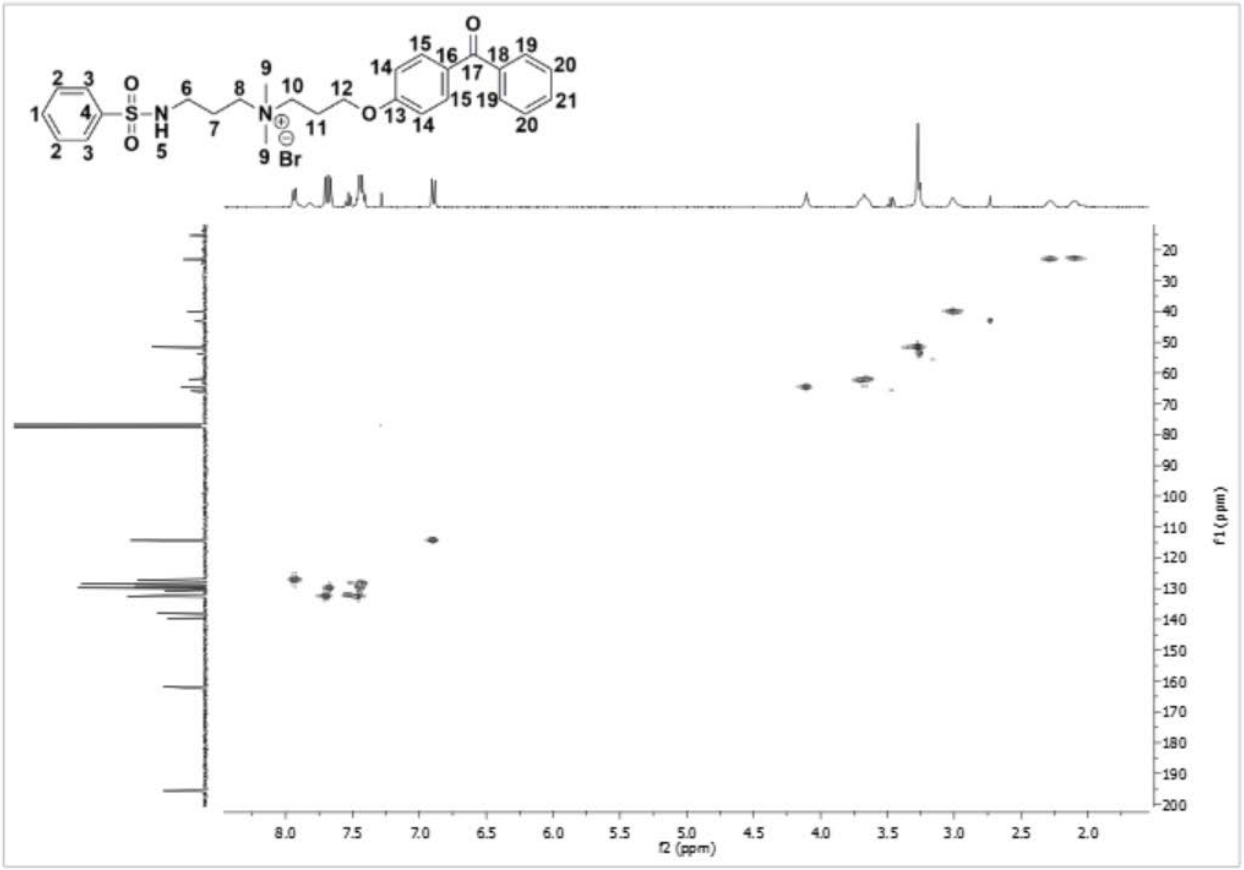


Figure S 64. HSQC 2D NMR ($CDCl_3$) spectrum of **1a**.

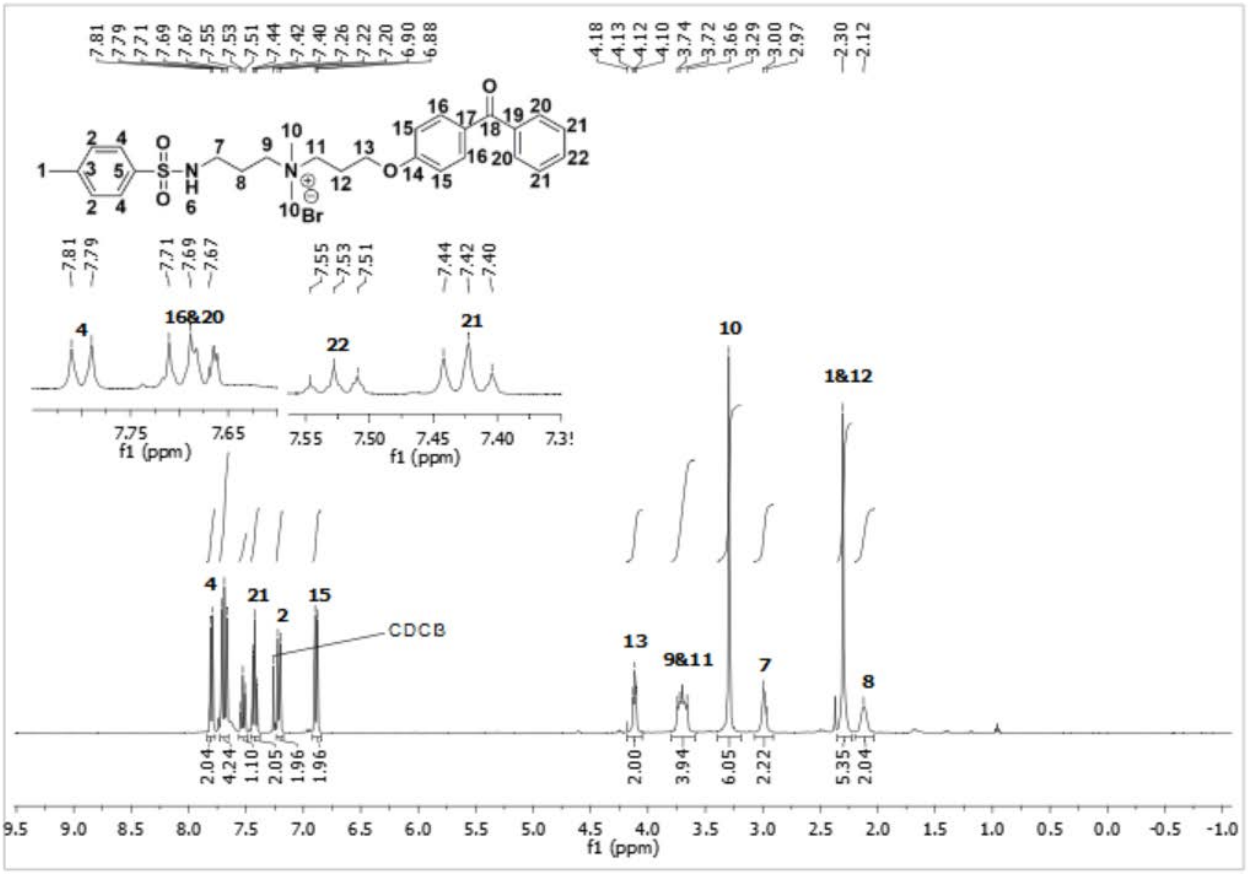


Figure S 65. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **2a**.

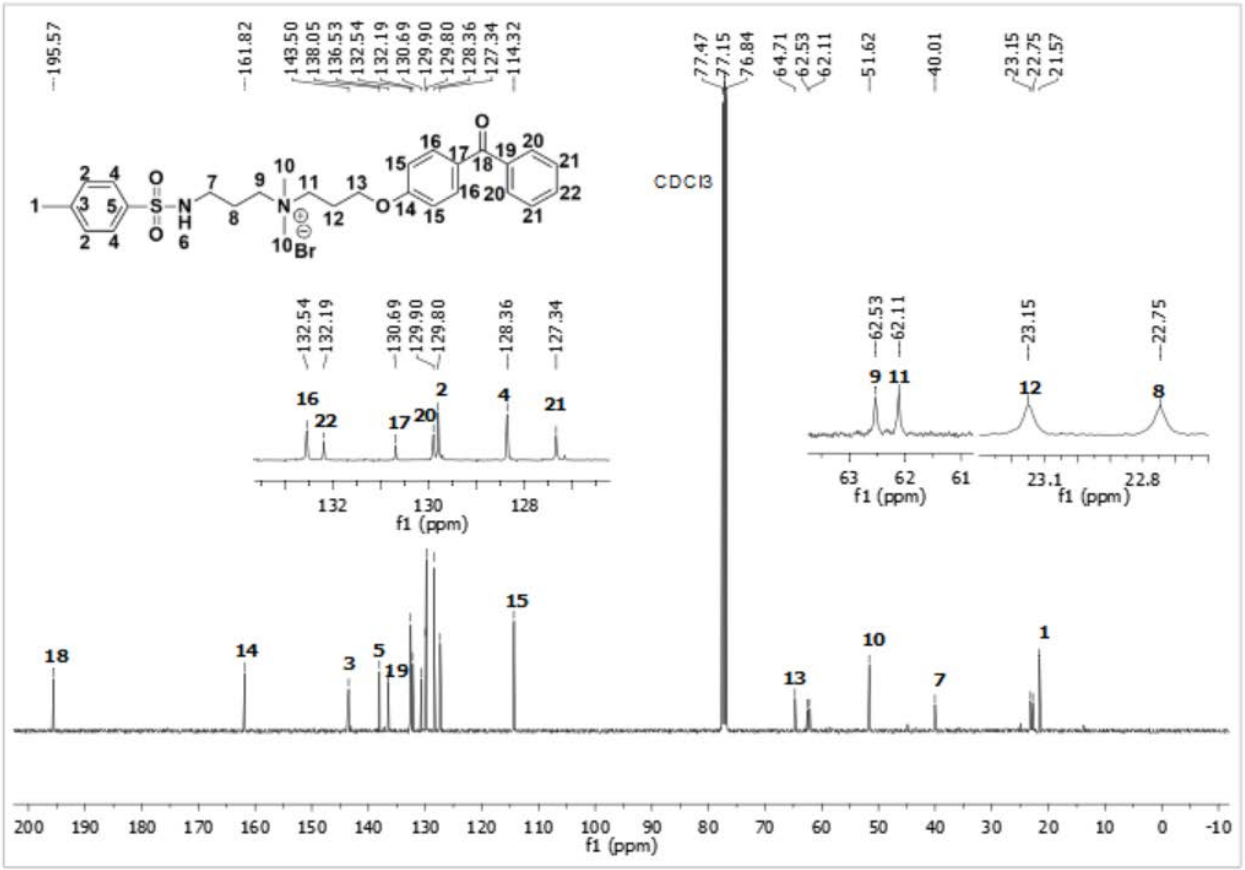


Figure S 66. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **2a.**

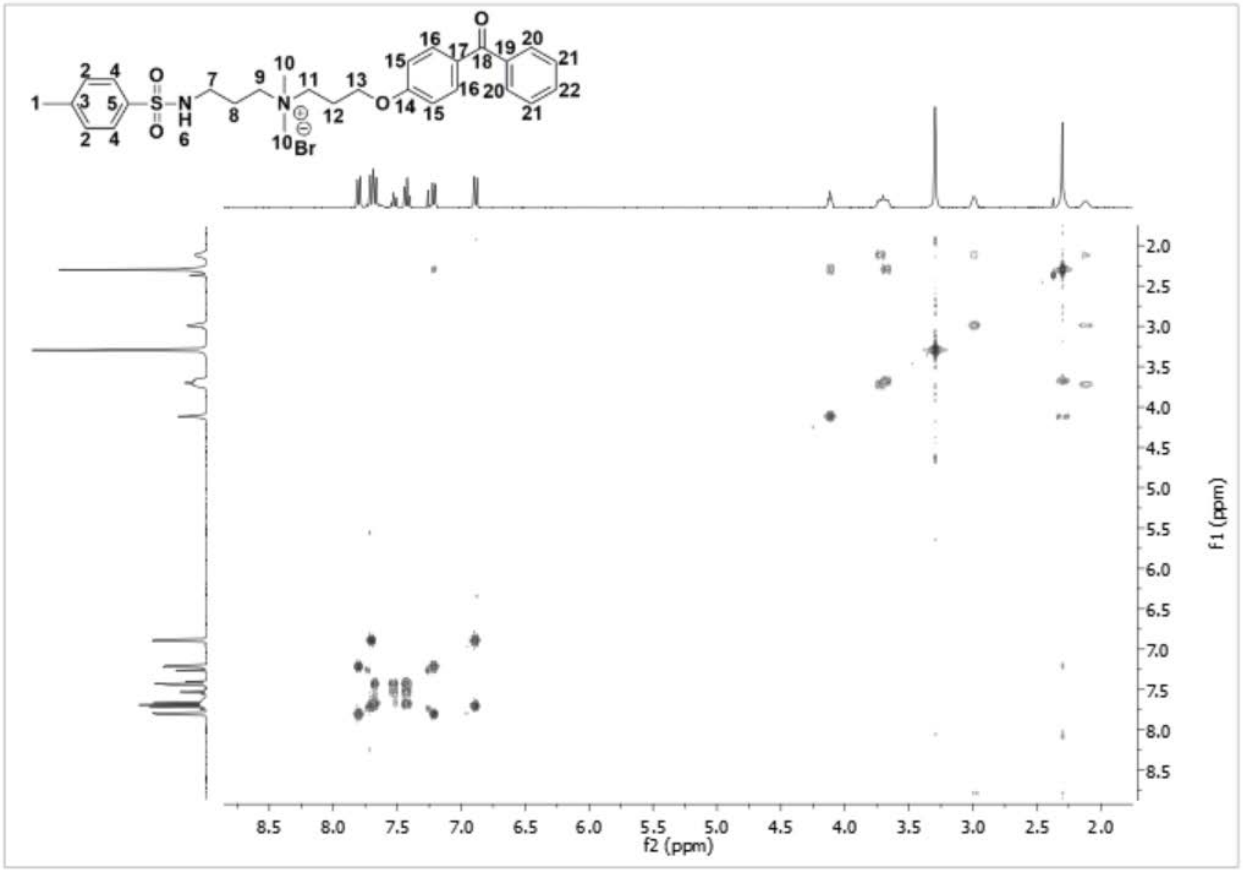


Figure S 67. COSY 2D NMR ($CDCl_3$) spectrum of **2a**.

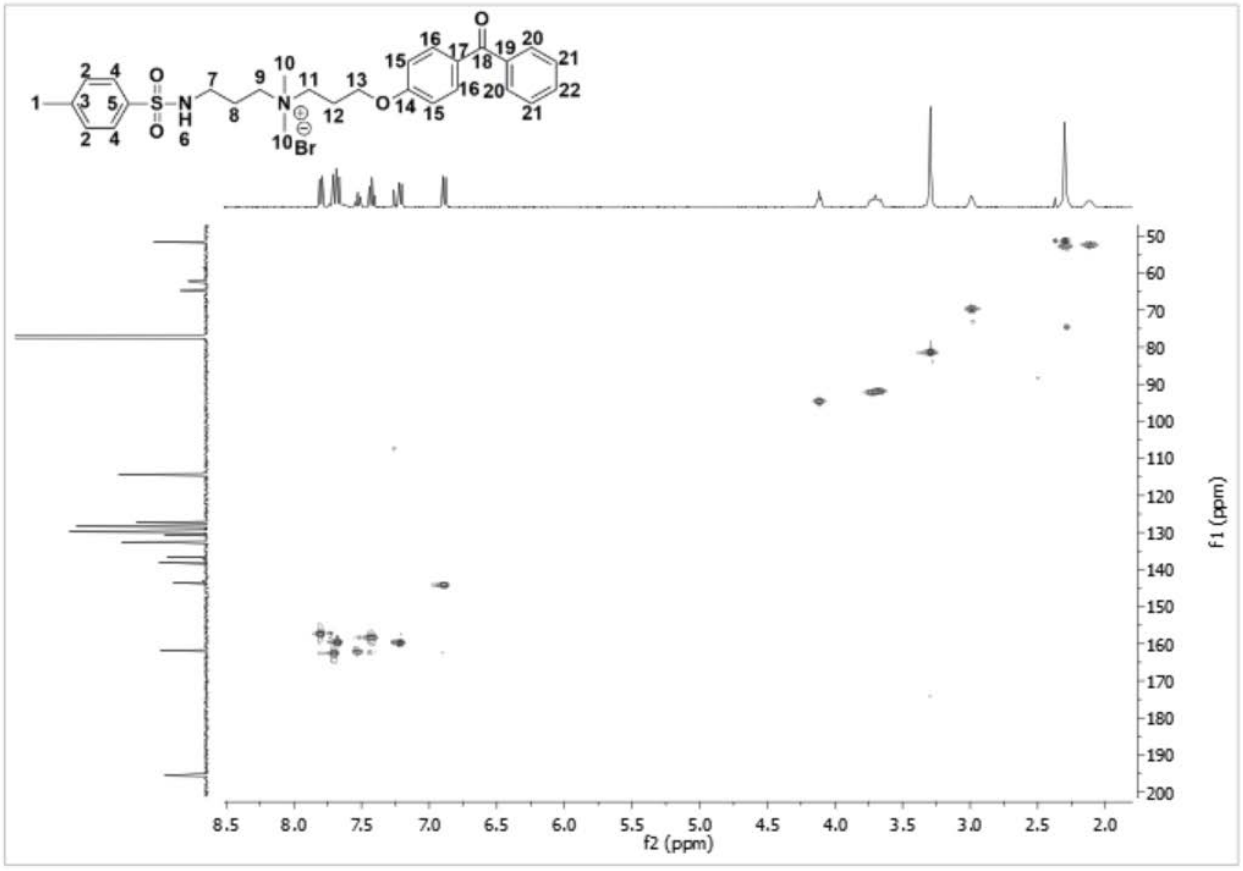


Figure S 68. HSQC 2D NMR ($CDCl_3$) spectrum of **2a**.

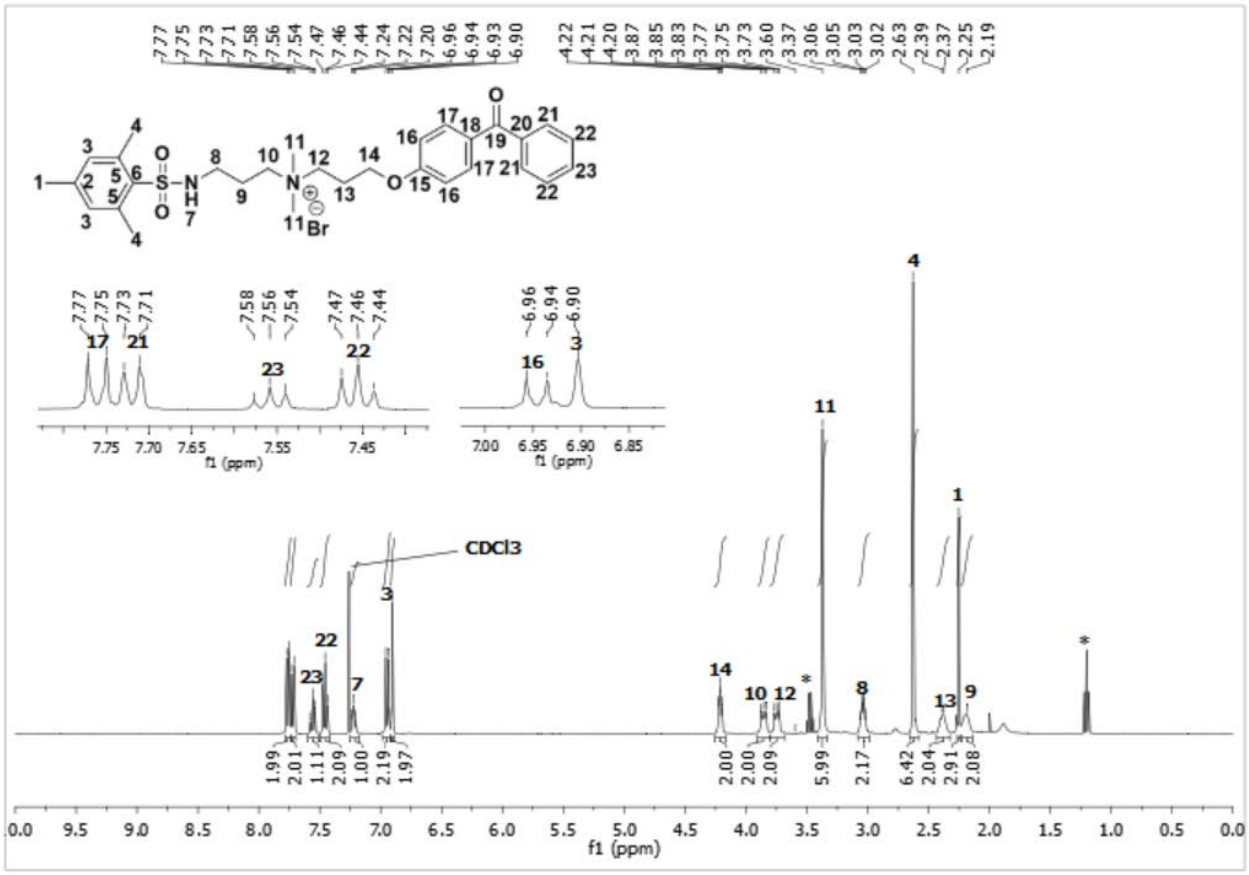


Figure S 69. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **3a**.

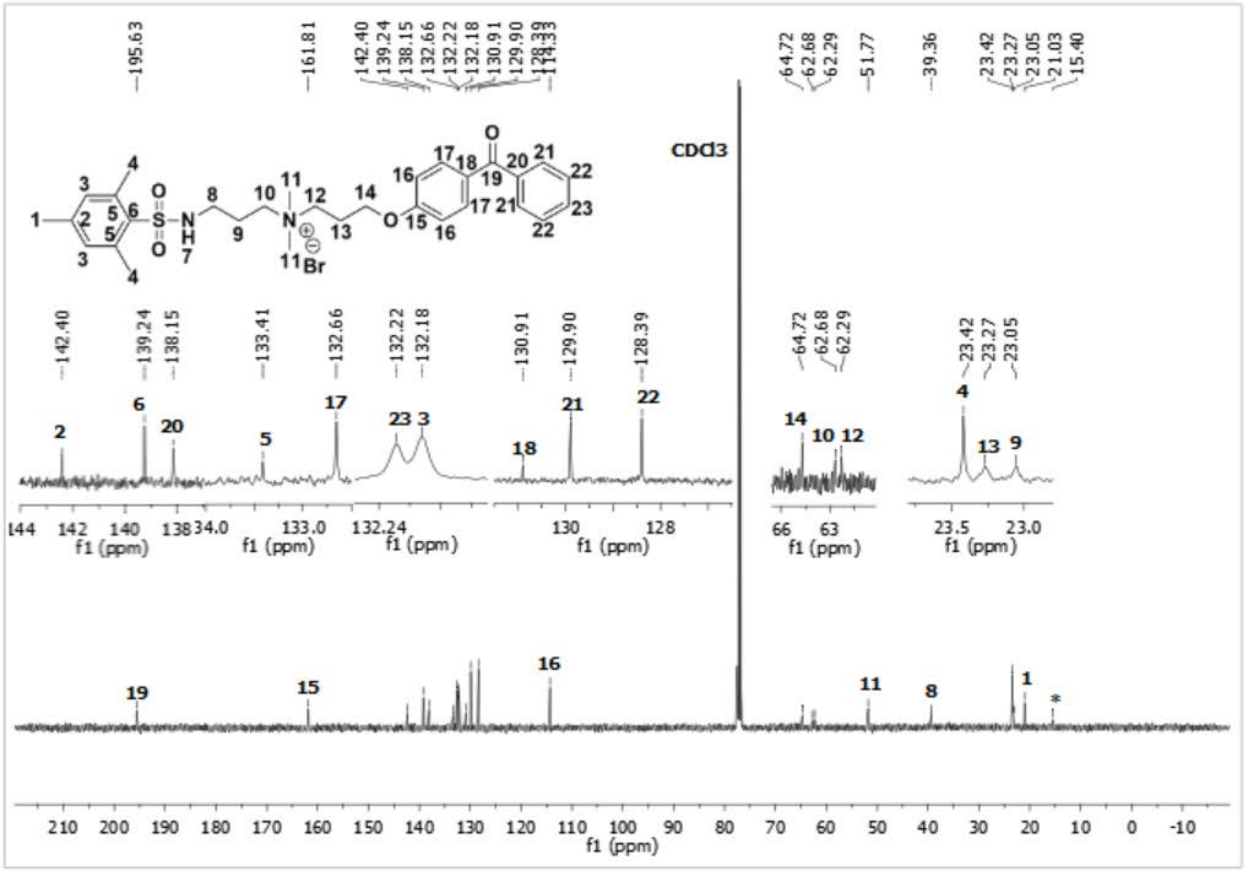


Figure S 70. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **3a**.

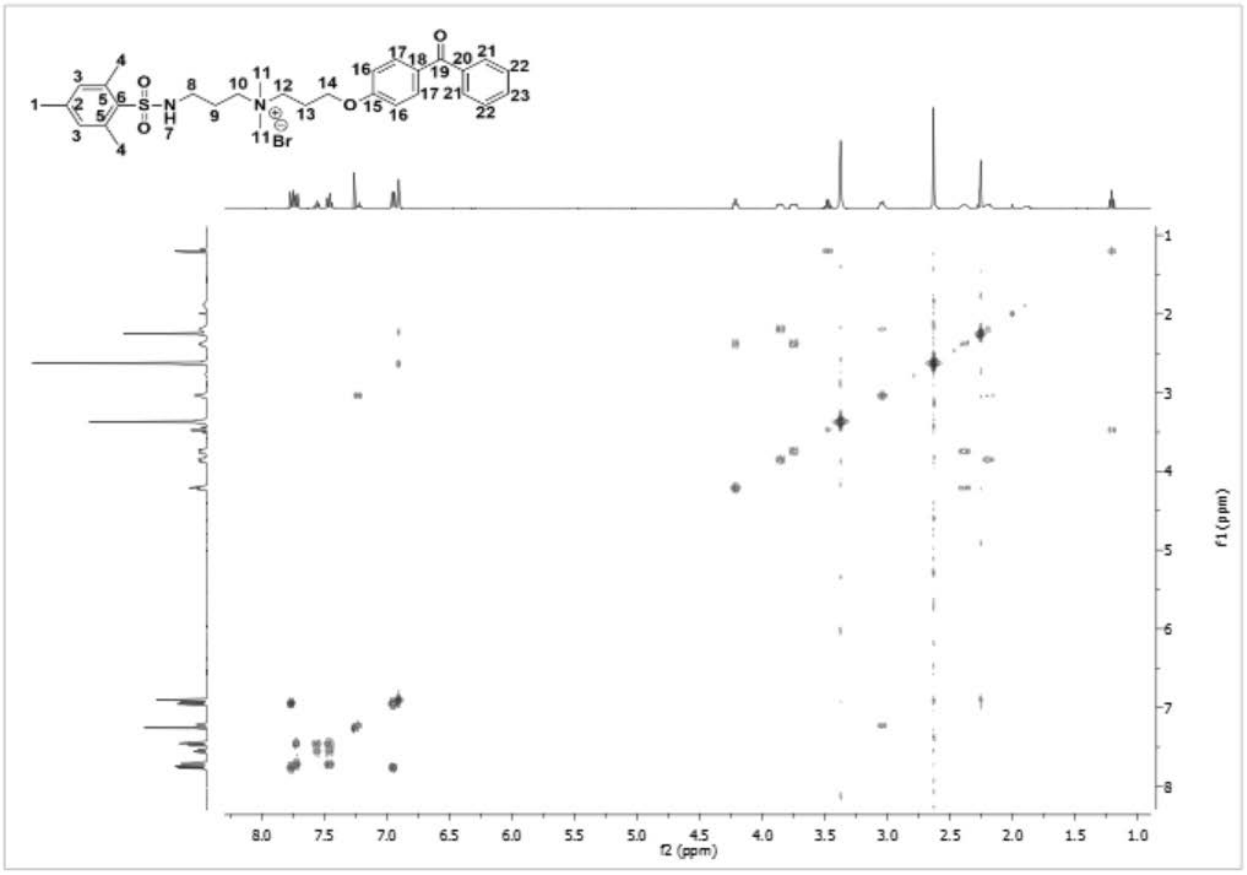


Figure S 71. COSY 2D NMR ($CDCl_3$) spectrum of **3a**.

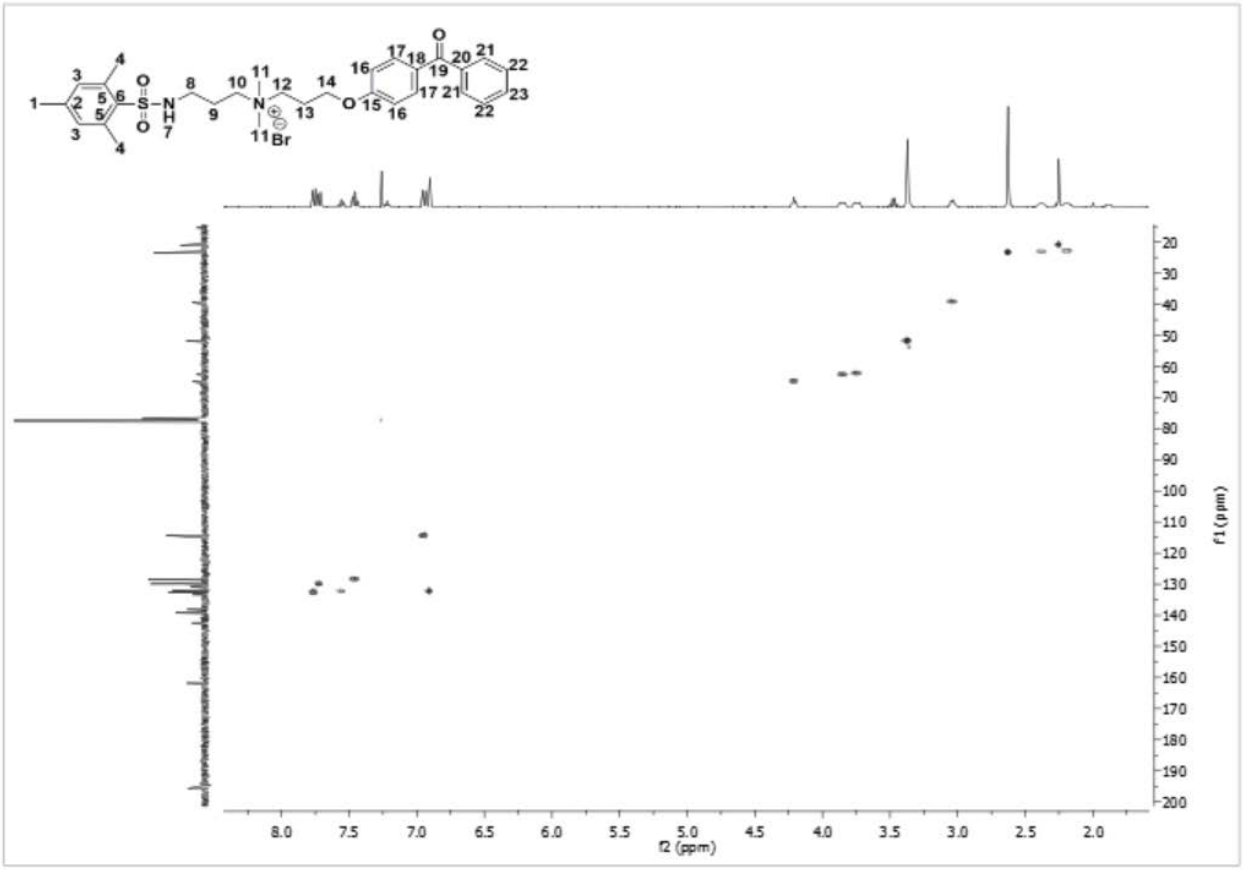


Figure S 72. HSQC 2D NMR ($CDCl_3$) spectrum of **3a**.

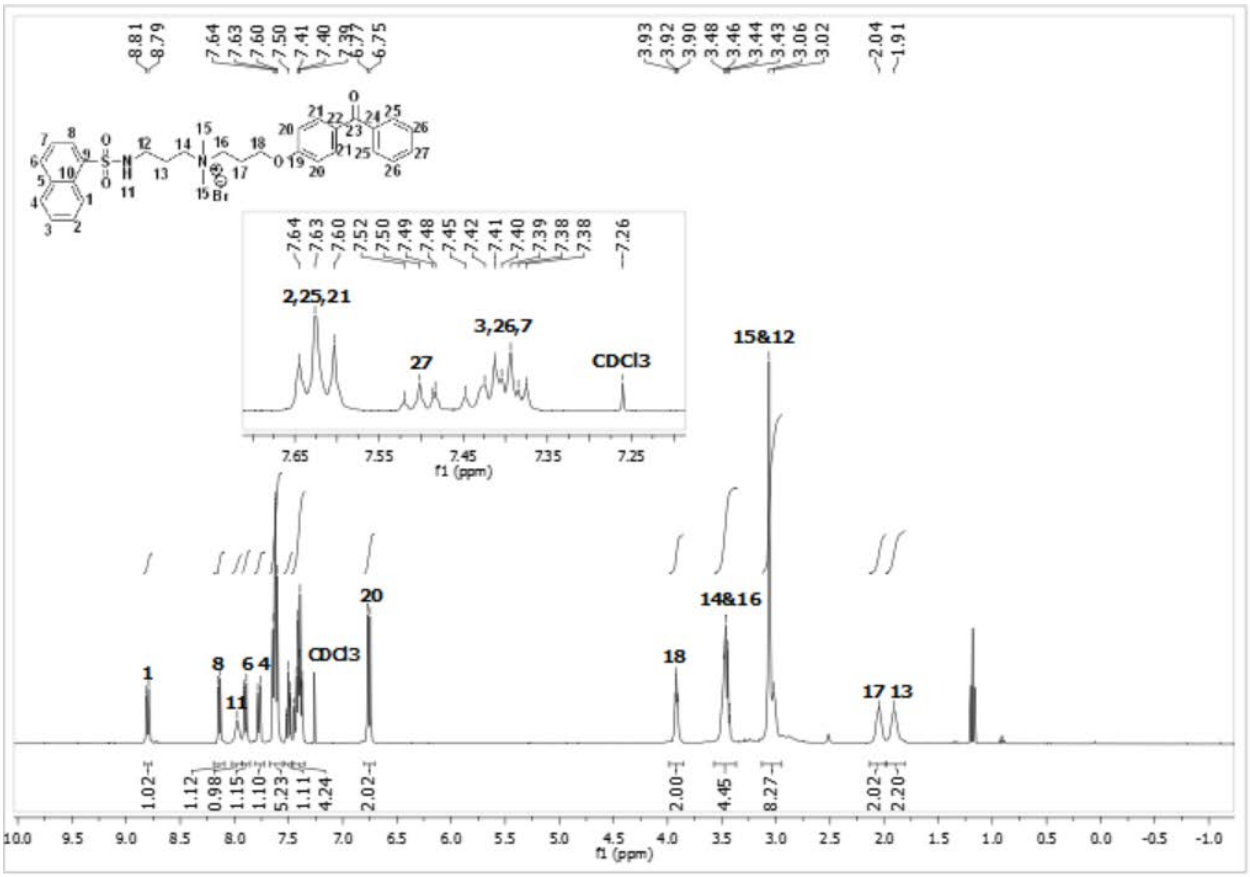


Figure S 73. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **4a.**

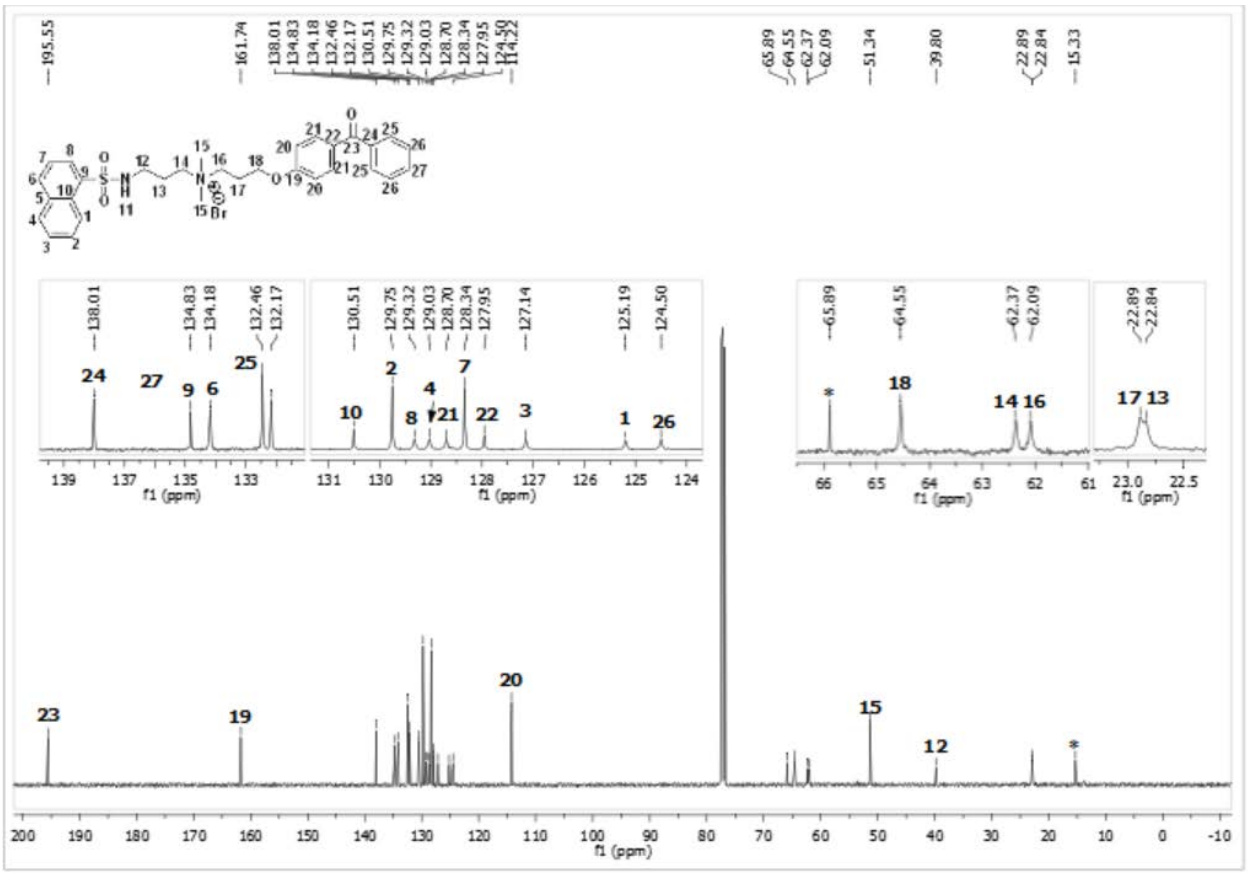


Figure S 74. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **4a**.

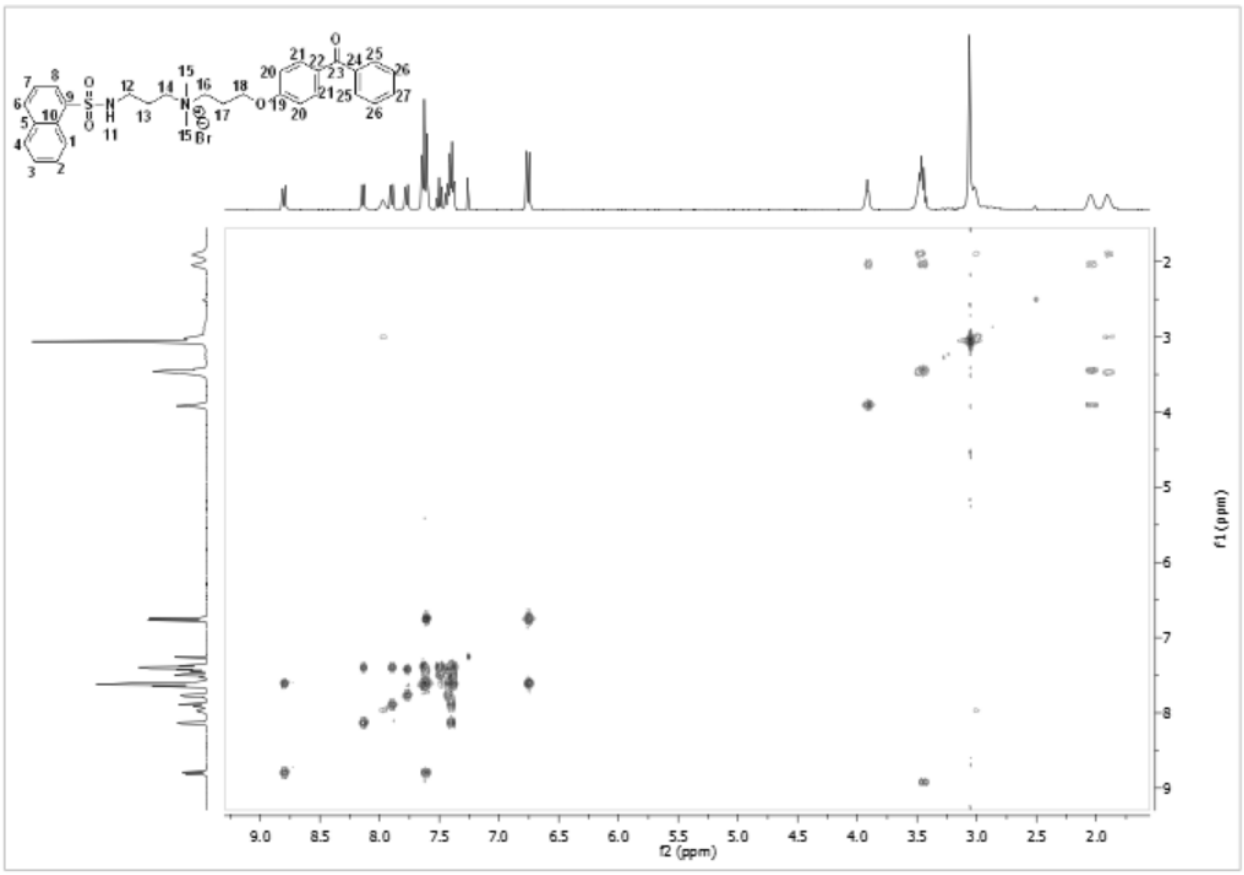


Figure S 75. COSY 2D NMR ($CDCl_3$) spectrum of **4a**.

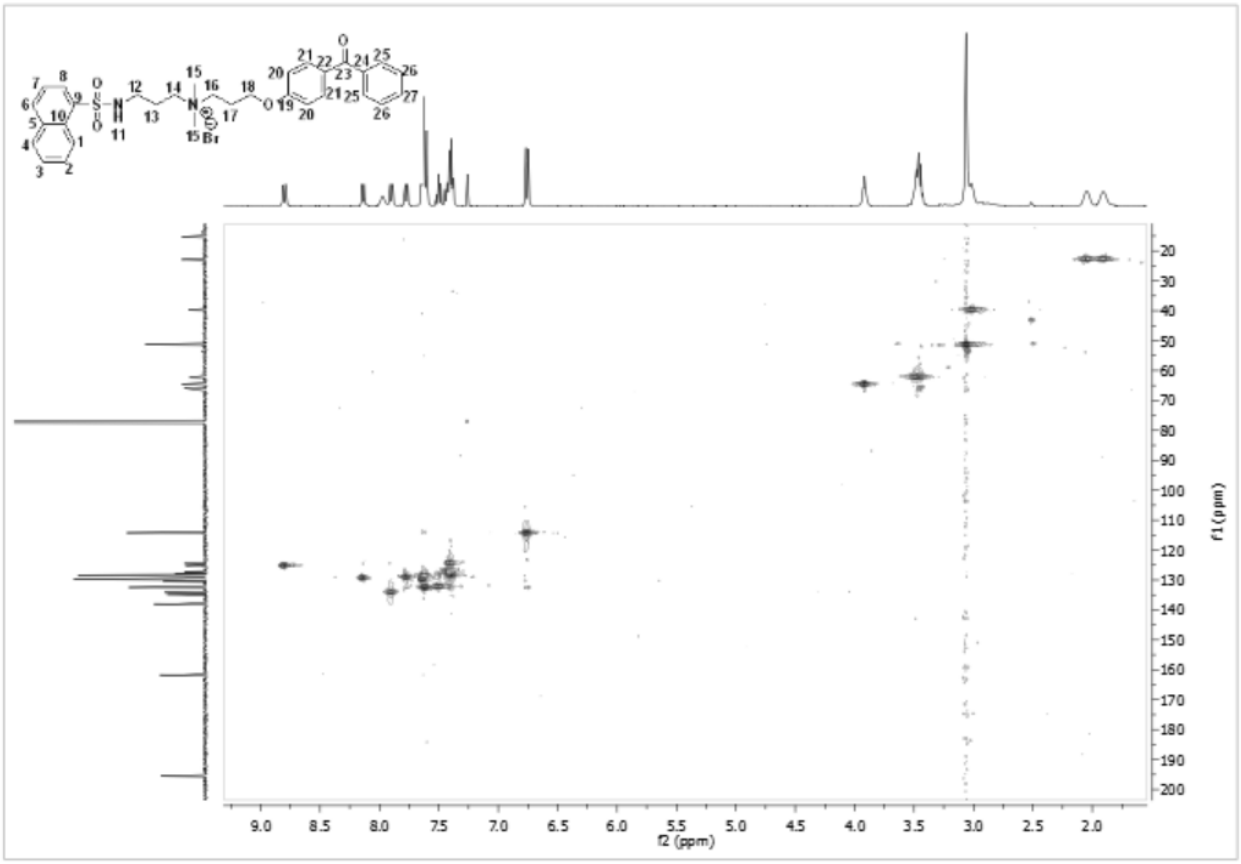


Figure S 76. HSQC 2D NMR ($CDCl_3$) spectrum of **4a**.

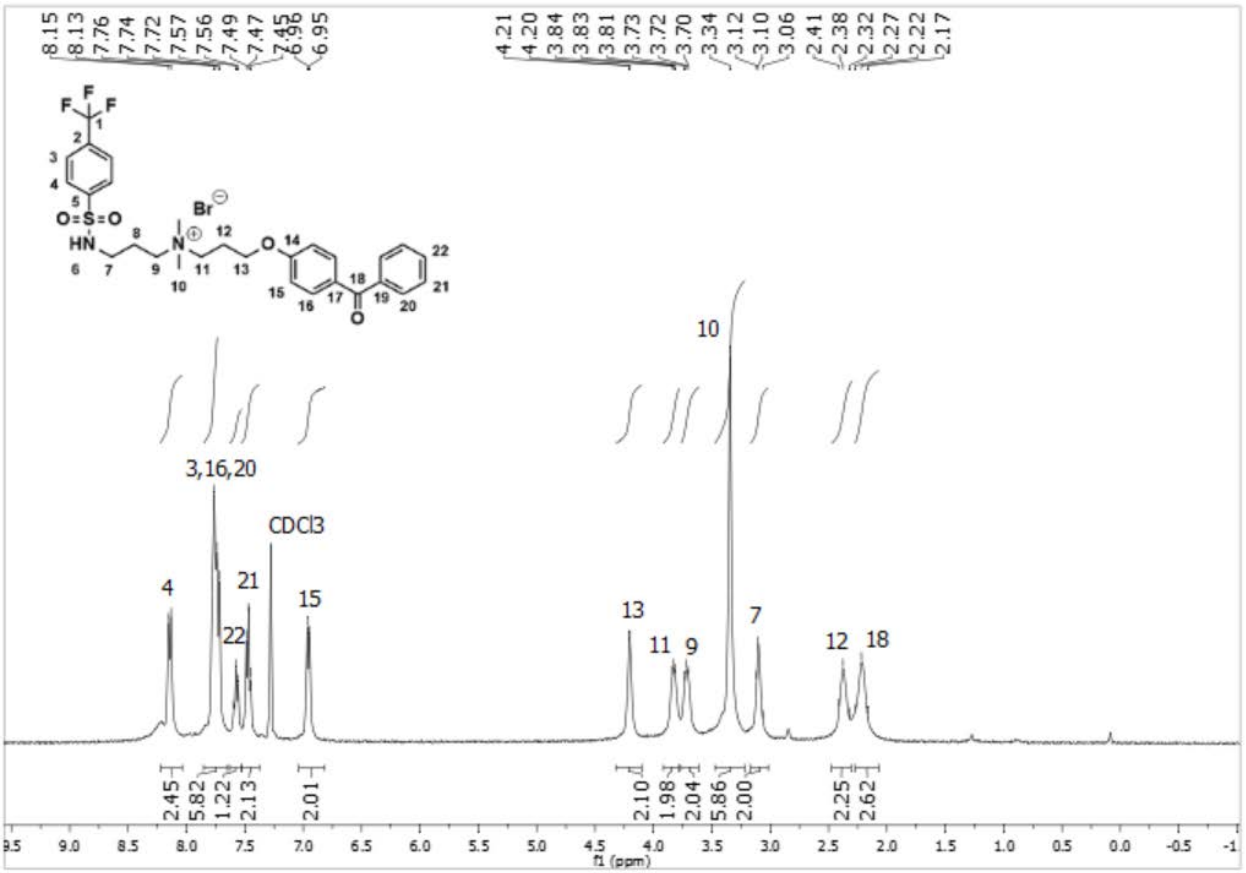


Figure S 77. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **5a.**

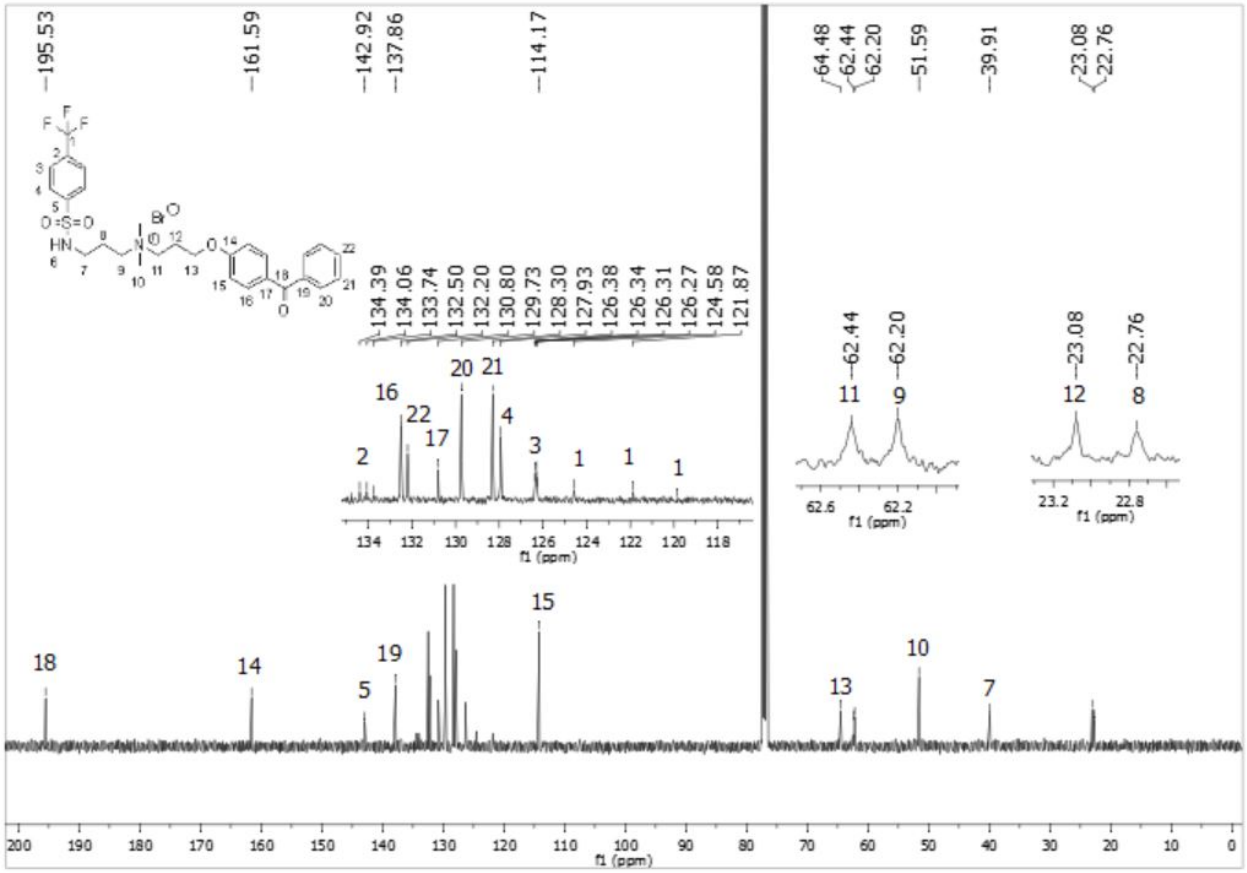


Figure S 78. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **5a**.

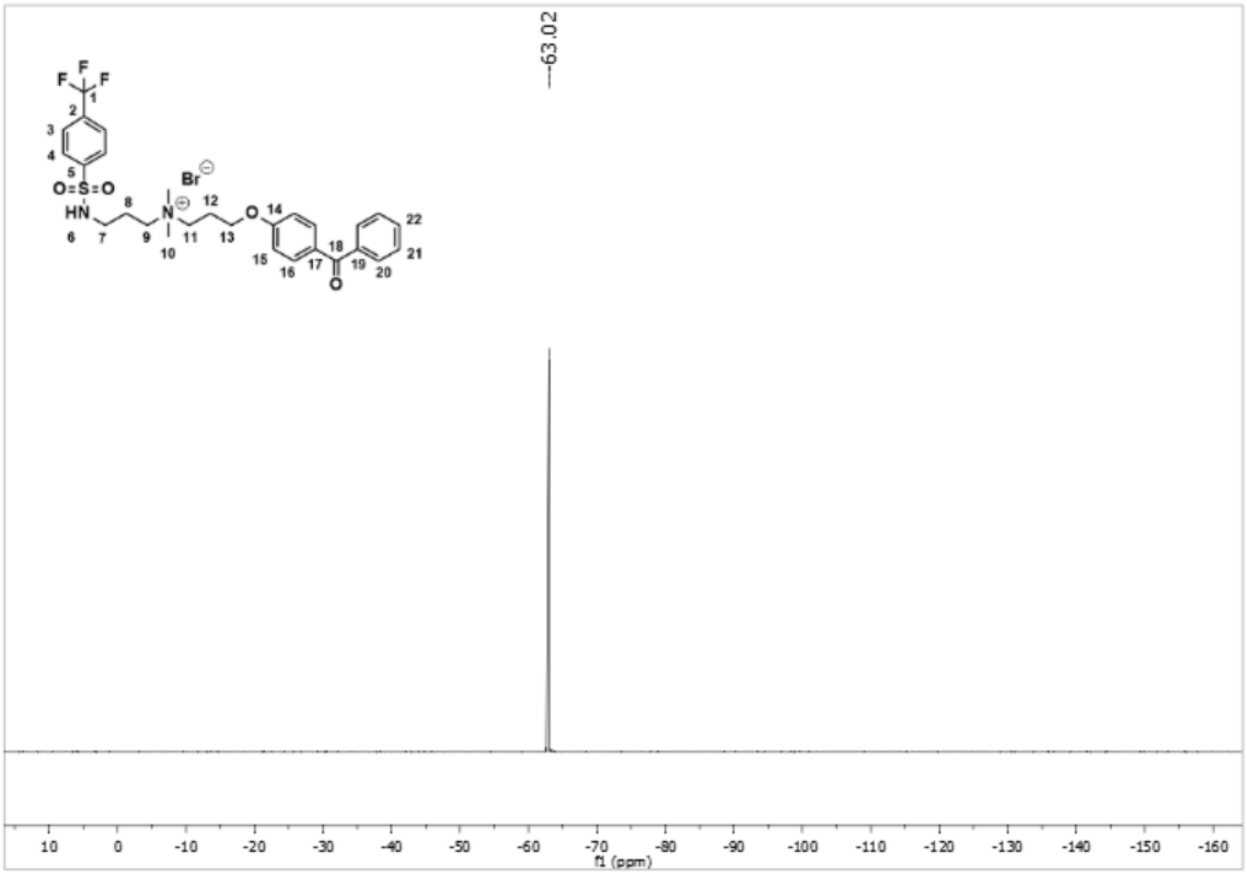


Figure S 79. ^{19}F NMR (376 MHz, $CDCl_3$) spectrum of **5a**.

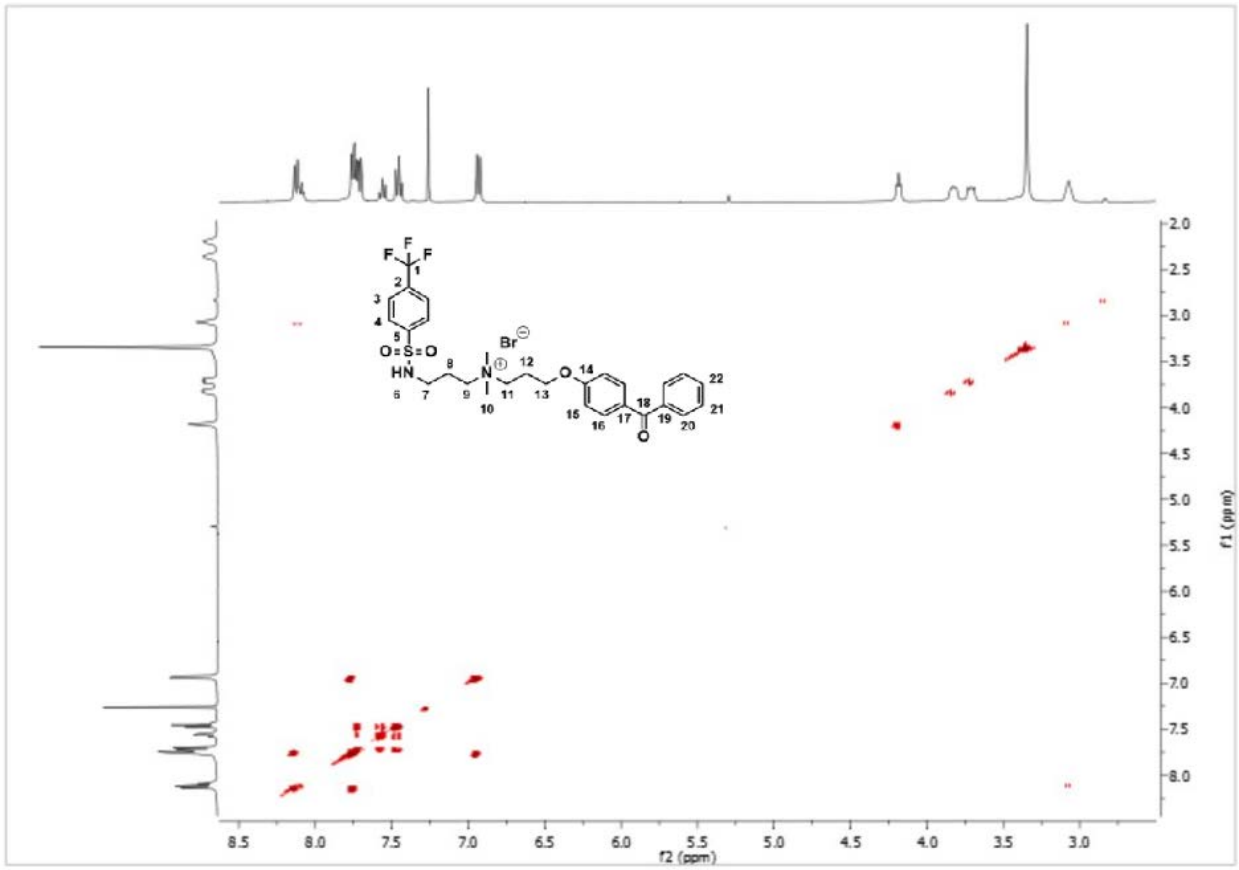


Figure S 80. COSY 2D NMR ($CDCl_3$) spectrum of **5a**.

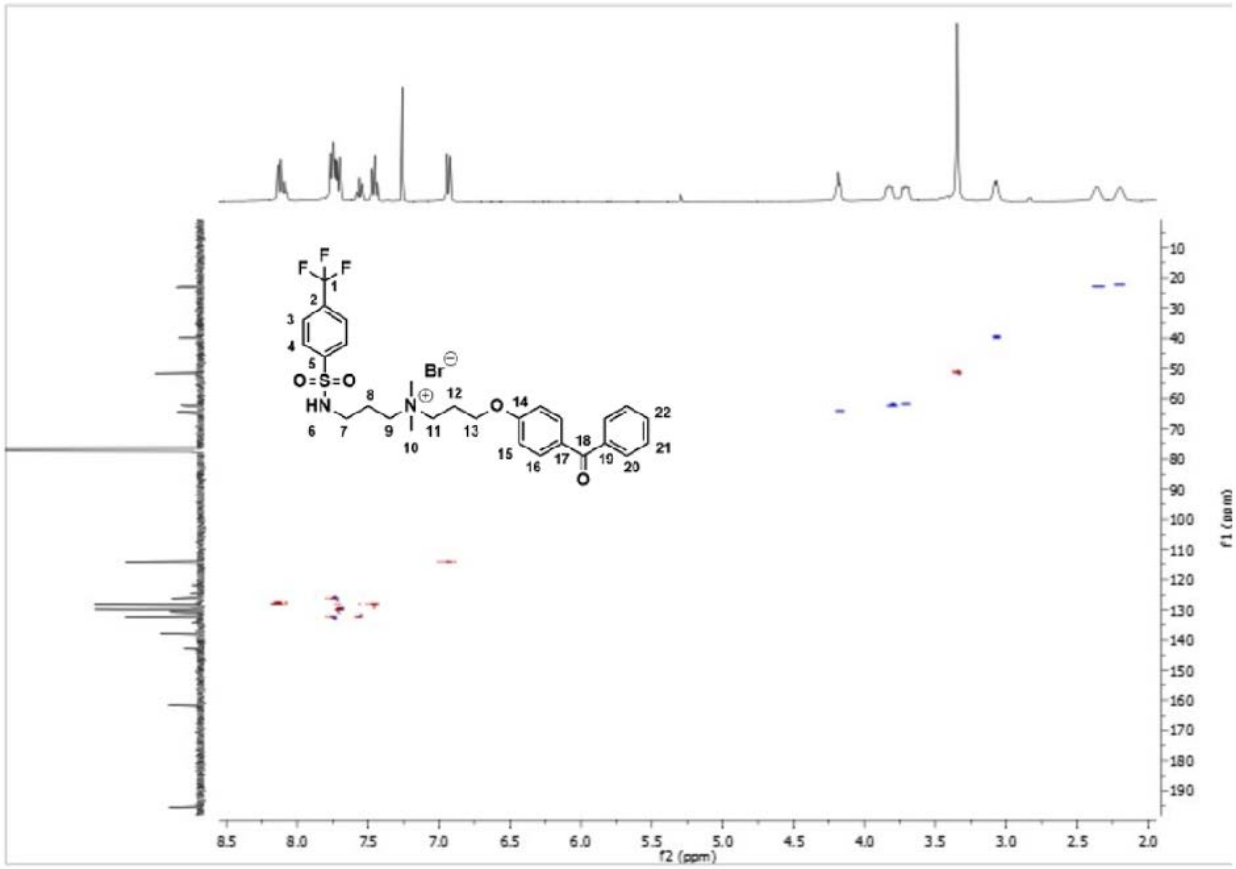


Figure S 81. HSQC 2D NMR ($CDCl_3$) spectrum of **5a**.

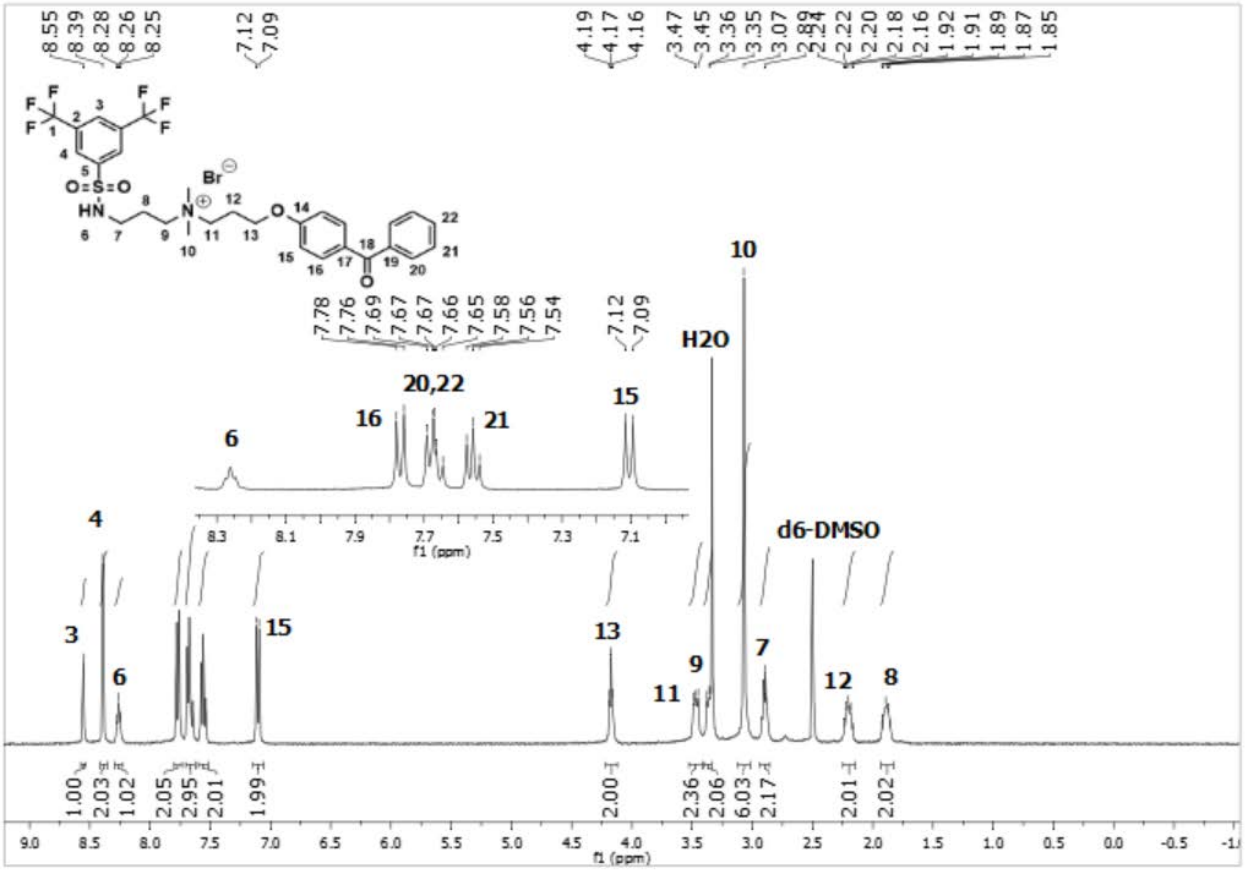


Figure S 82. ^{1}H NMR (400 MHz, DMSO-d_6) spectrum of **6a.**

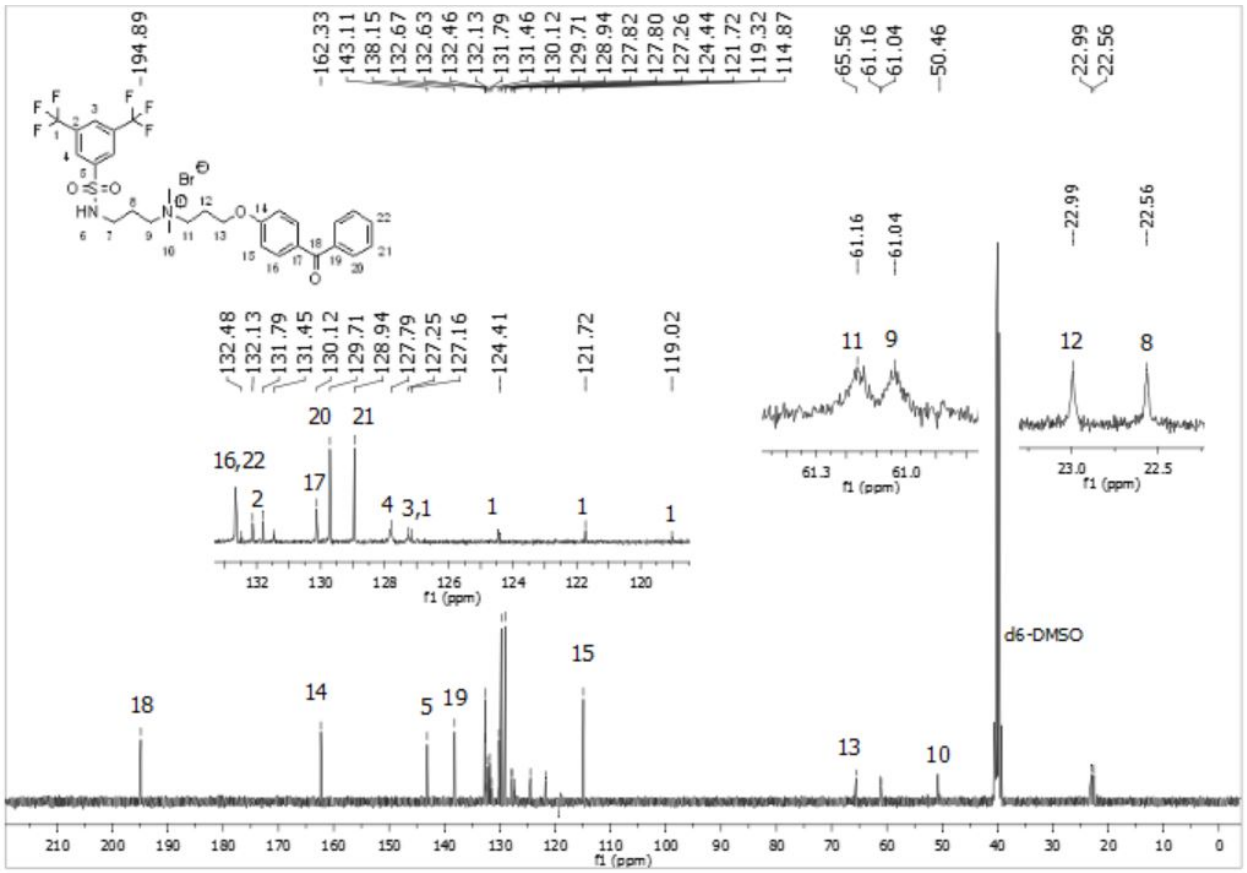


Figure S 83. ^{13}C NMR (101 MHz, DMSO-d_6) spectrum of **6a.**

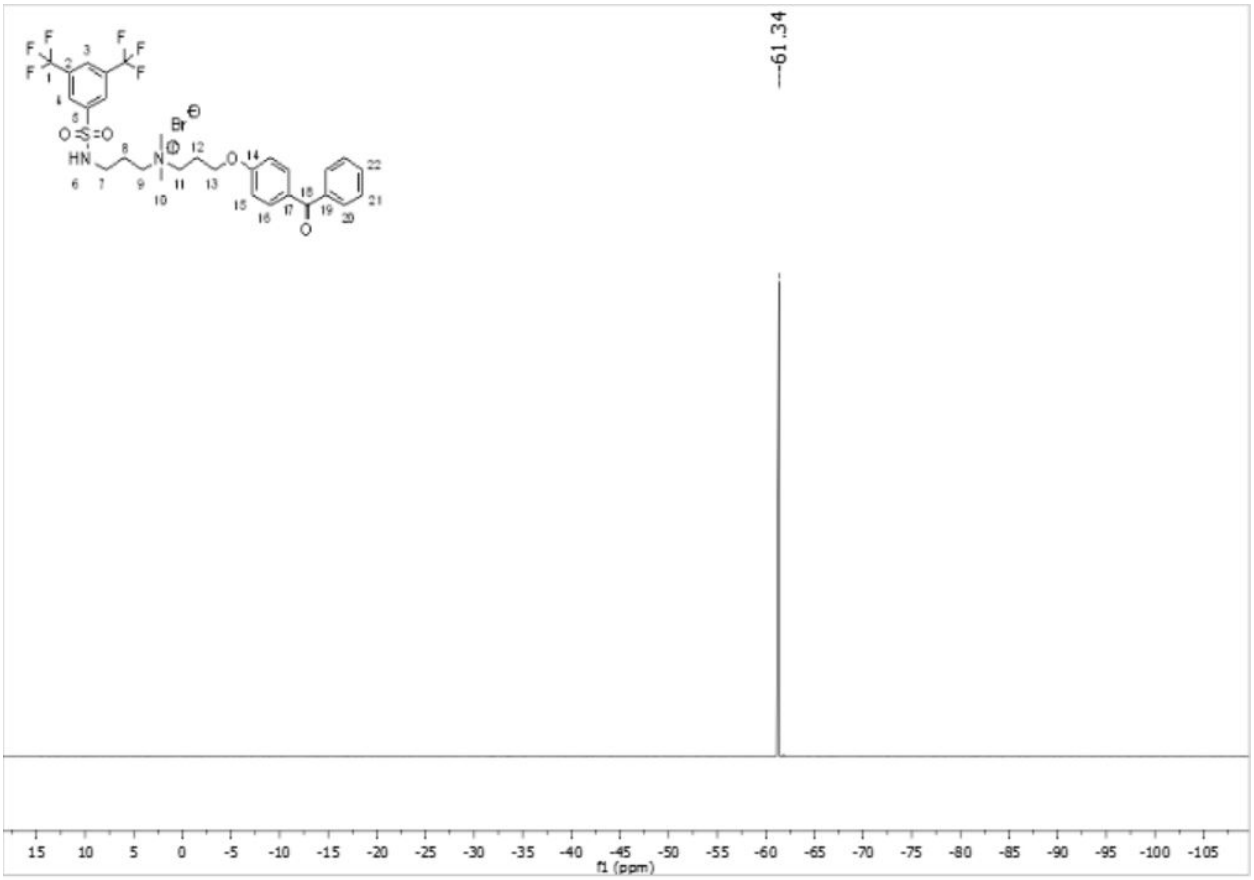


Figure S 84. ^{19}F NMR (376 MHz, DMSO-d_6) spectrum of **6a**.

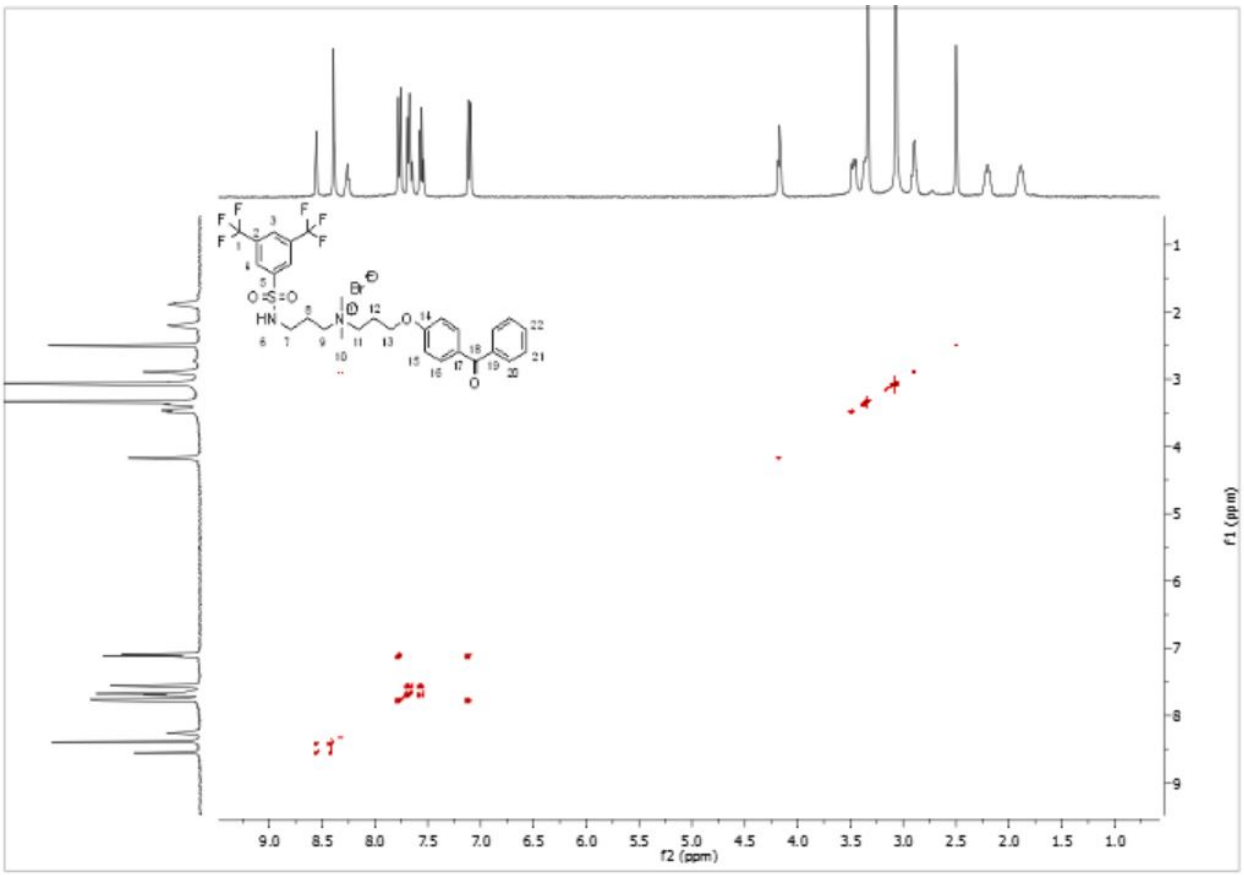


Figure S 85. COSY 2D NMR (DMSO-d_6) spectrum of **6a**.

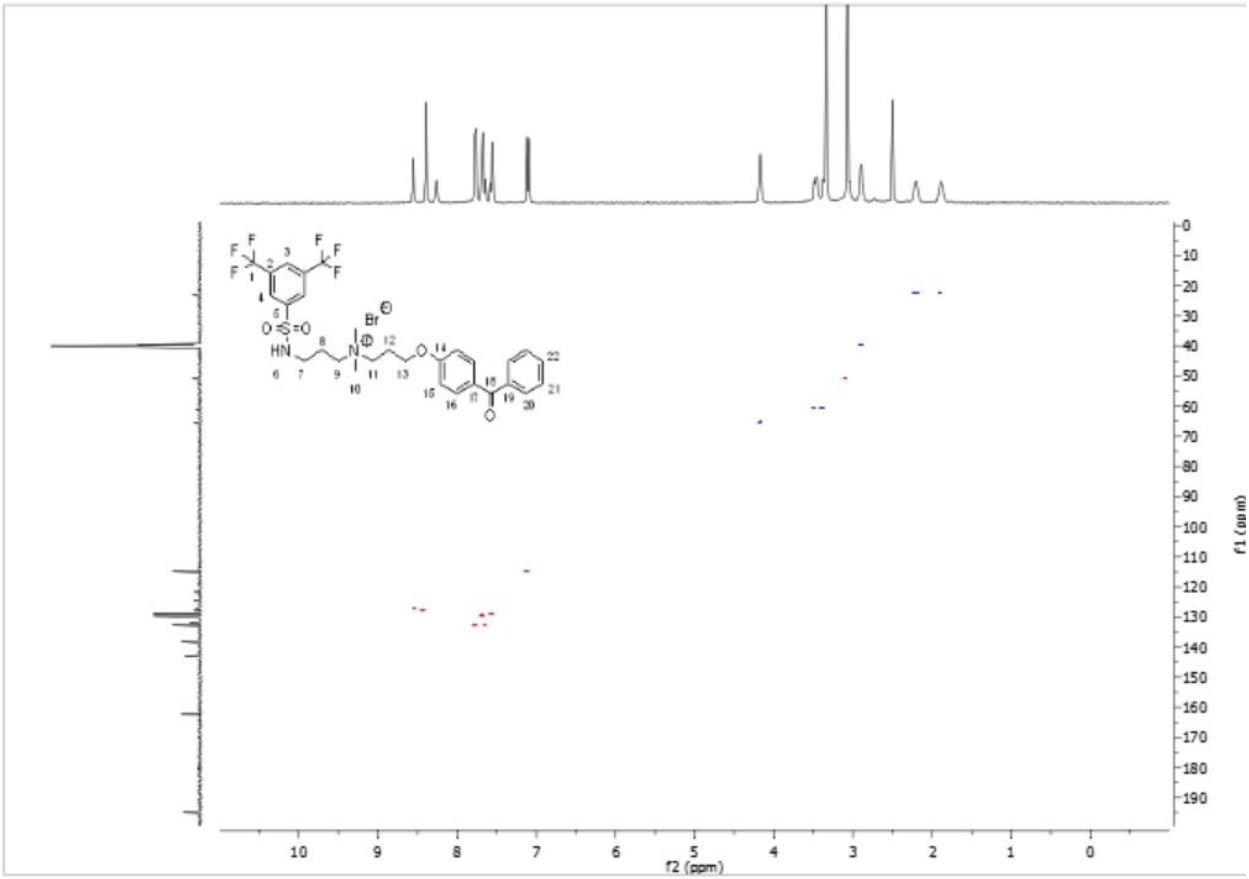


Figure S 86. HSQC 2D NMR (DMSO-d_6) spectrum of **6a**.

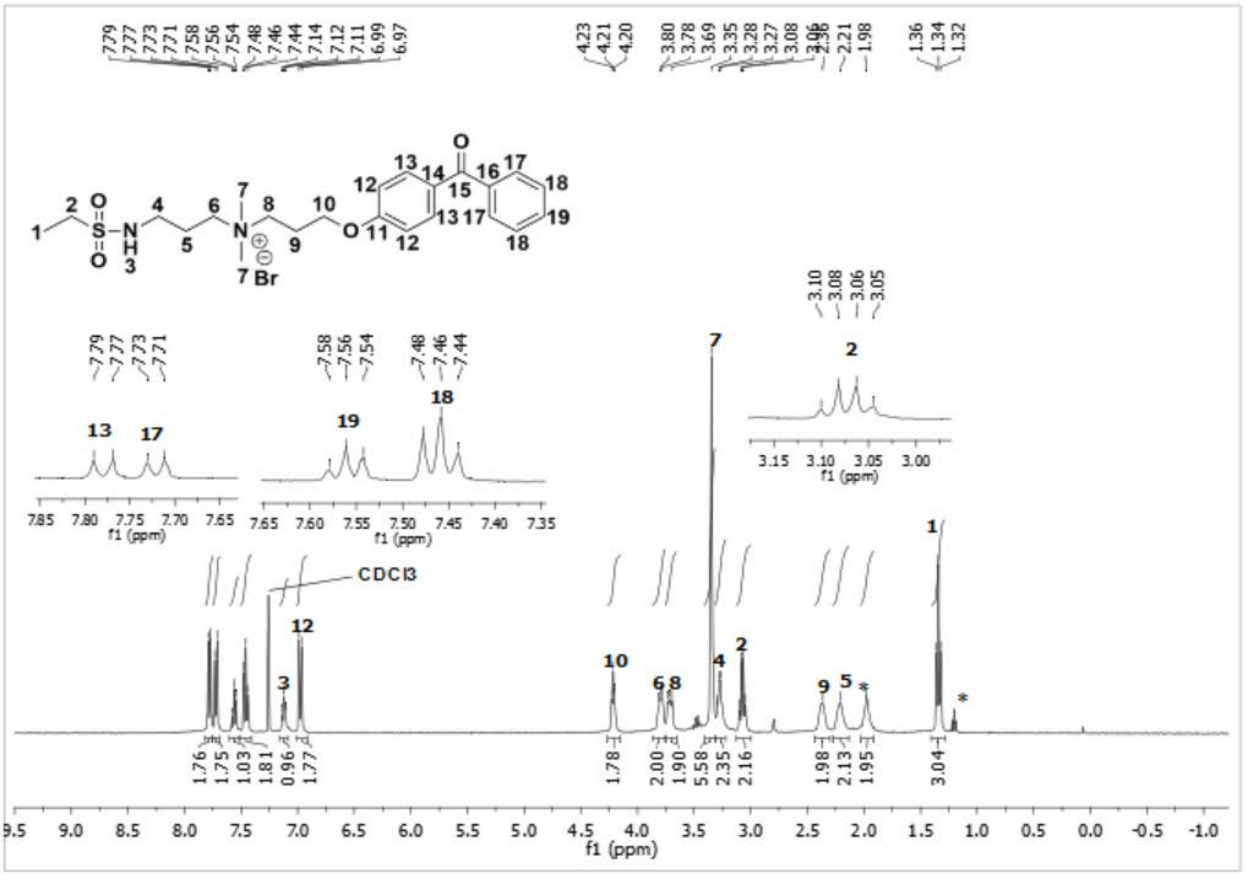


Figure S 87. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **7a**.

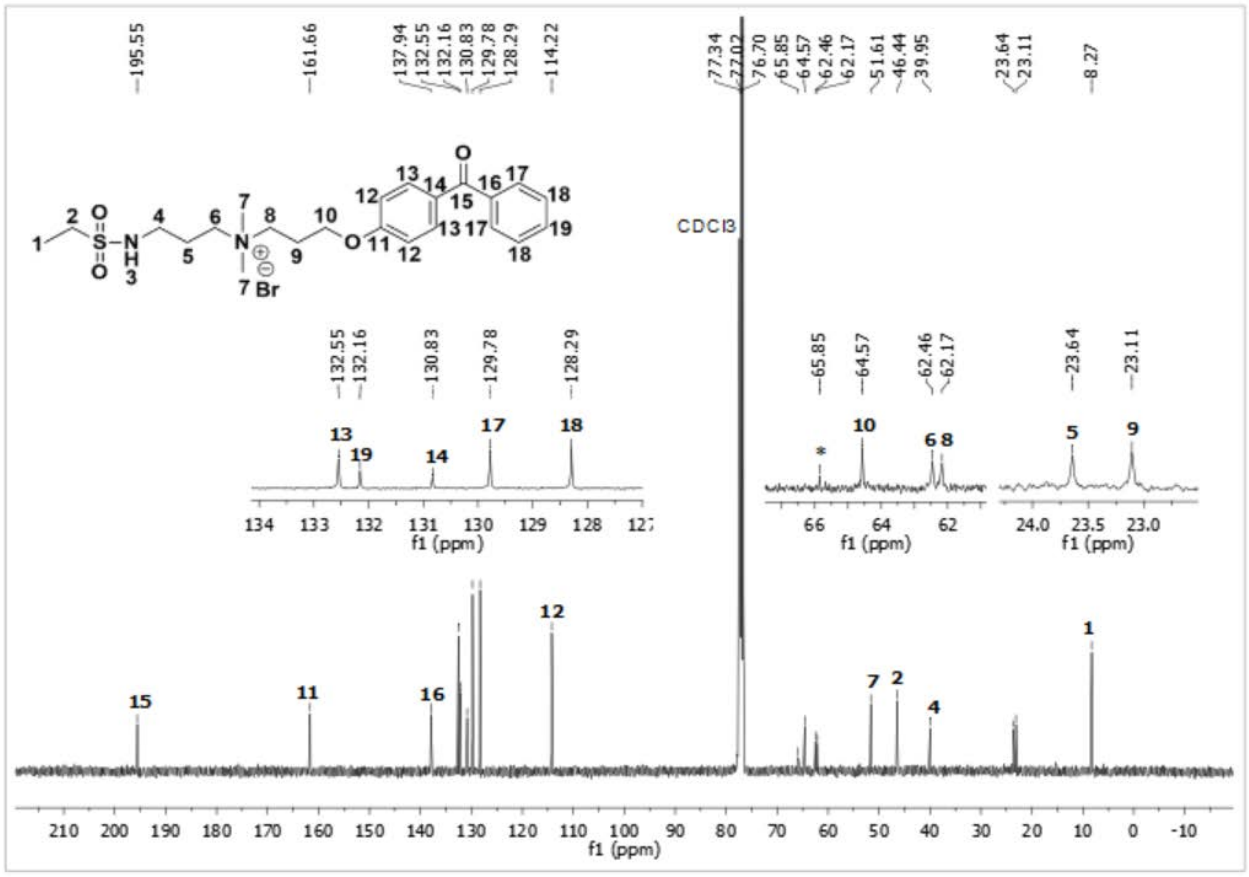


Figure S 88. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **7a**.

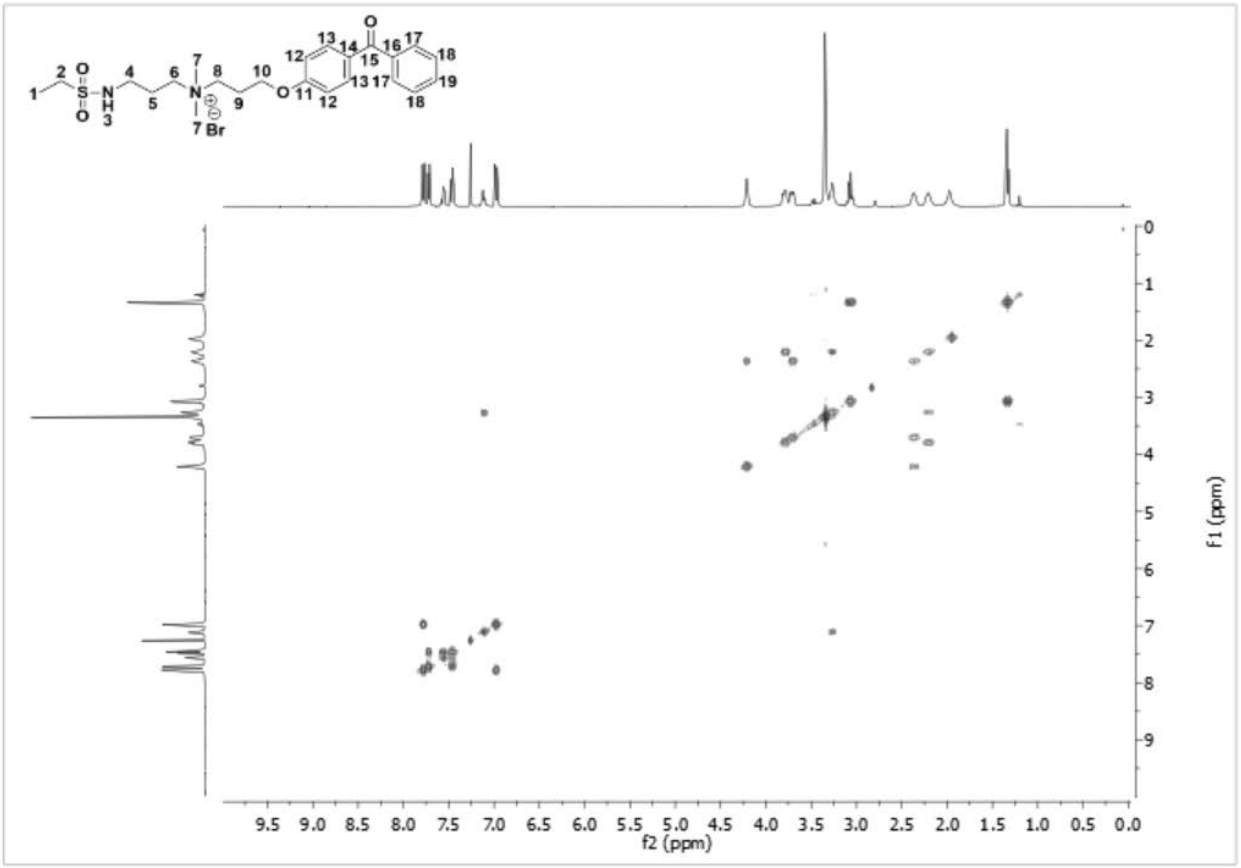


Figure S 89. COSY 2D NMR ($CDCl_3$) spectrum of **7a**.

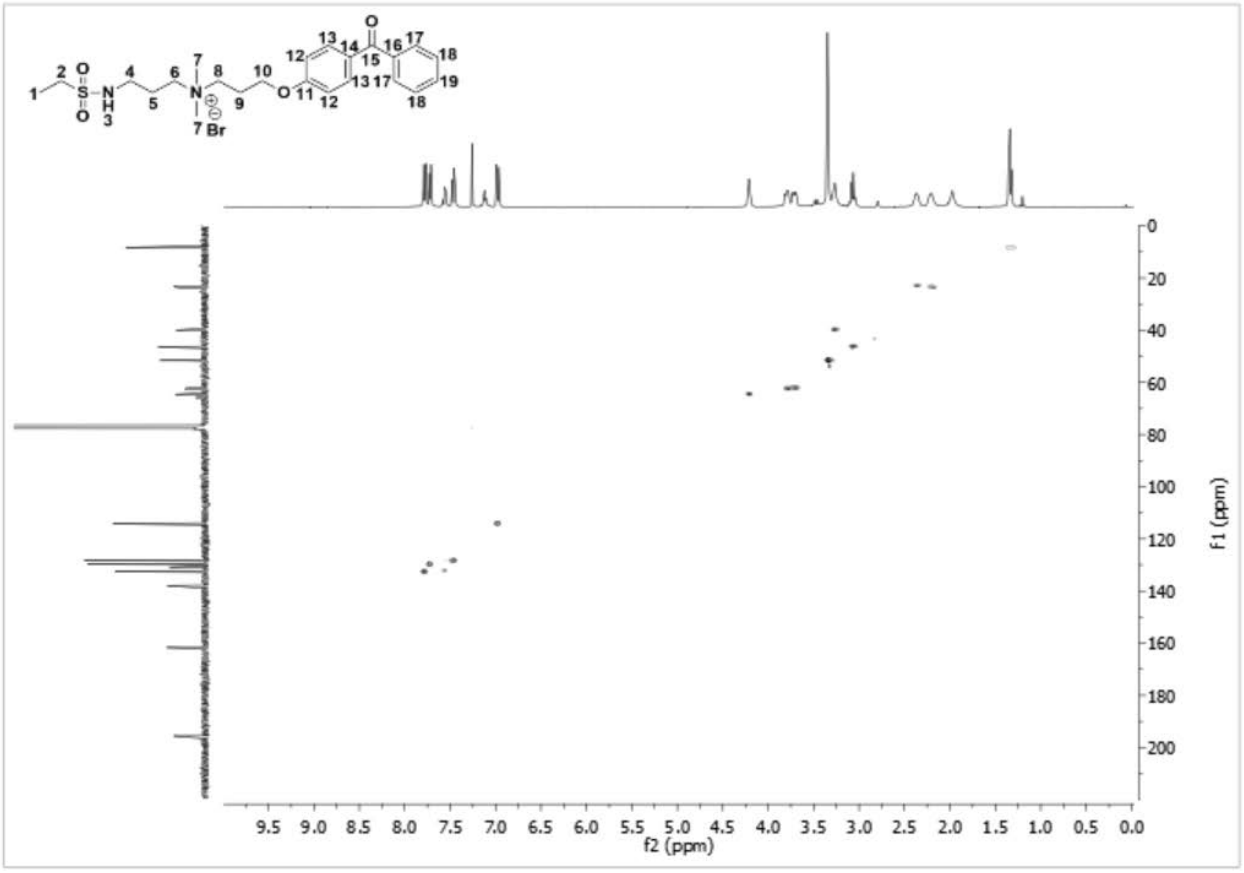


Figure S 90. HSQC 2D NMR ($CDCl_3$) spectrum of **7a**.

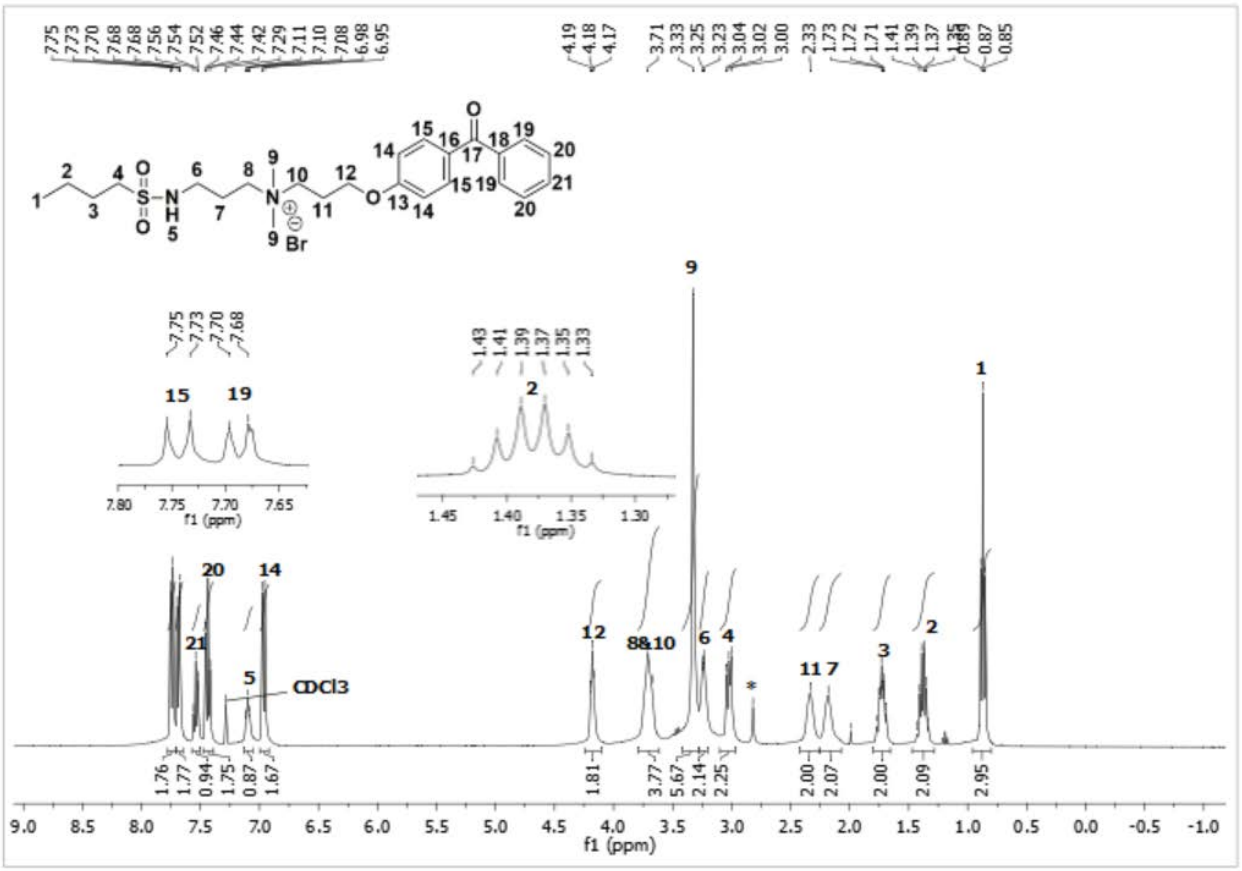


Figure S 91. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **8a**.

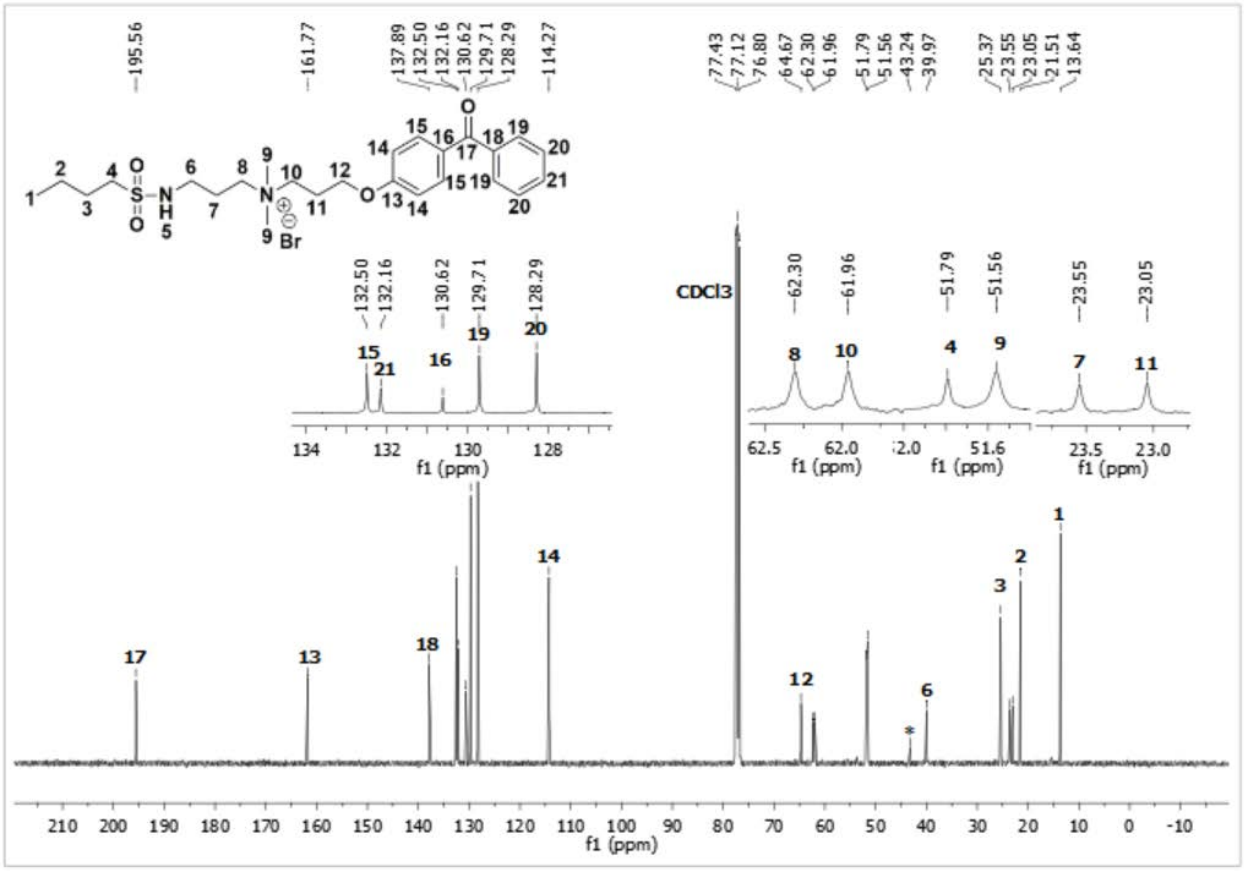


Figure S 92. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **8a.**

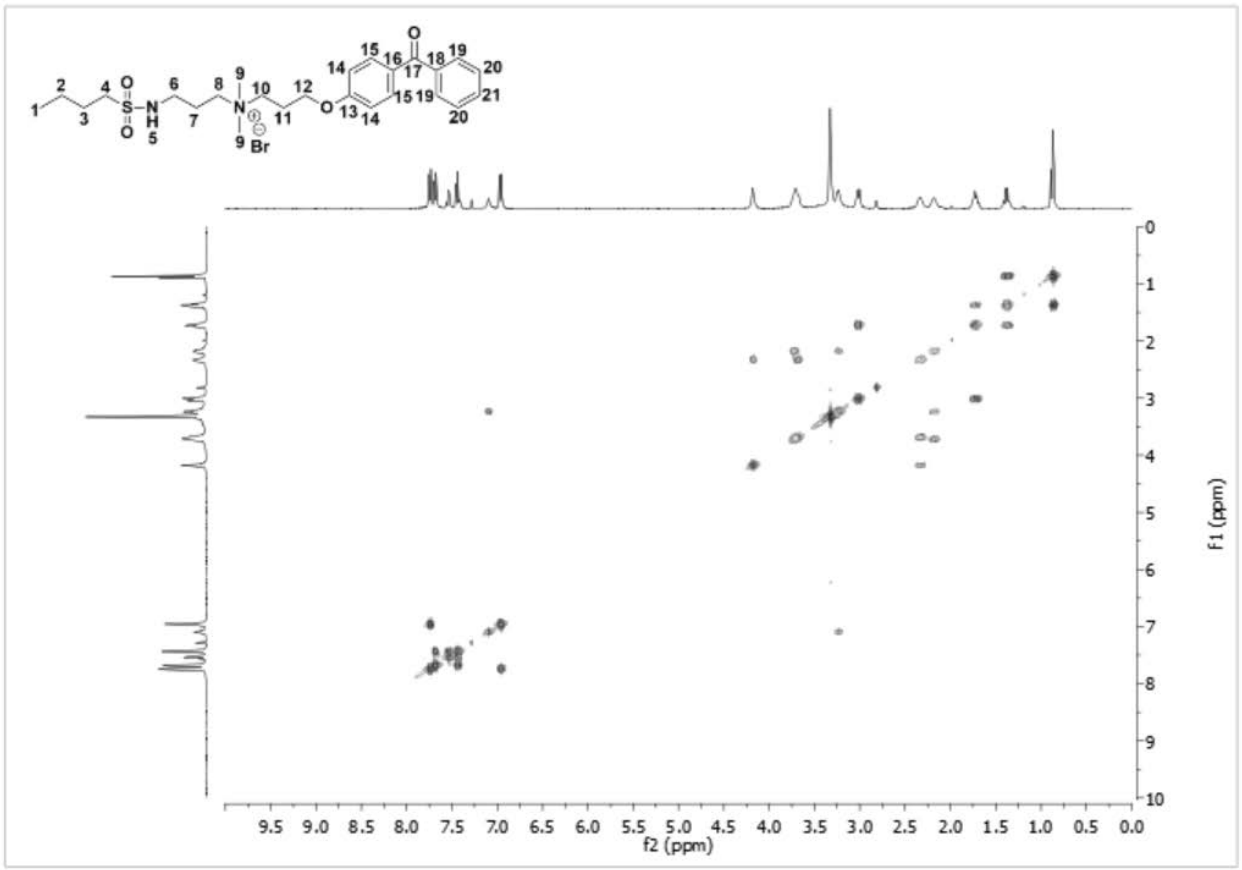


Figure S 93. COSY 2D NMR ($CDCl_3$) spectrum of **8a**.

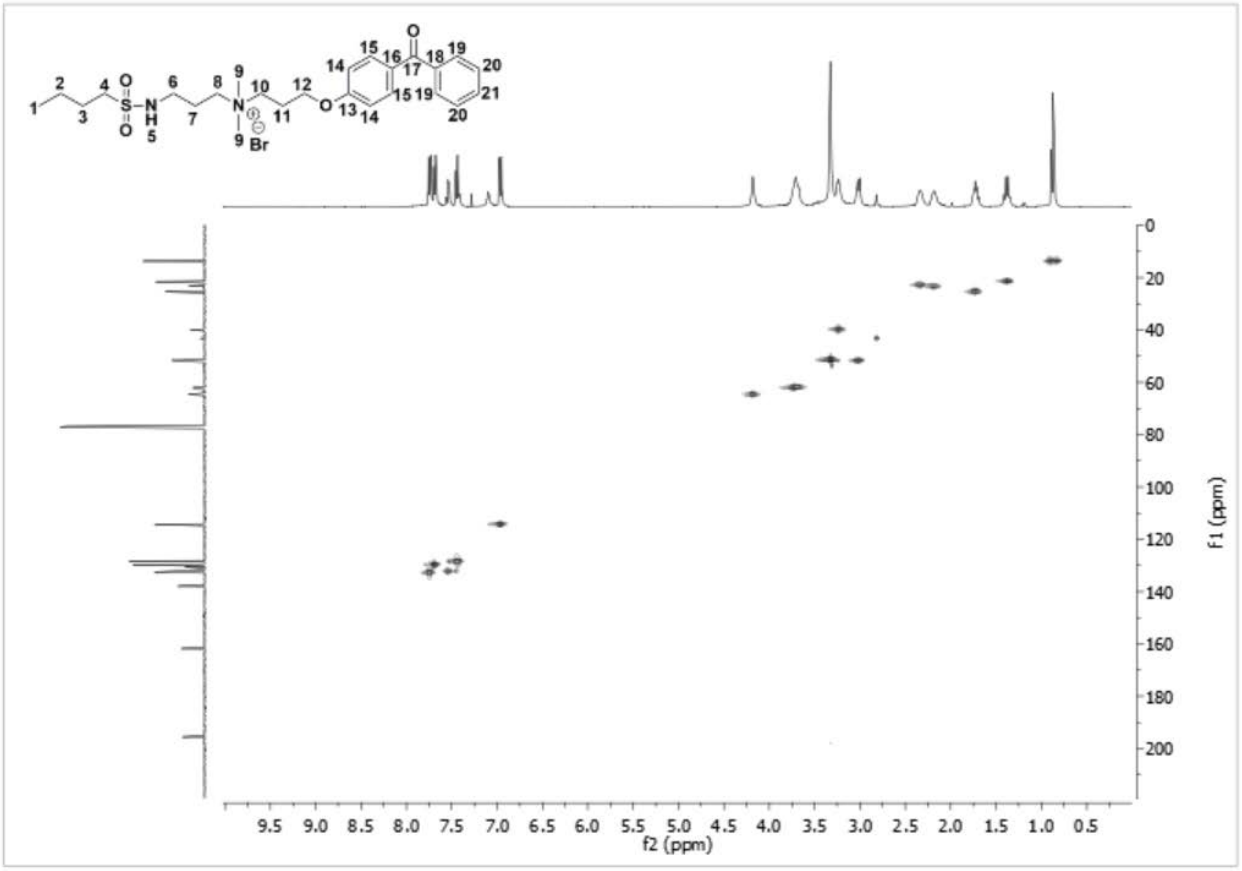


Figure S 94. HSQC 2D NMR ($CDCl_3$) spectrum of **8a**.

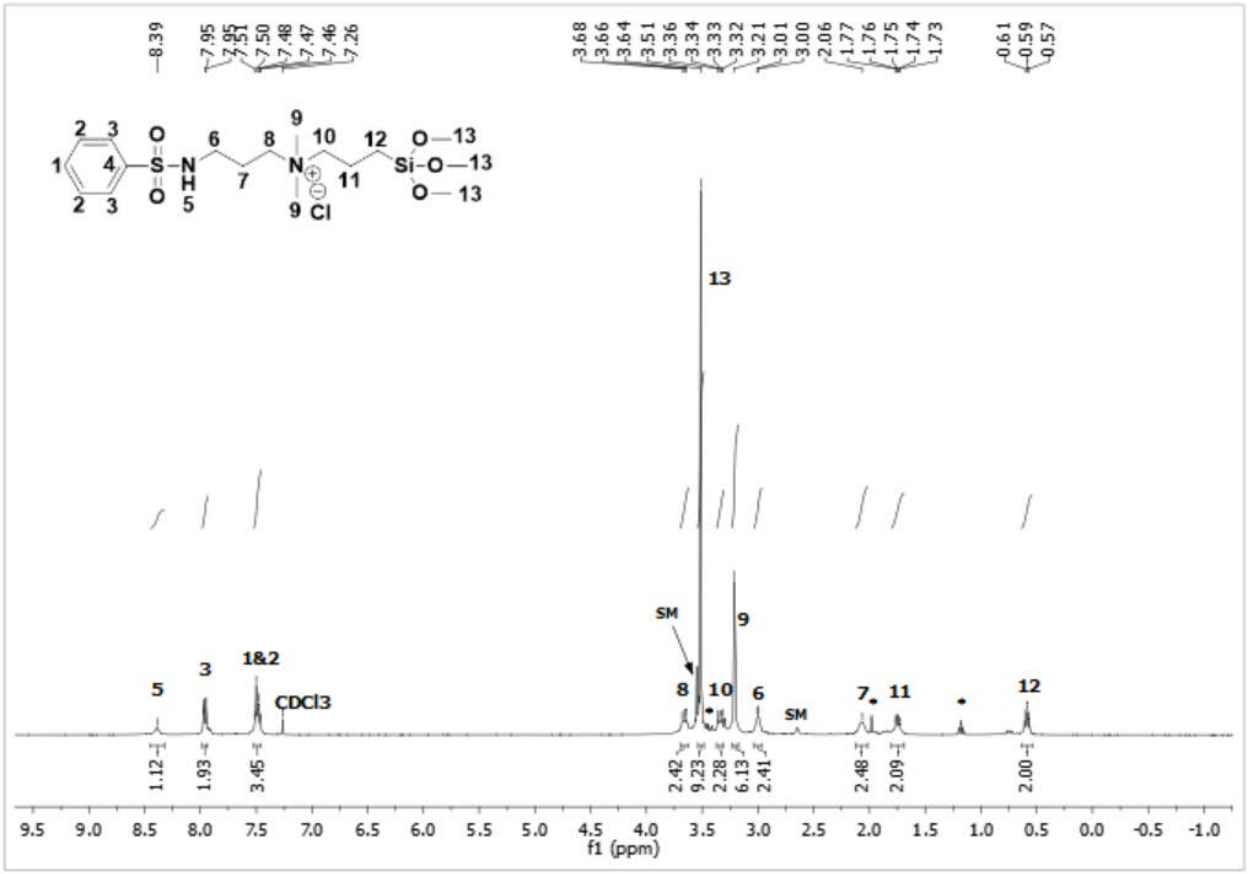


Figure S 95. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **1b**.

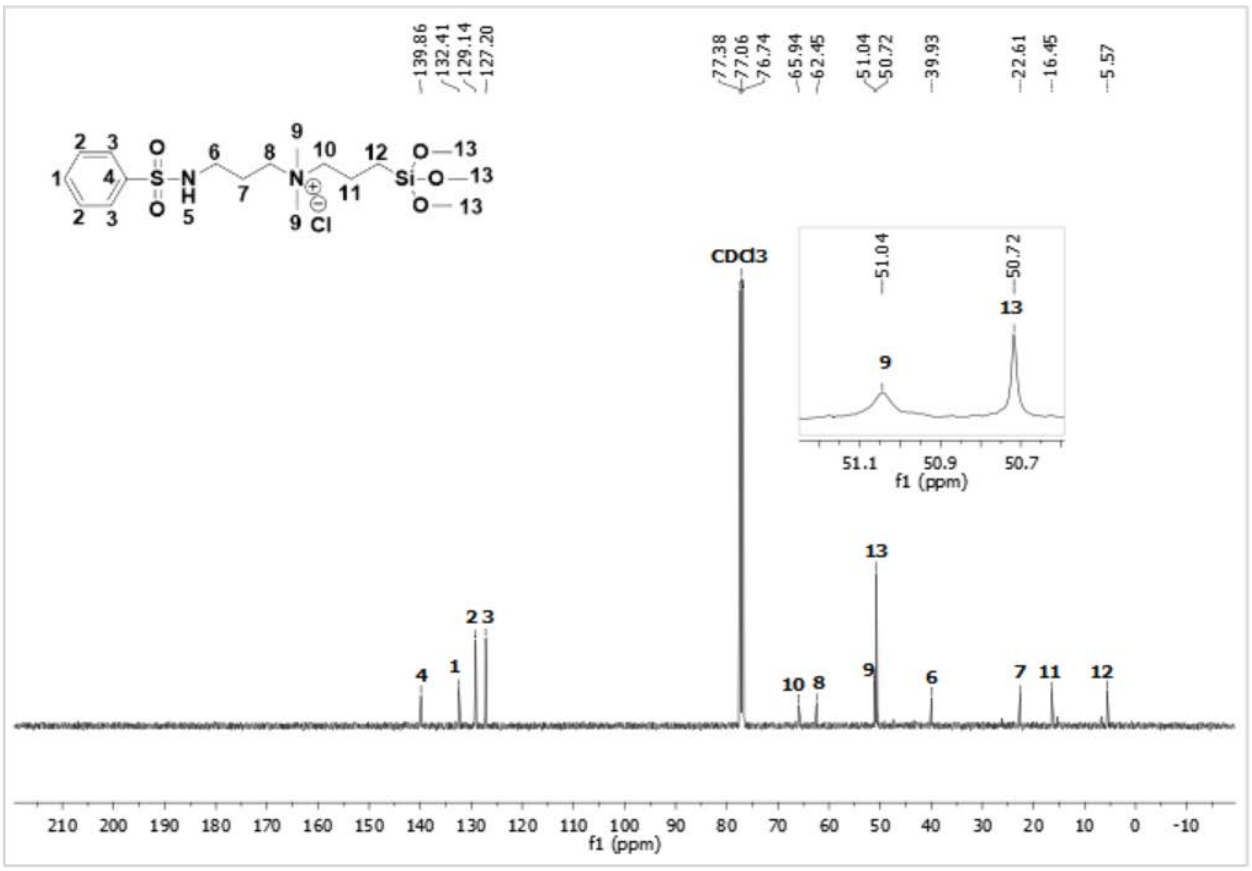


Figure S 96. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **1b.**

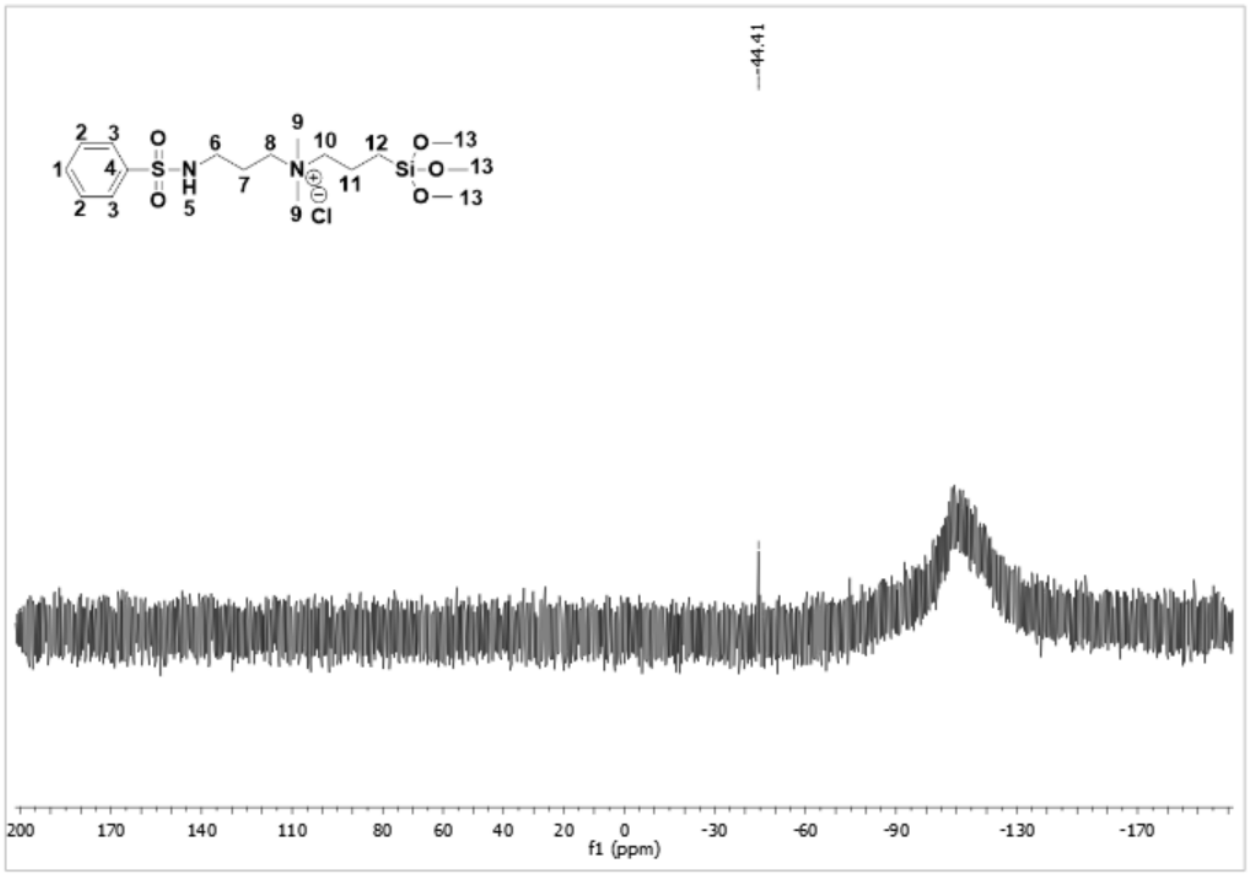


Figure S 97. ^{29}Si NMR (79 MHz, $CDCl_3$) spectrum of **1b.**

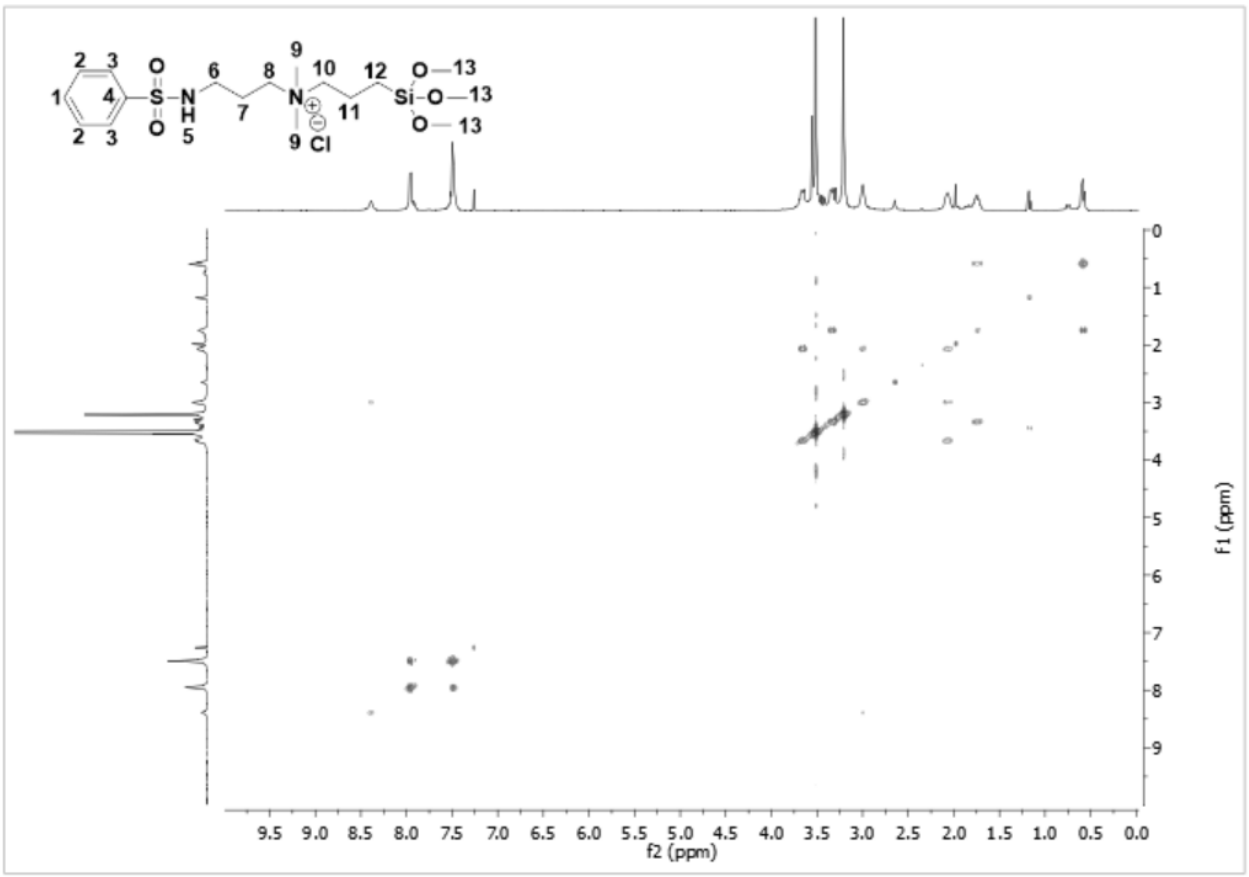


Figure S 98. COSY 2D NMR ($CDCl_3$) spectrum of **1b**.

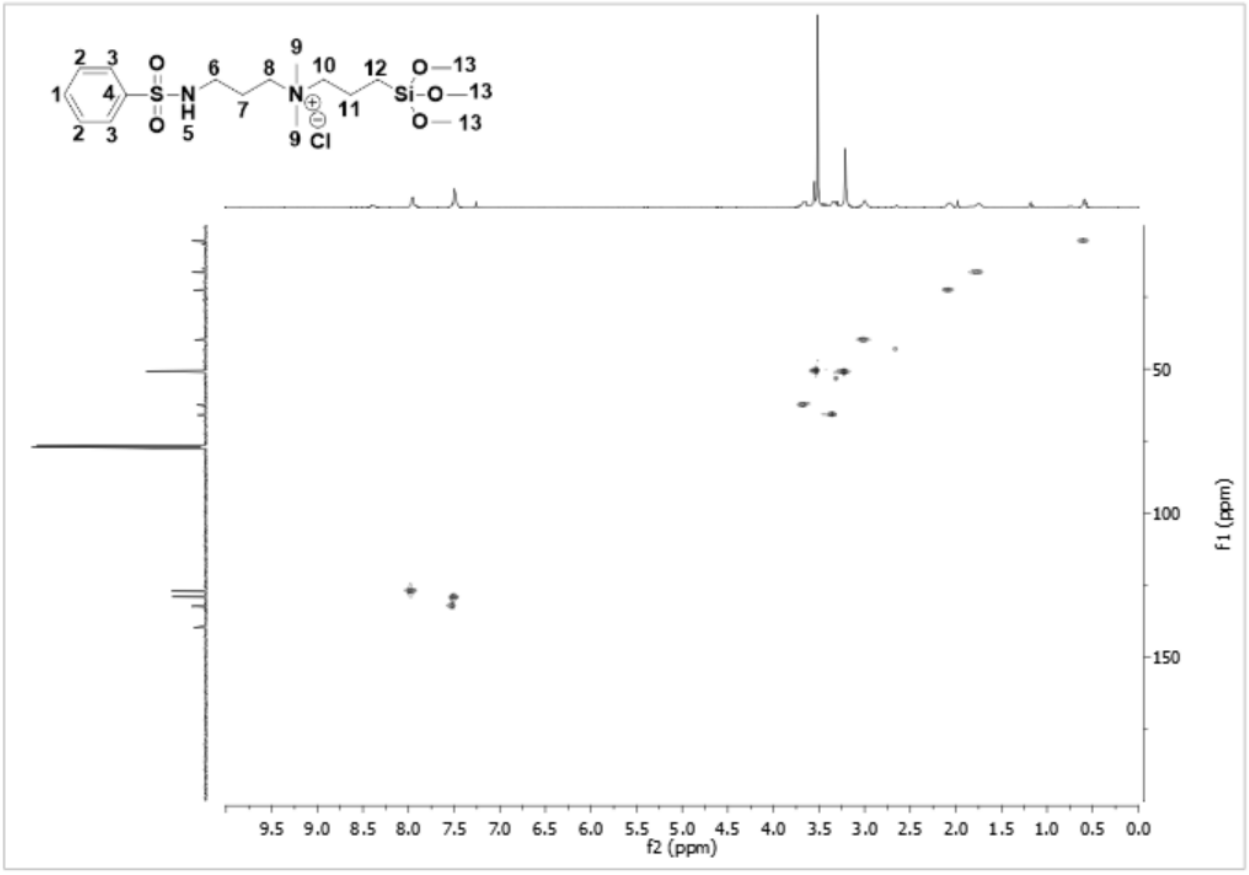


Figure S 99. HSQC 2D NMR ($CDCl_3$) spectrum of **1b**.

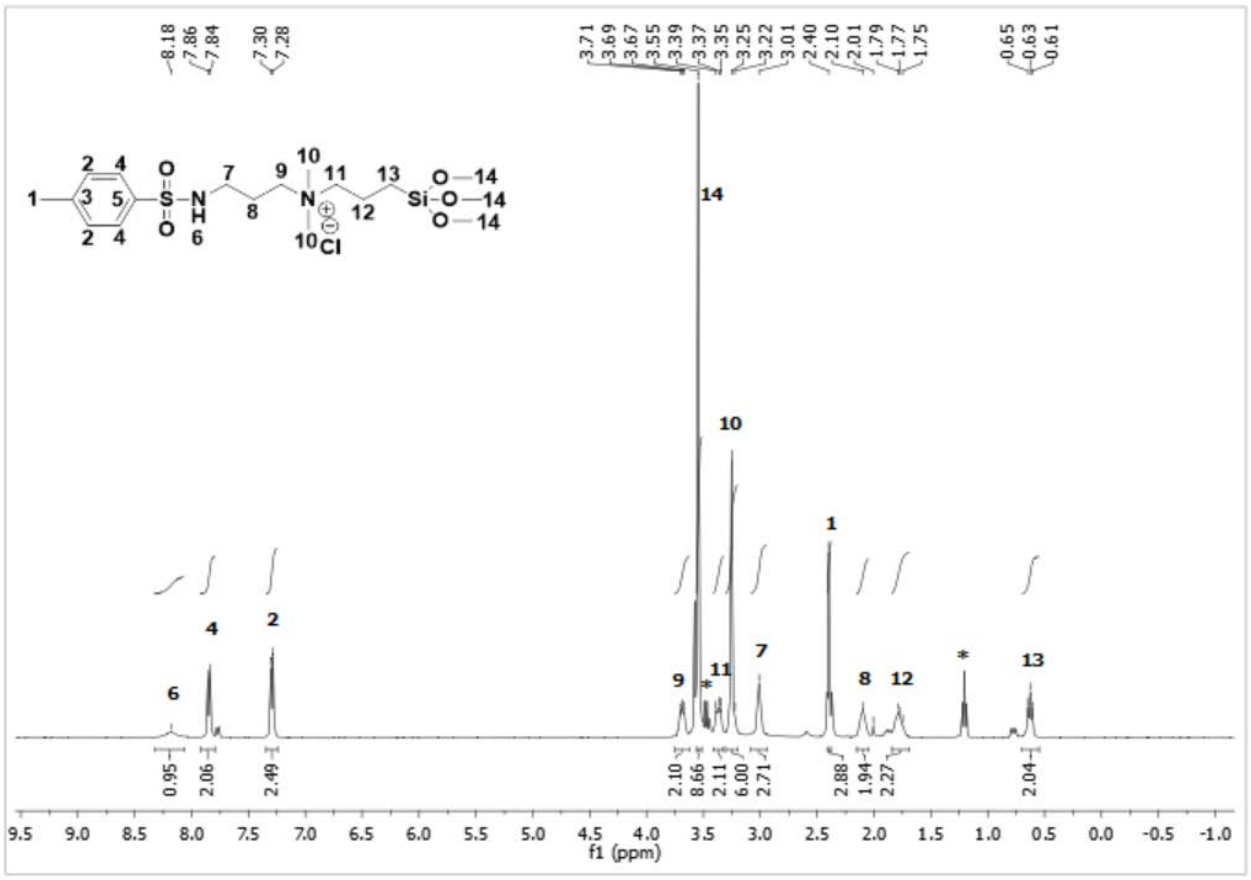


Figure S 100. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **2b.**

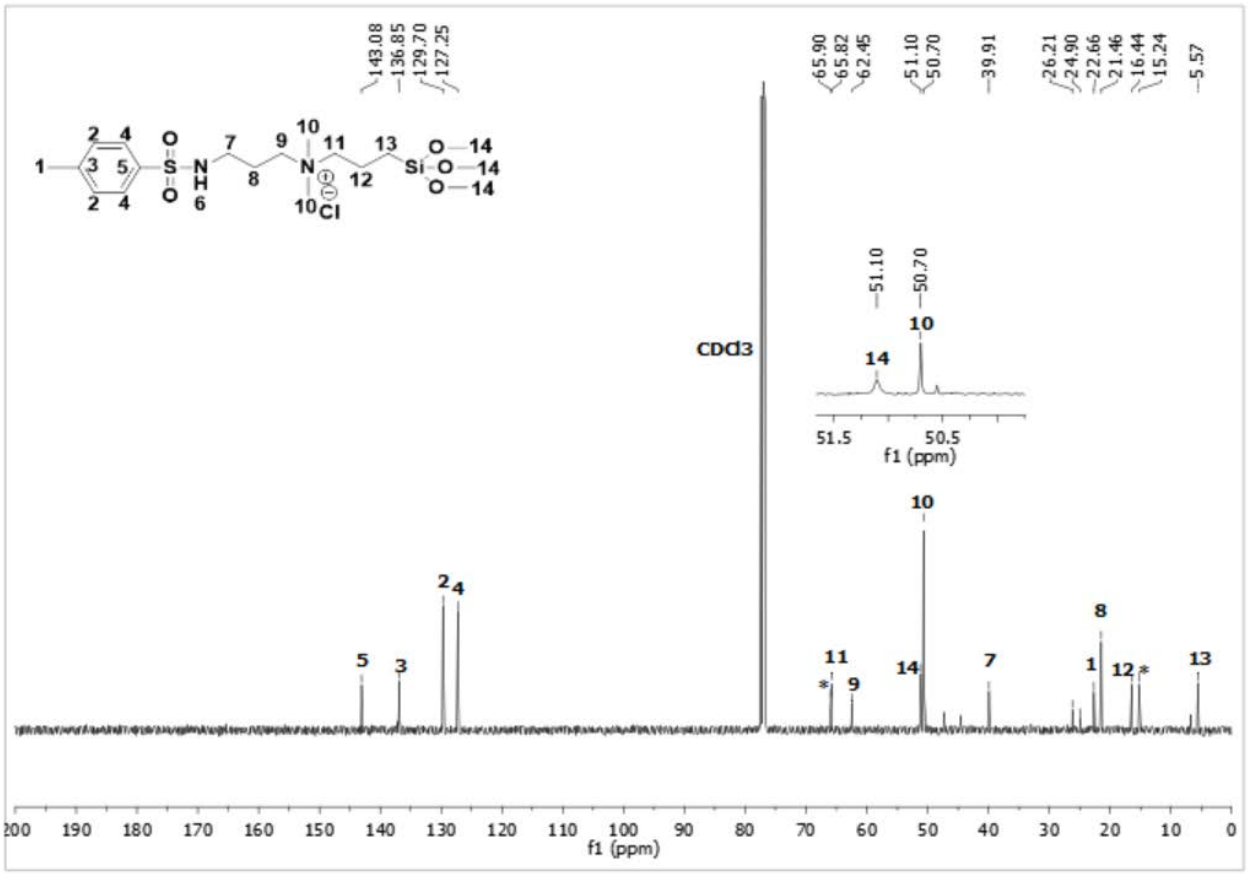


Figure S 101. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **2b**.

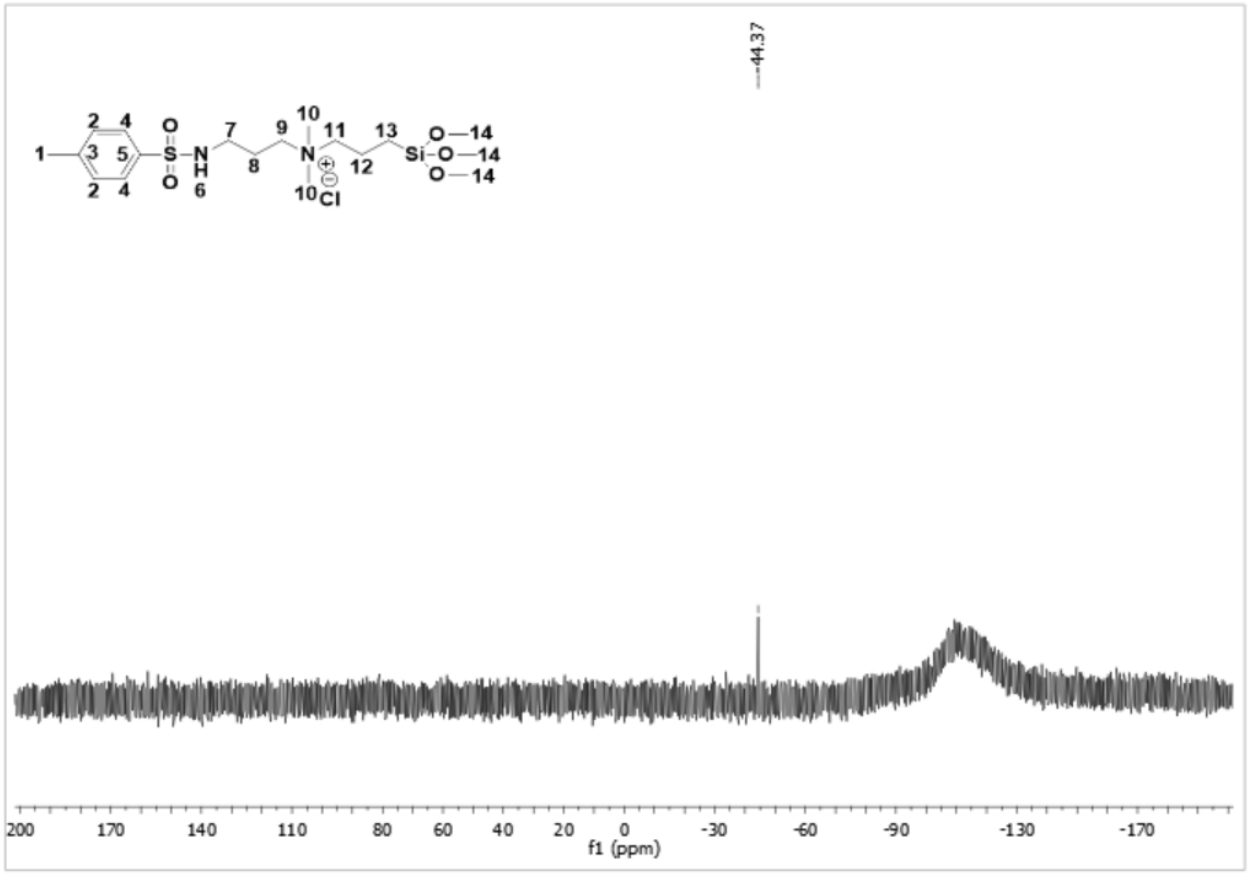


Figure S 102. ^{29}Si NMR (79 MHz, $CDCl_3$) spectrum of **2b**.

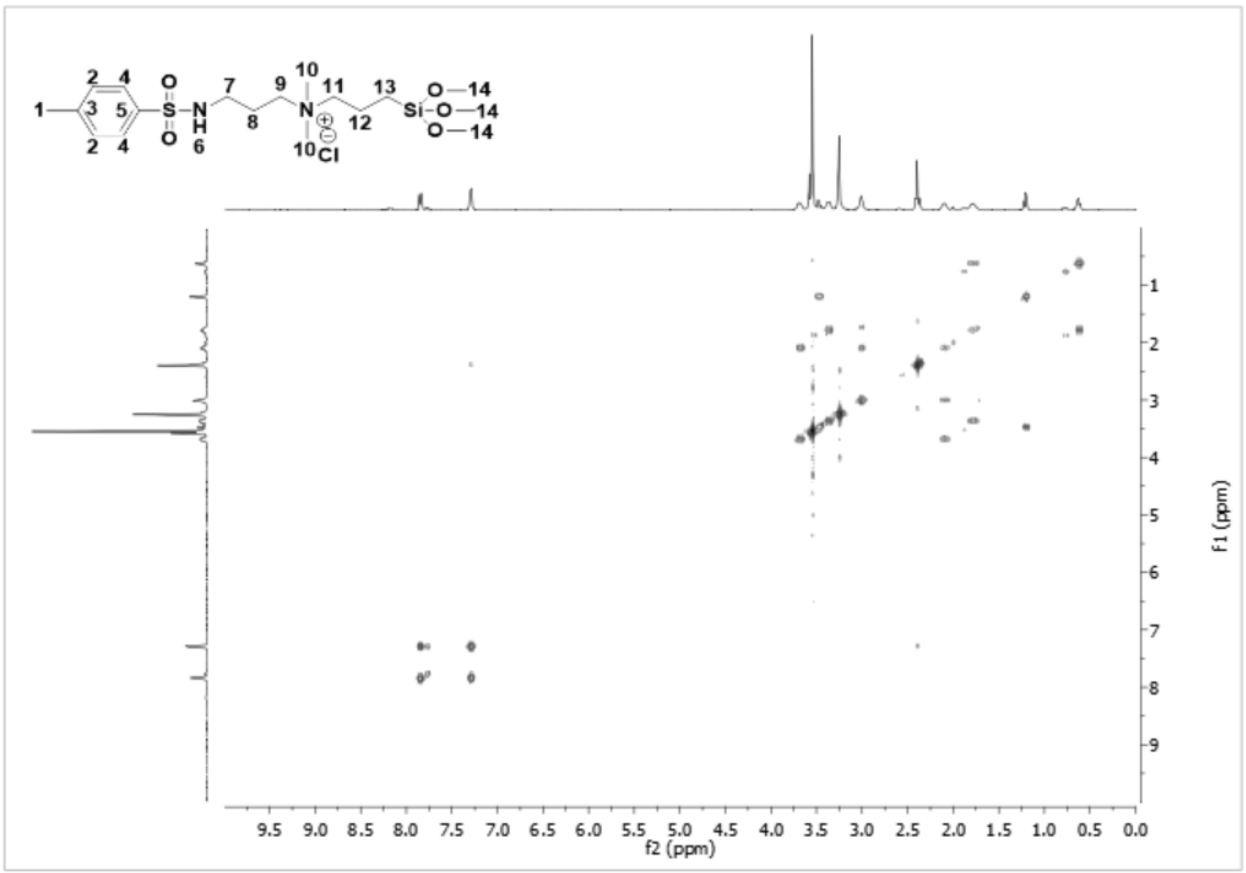


Figure S 103. COSY 2D NMR ($CDCl_3$) spectrum of **2b**.

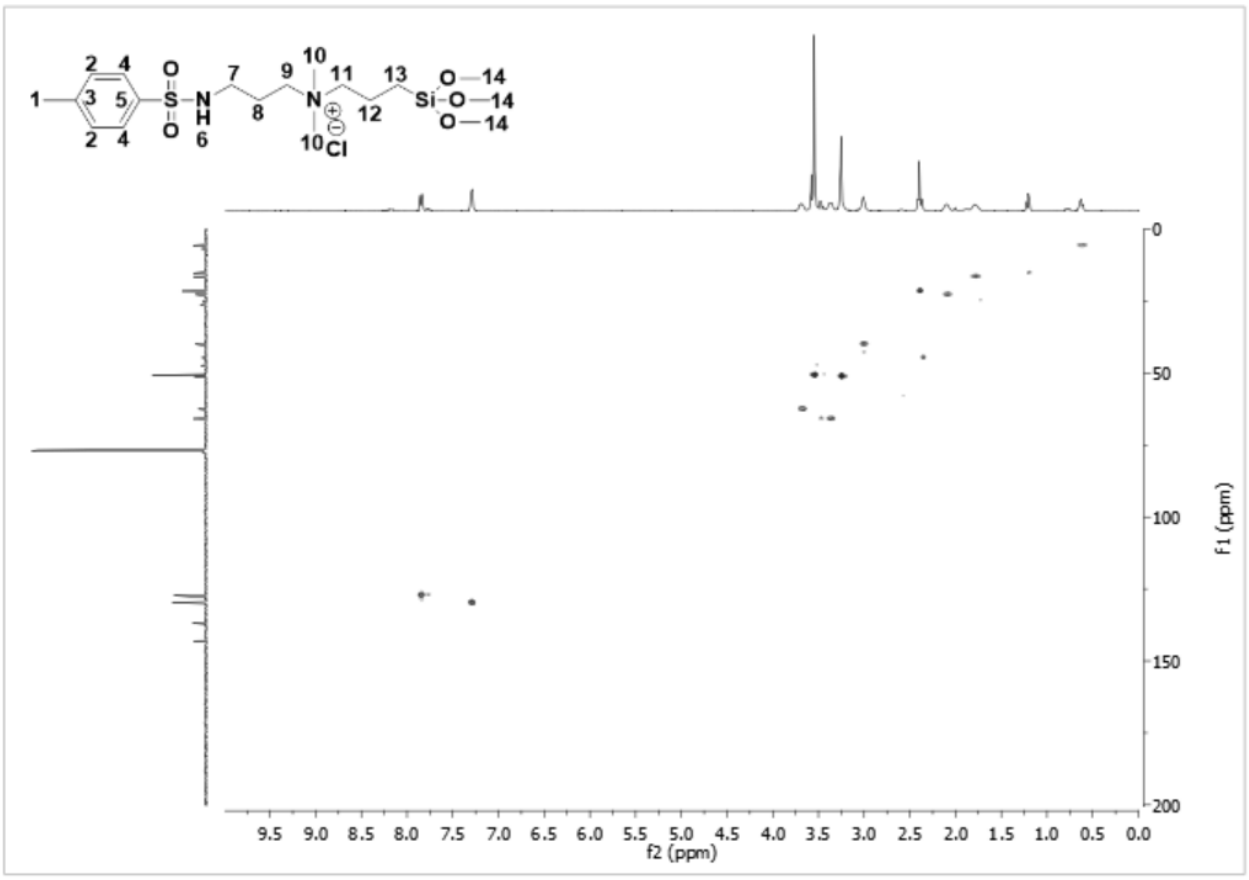


Figure S 104. HSQC 2D NMR ($CDCl_3$) spectrum of **2b**.

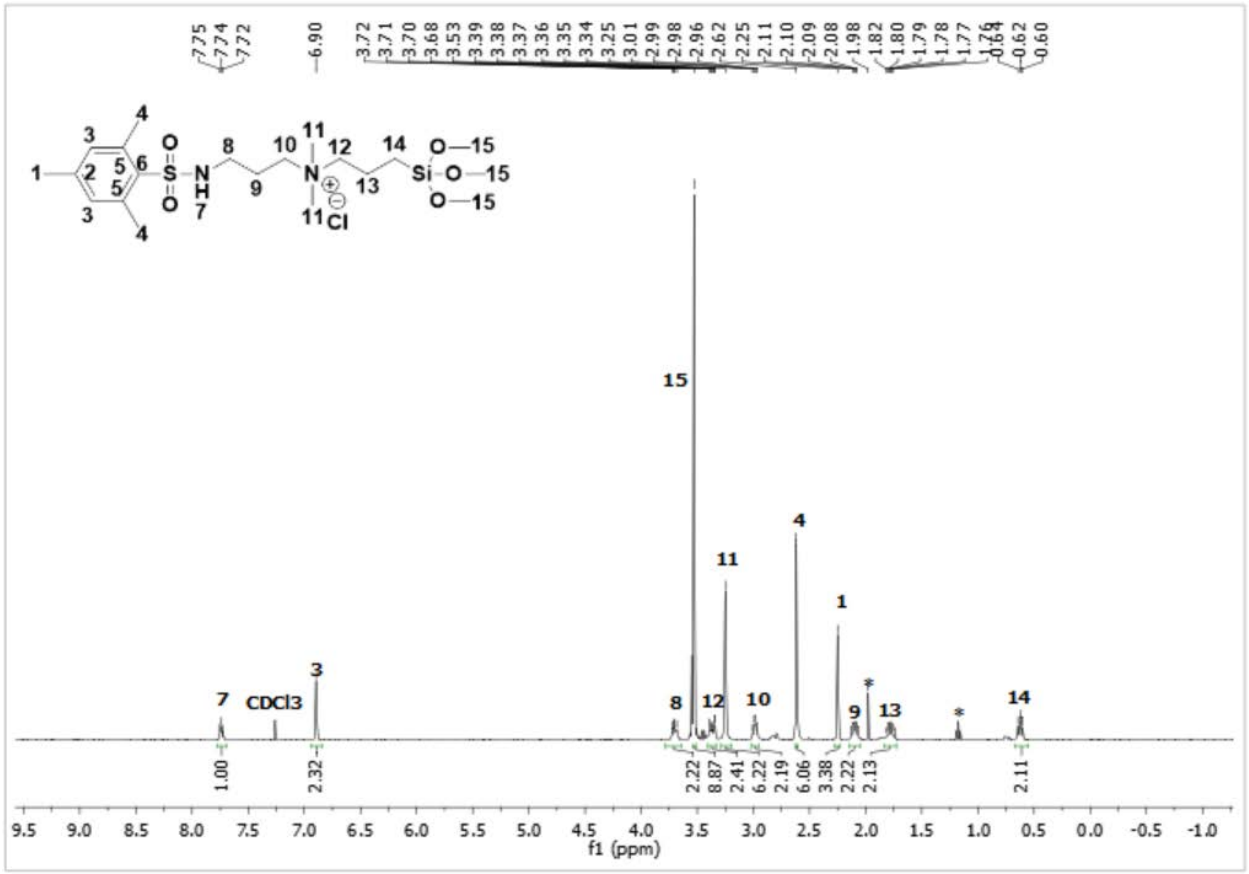


Figure S 105. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **3b**.

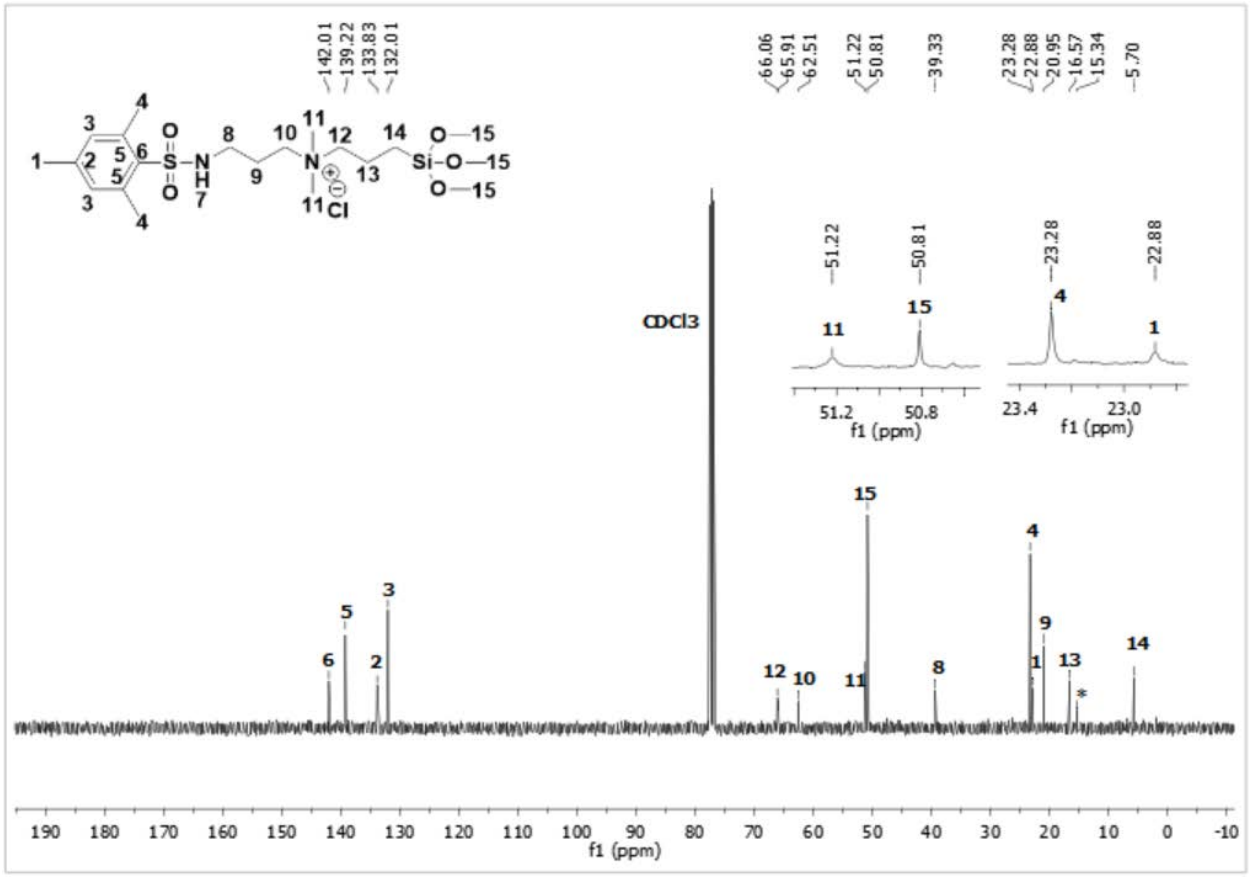


Figure S 106. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **3b**.

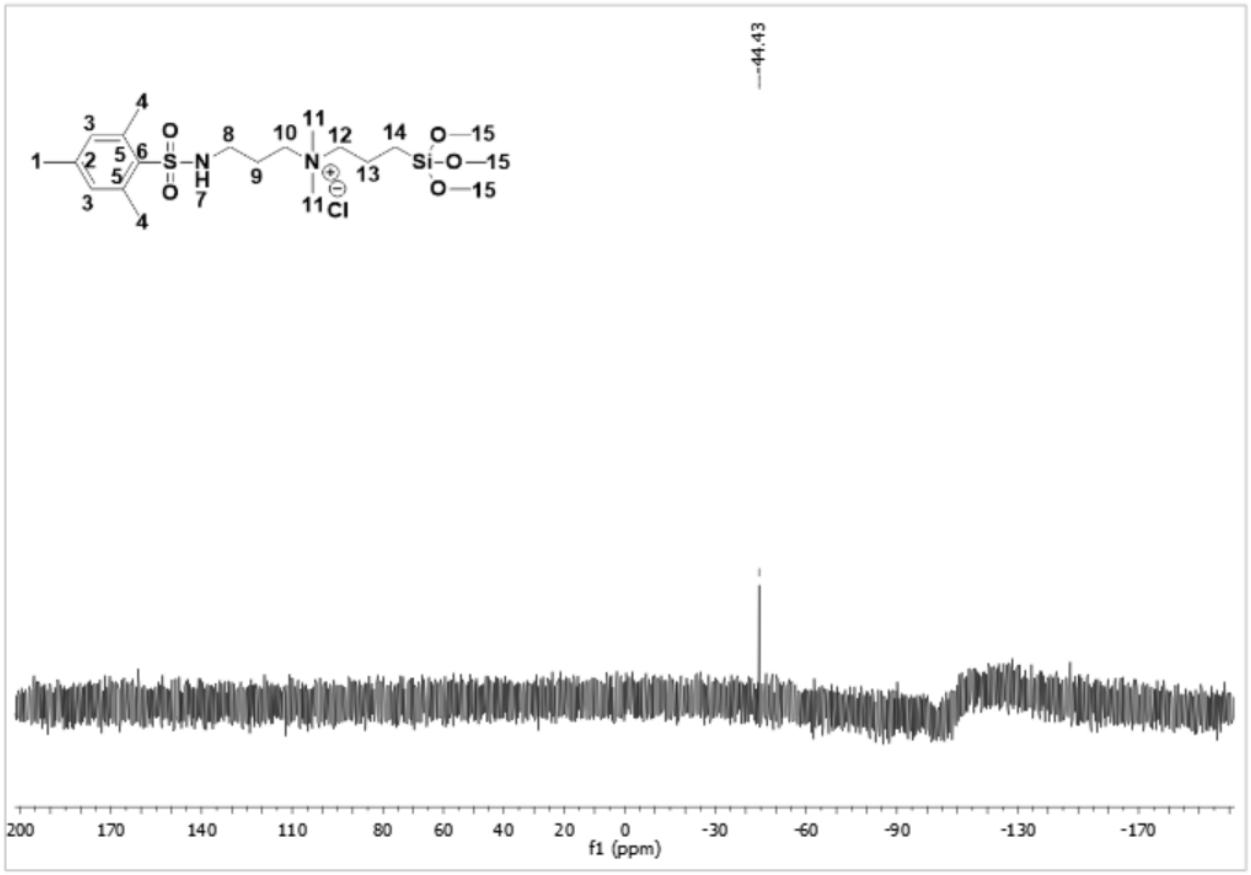


Figure S 107. ^{29}Si NMR (79 MHz, $CDCl_3$) spectrum of **3b**.

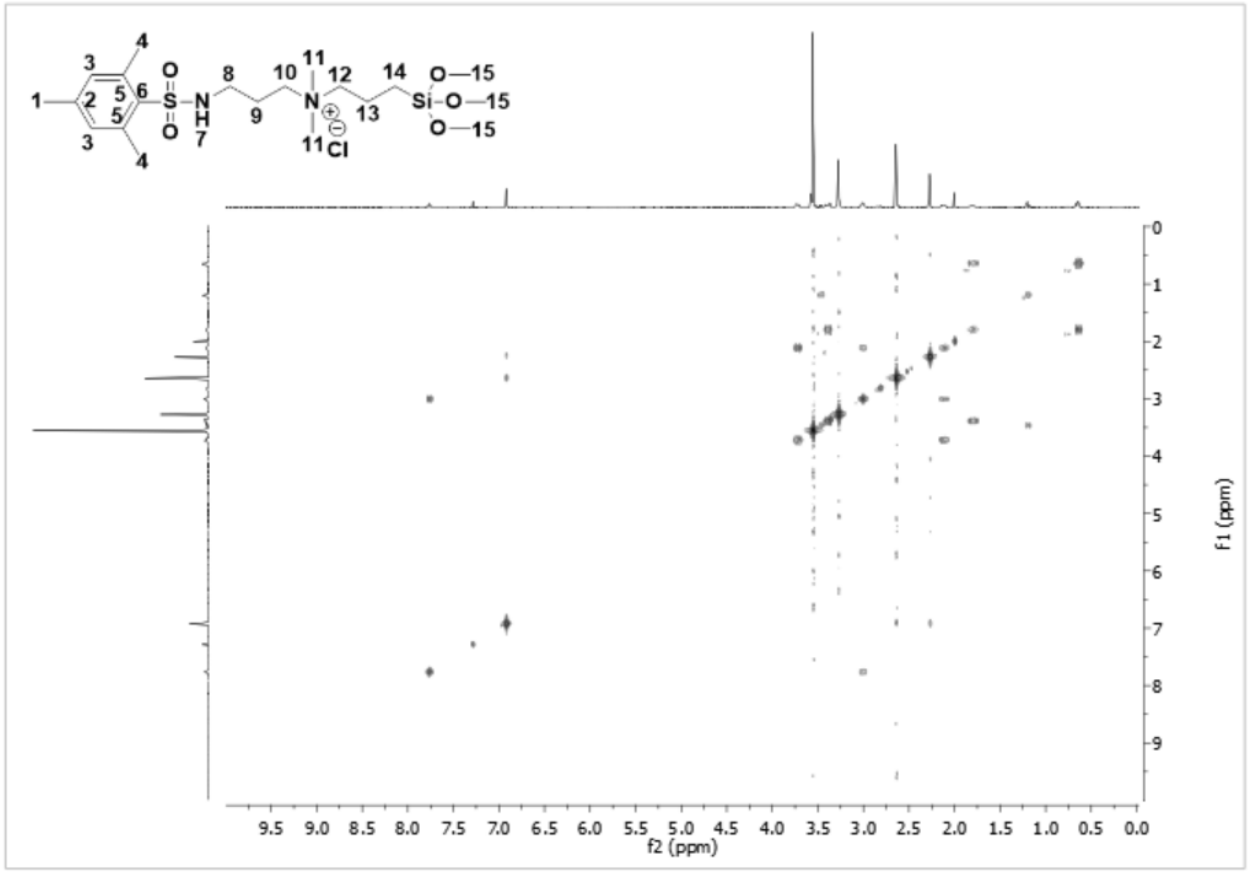


Figure S 108. COSY 2D NMR ($CDCl_3$) spectrum of **3b**.

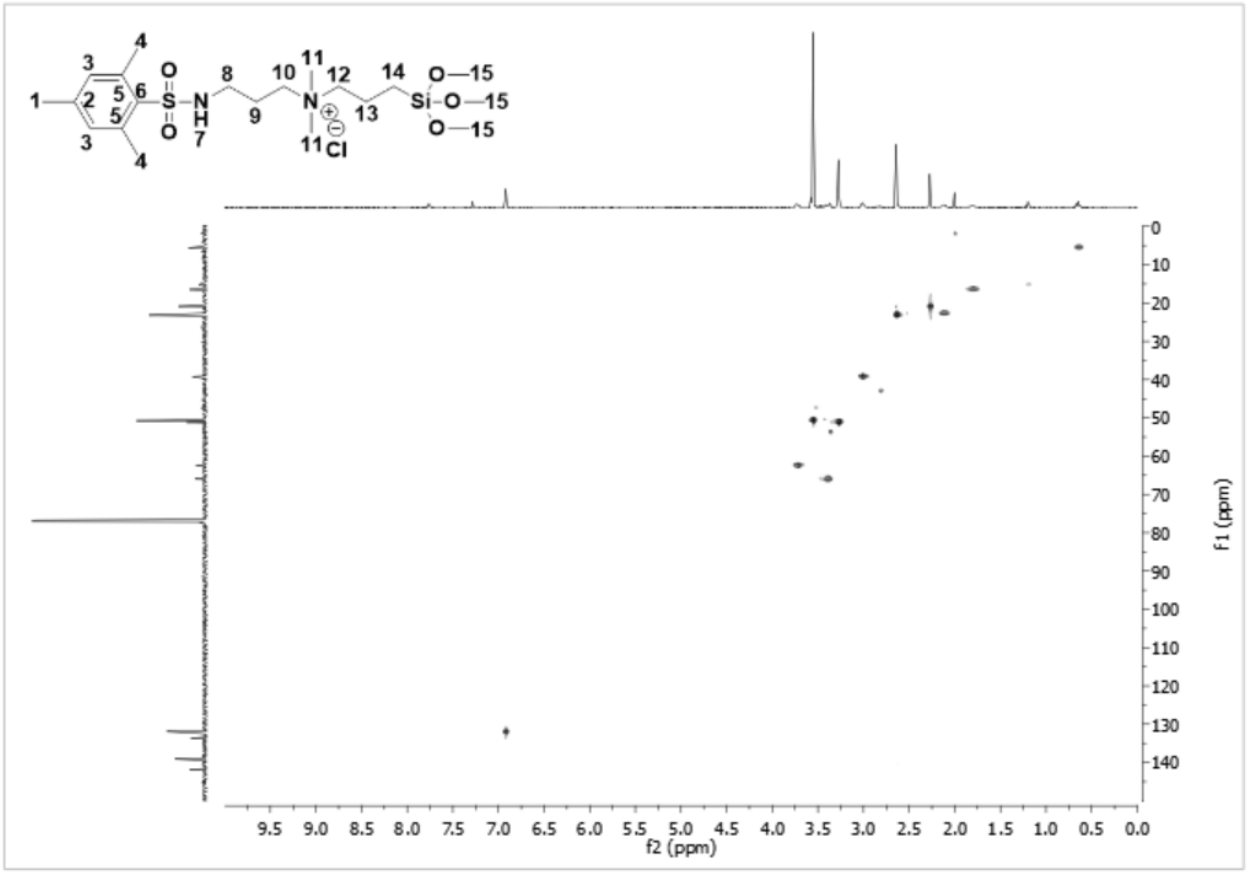


Figure S 109. HSQC 2D NMR ($CDCl_3$) spectrum of **3b**.

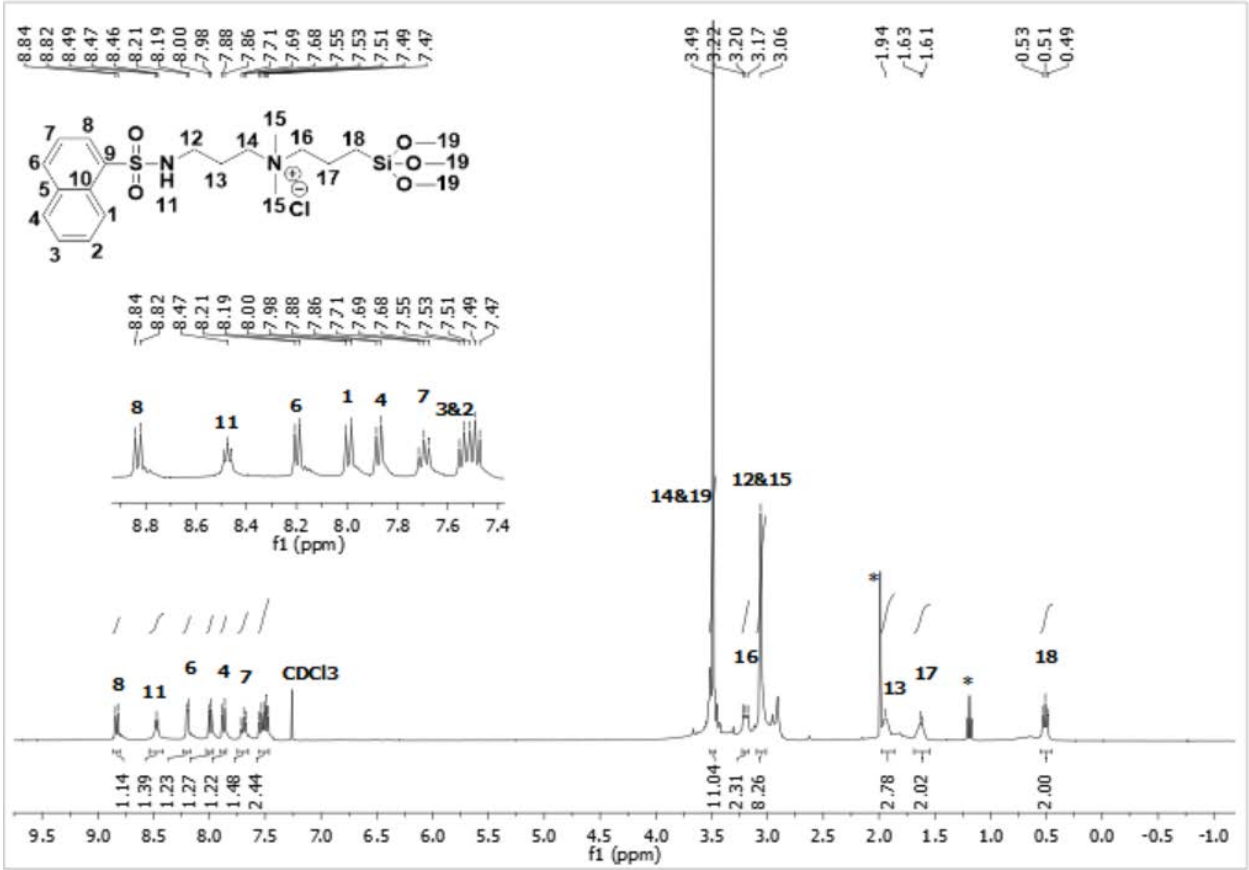


Figure S 110. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **4b**.

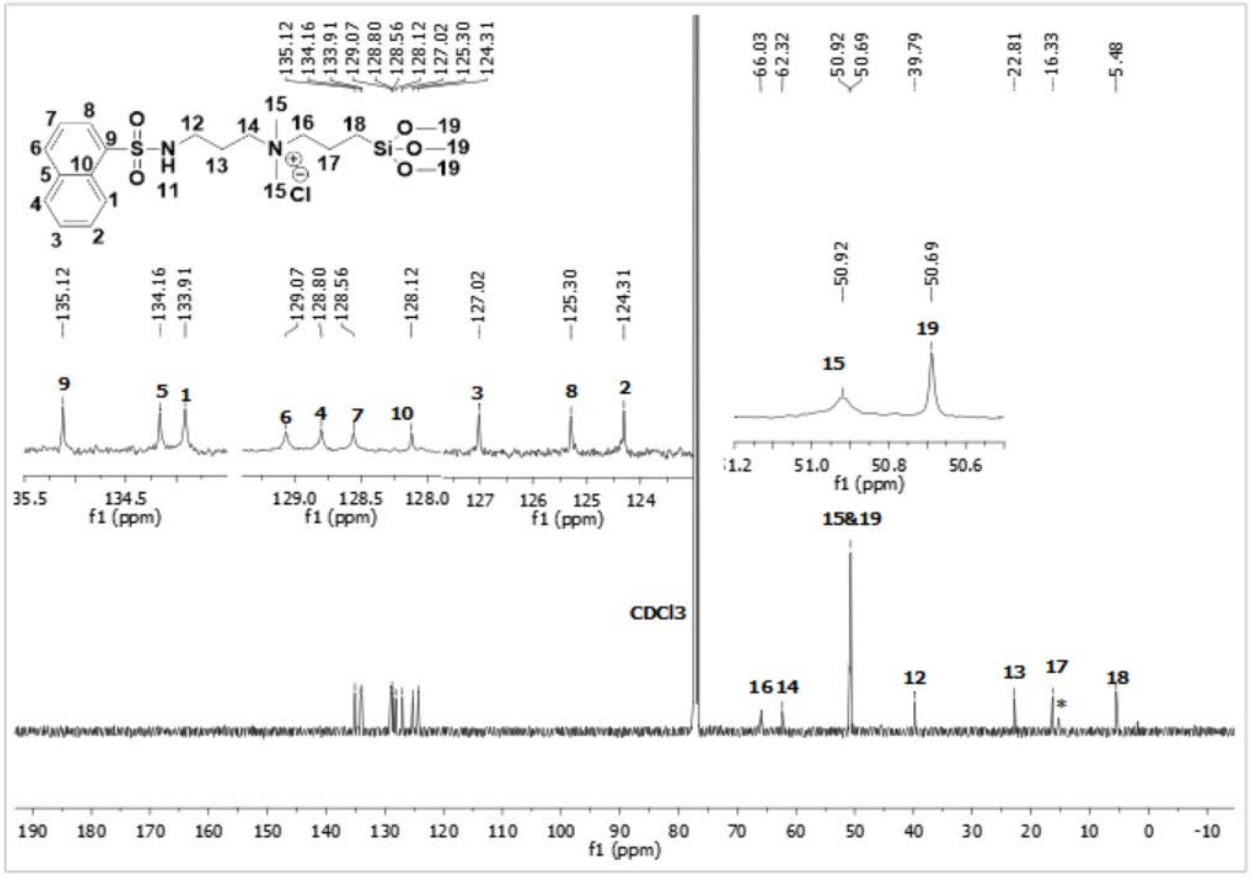


Figure S 111. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **4b**.

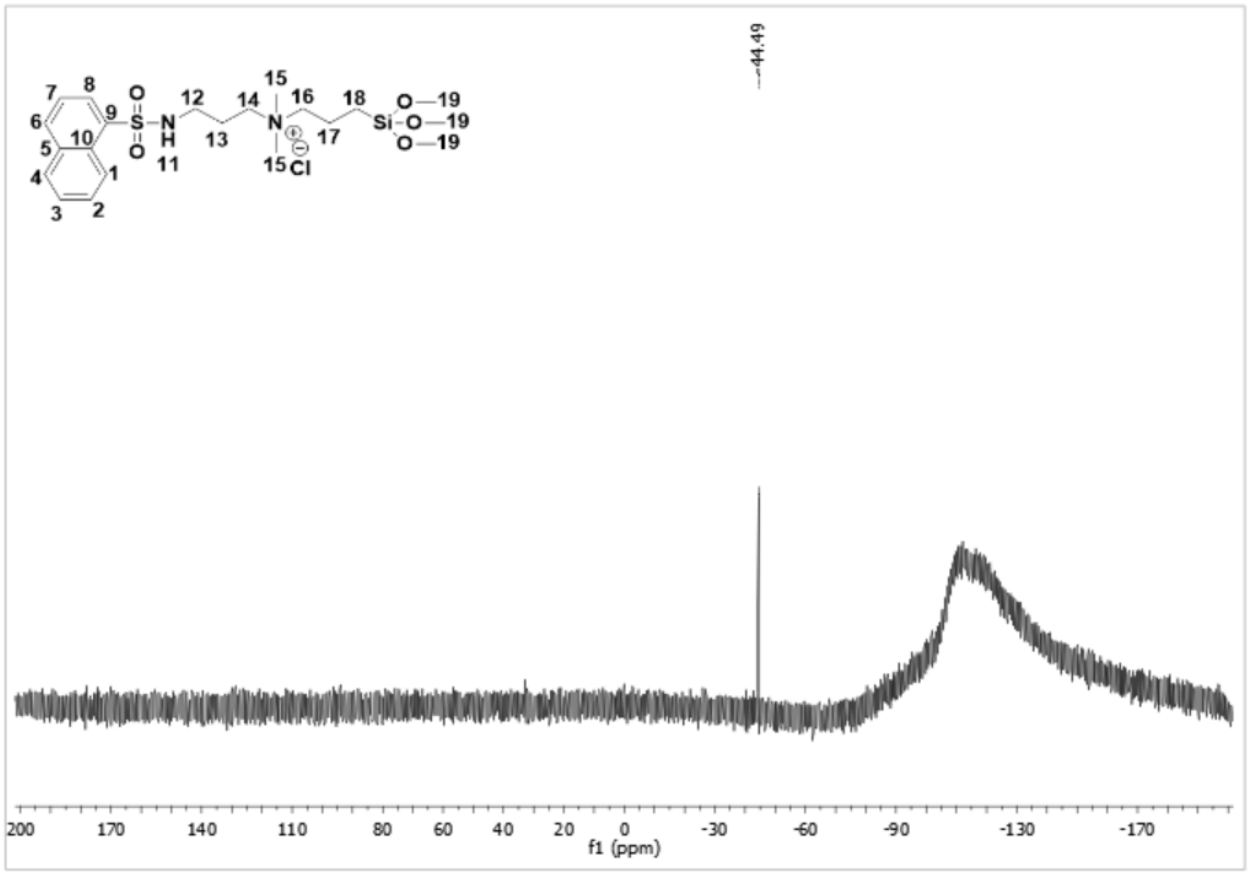


Figure S 112. ^{29}Si NMR (79 MHz, $CDCl_3$) spectrum of **4b.**

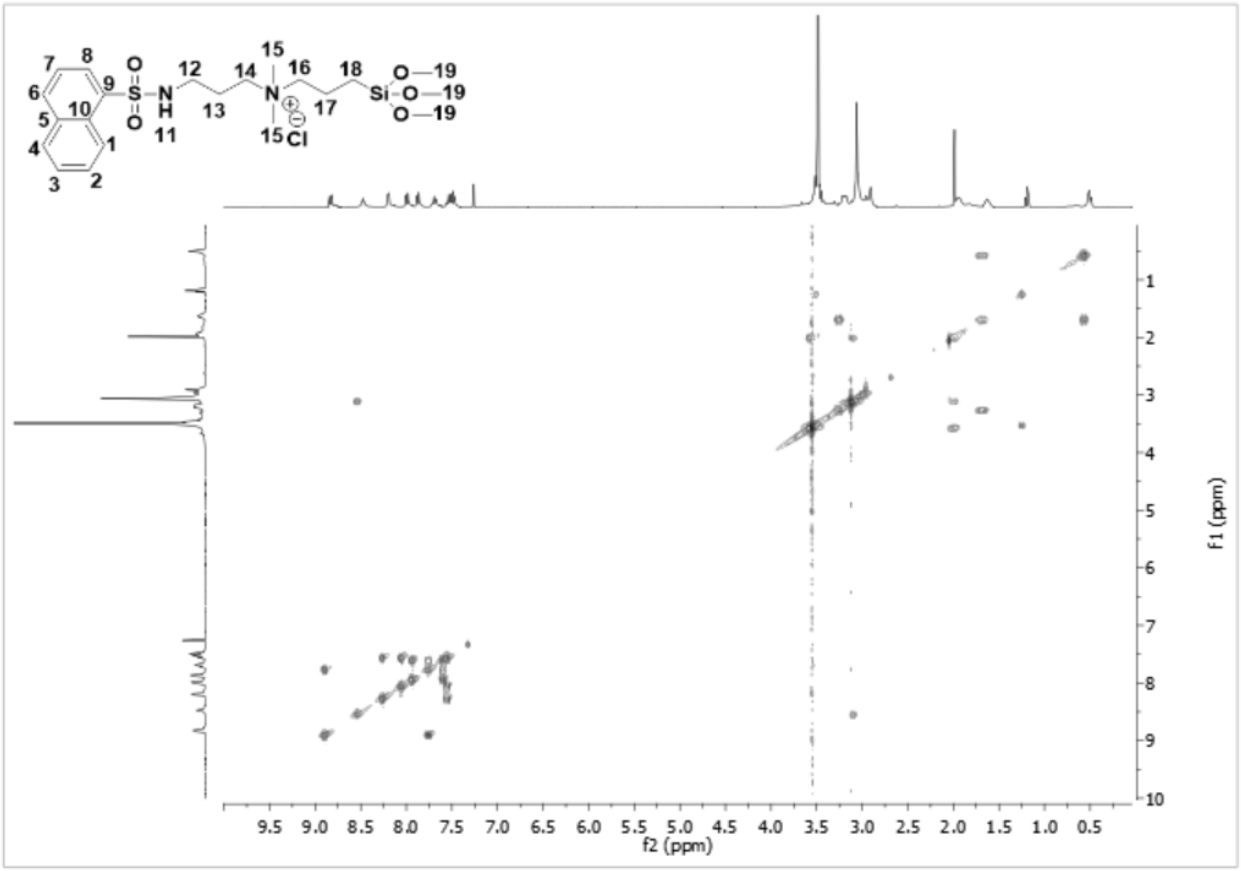


Figure S 113. COSY 2D NMR ($CDCl_3$) spectrum of **4b**.

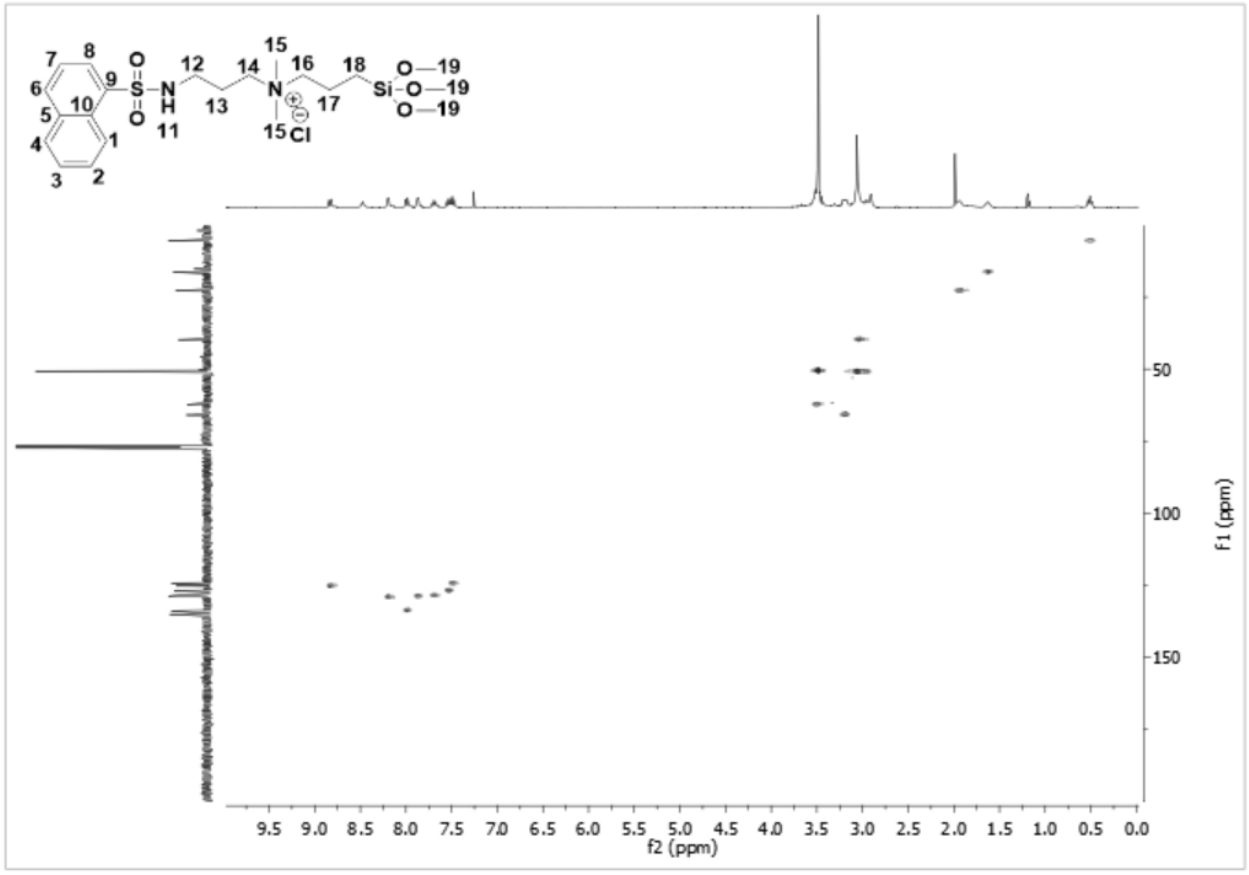


Figure S 114. HSQC 2D NMR ($CDCl_3$) spectrum of **4b**.

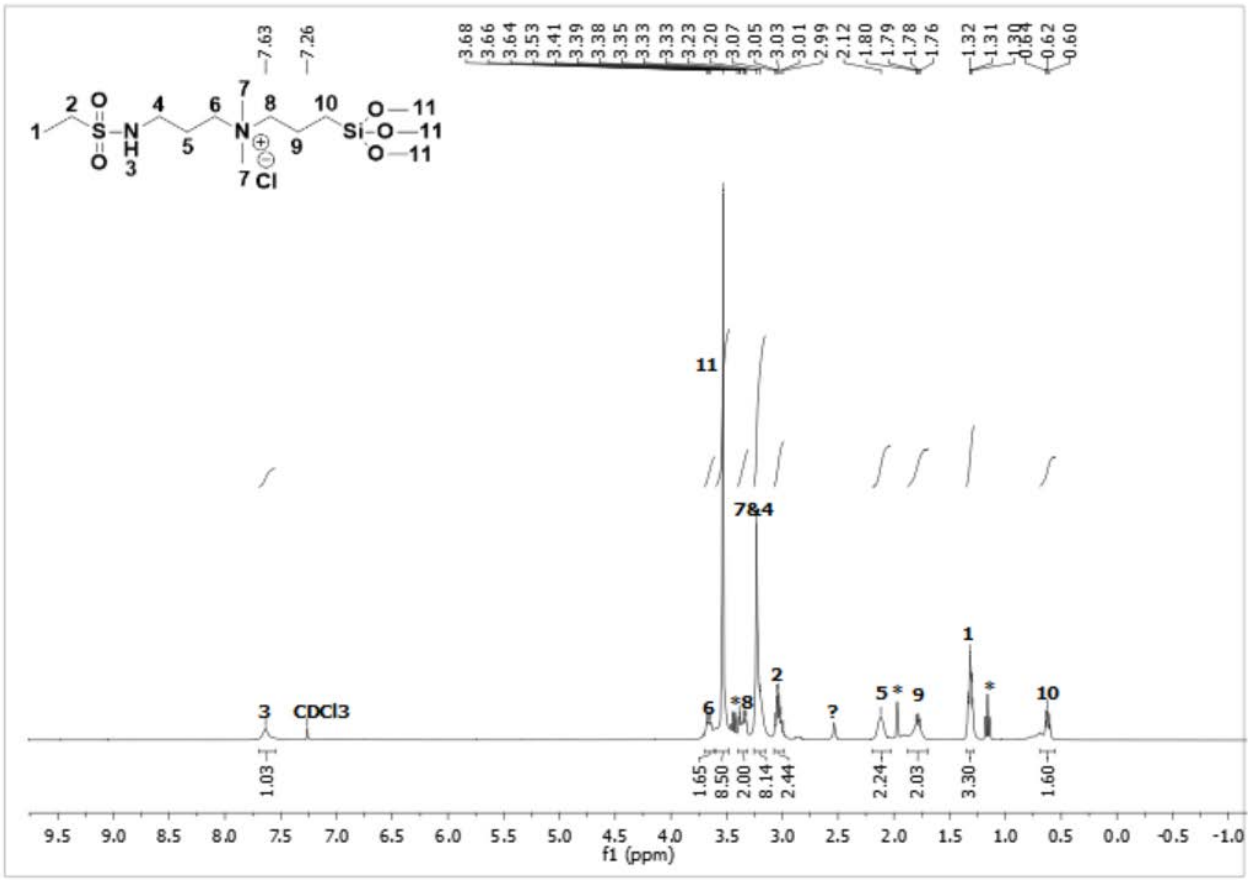


Figure S 115. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **7b**.

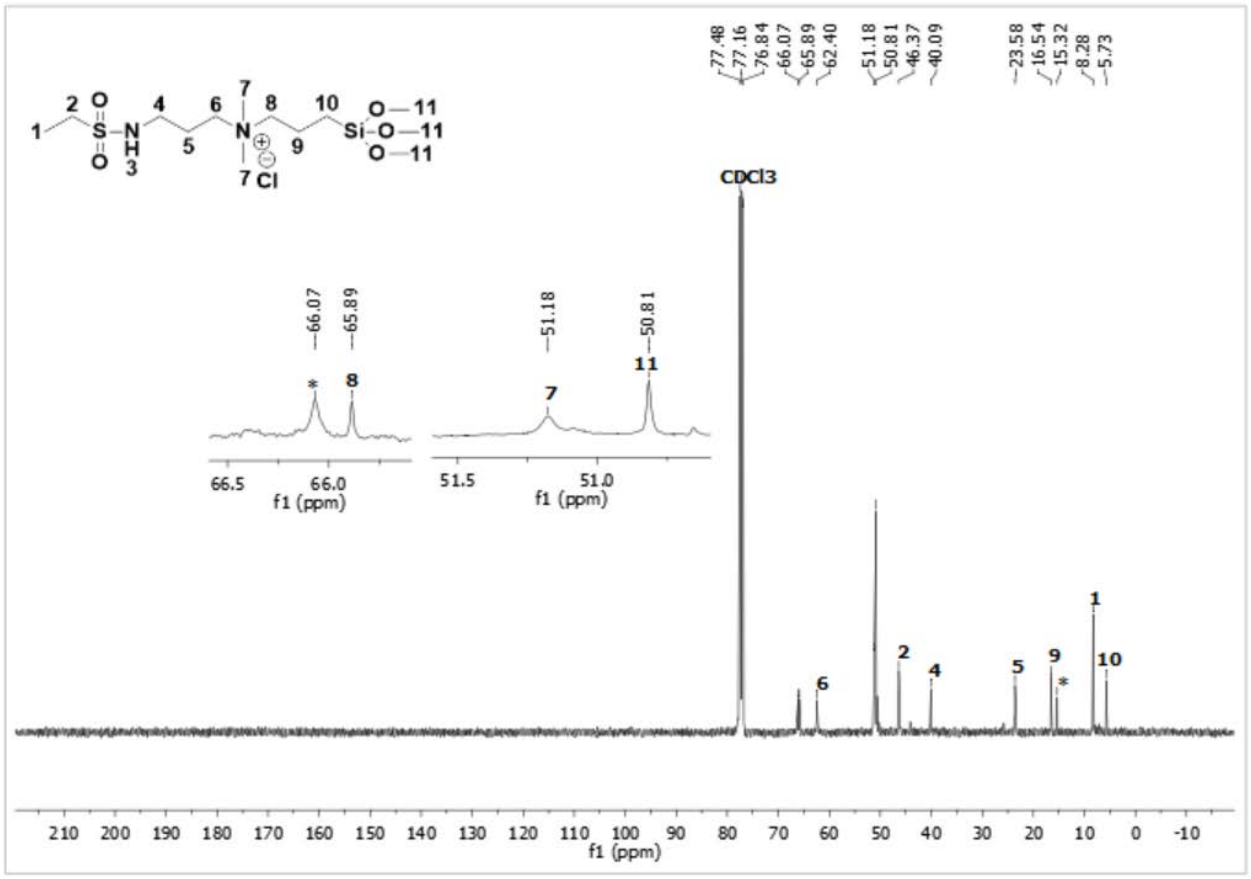


Figure S 116. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **7b**.

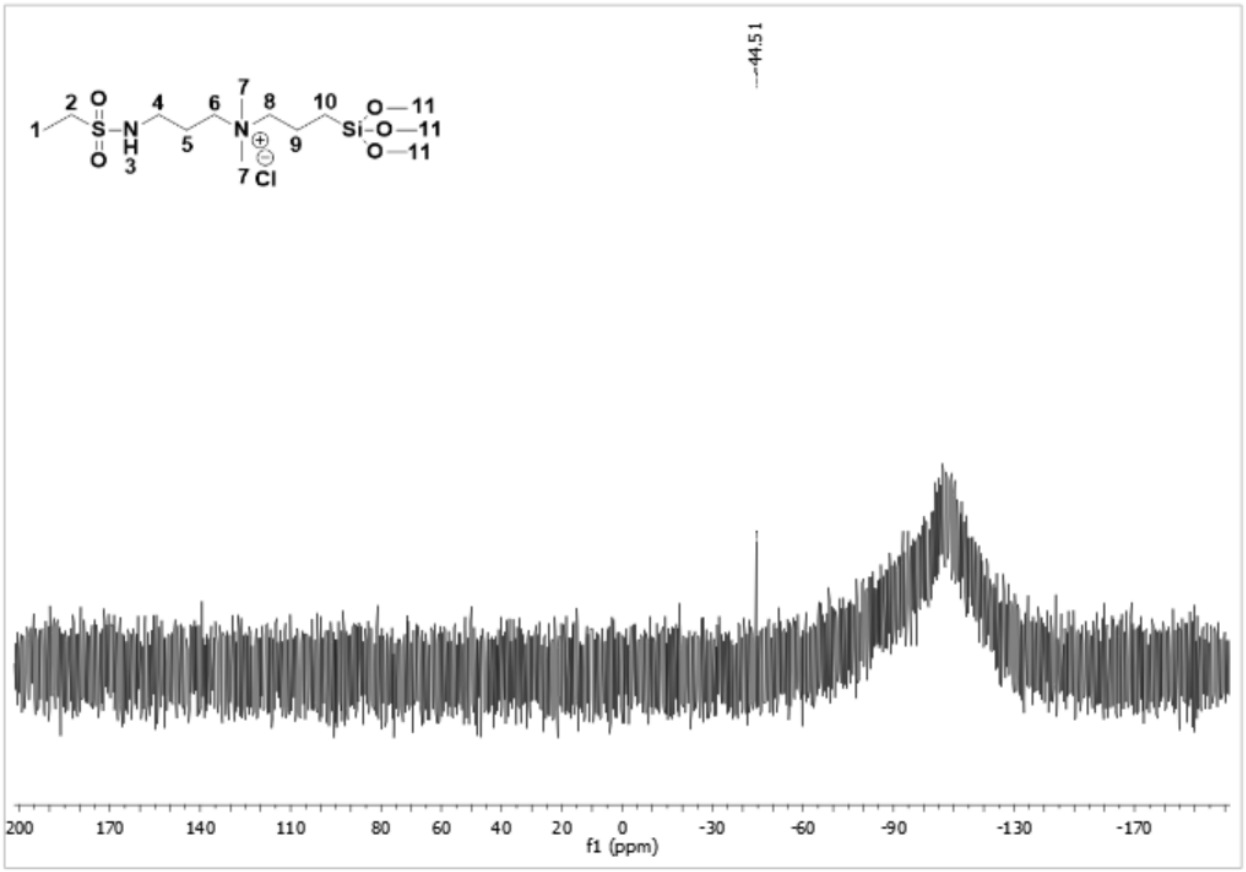


Figure S 117. ^{29}Si NMR (79 MHz, $CDCl_3$) spectrum of **7b**.

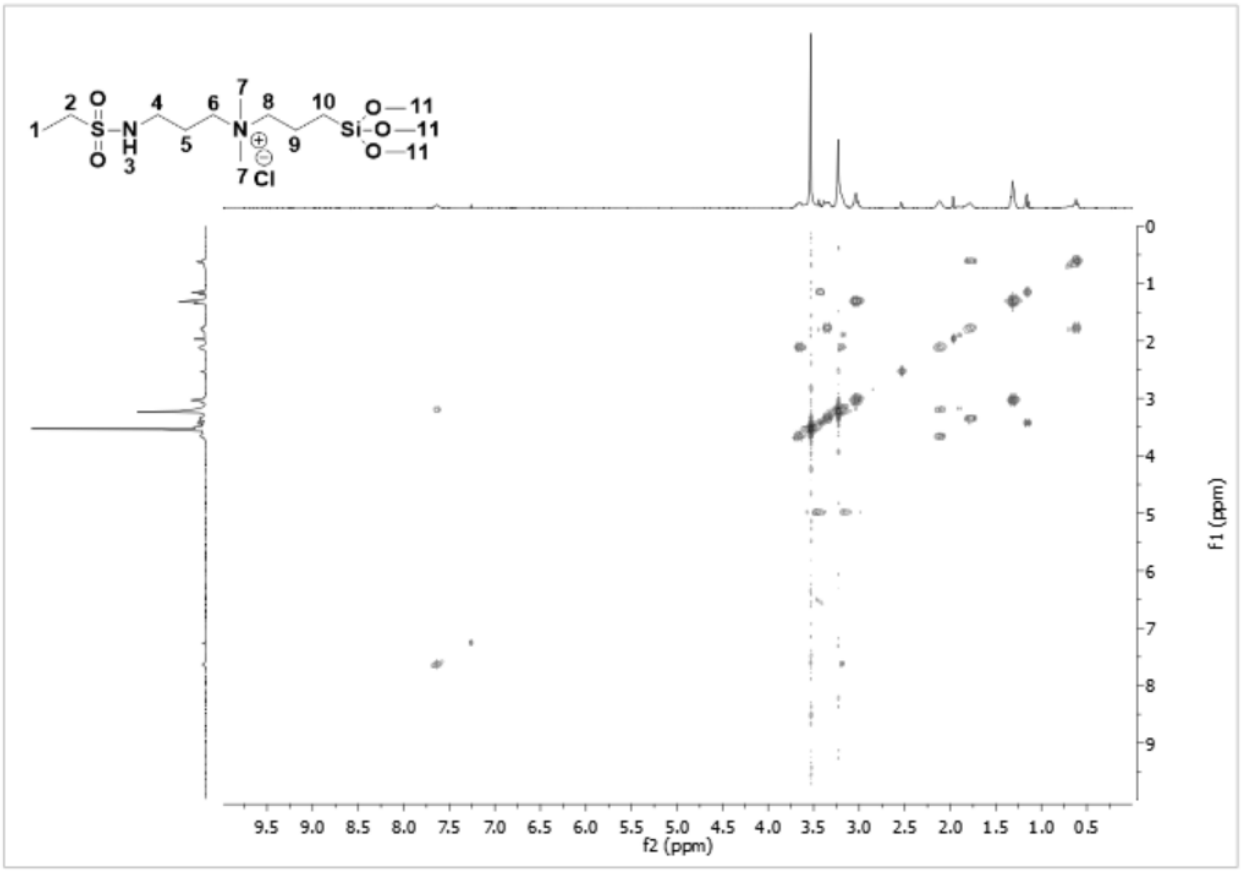


Figure S 118. COSY 2D NMR ($CDCl_3$) spectrum of **7b**.

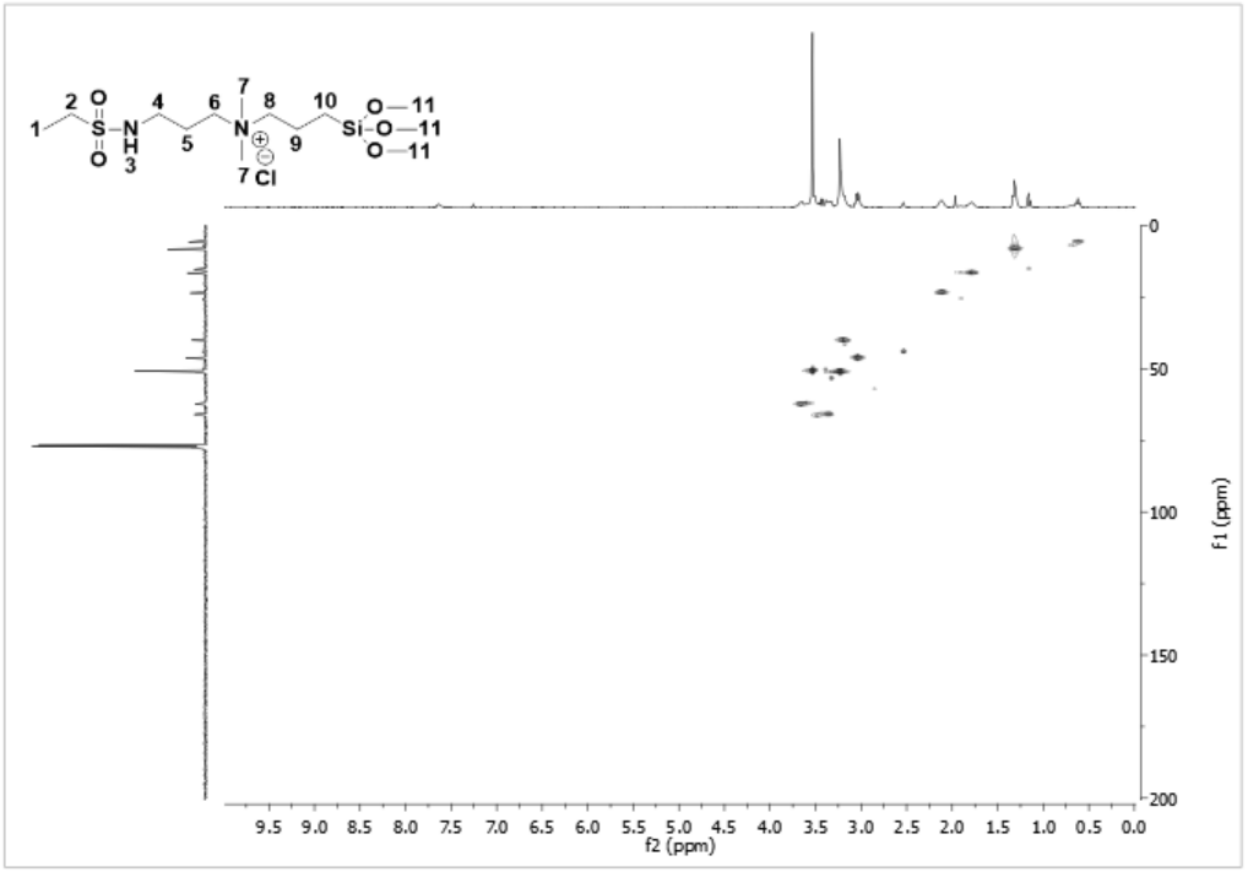


Figure S 119. HSQC 2D NMR ($CDCl_3$) spectrum of **7b**.

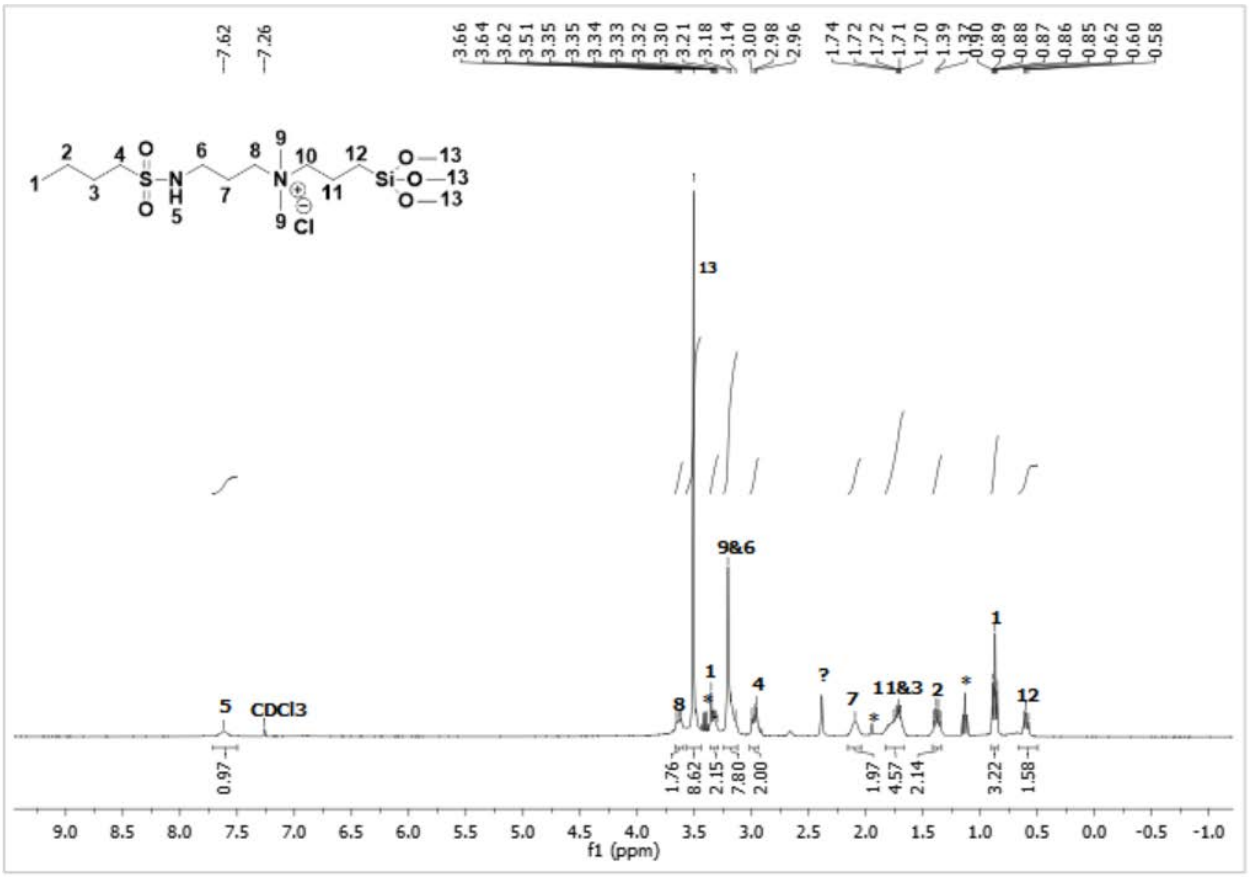


Figure S 120. ^{1}H NMR (400 MHz, $CDCl_3$) spectrum of **8b**.

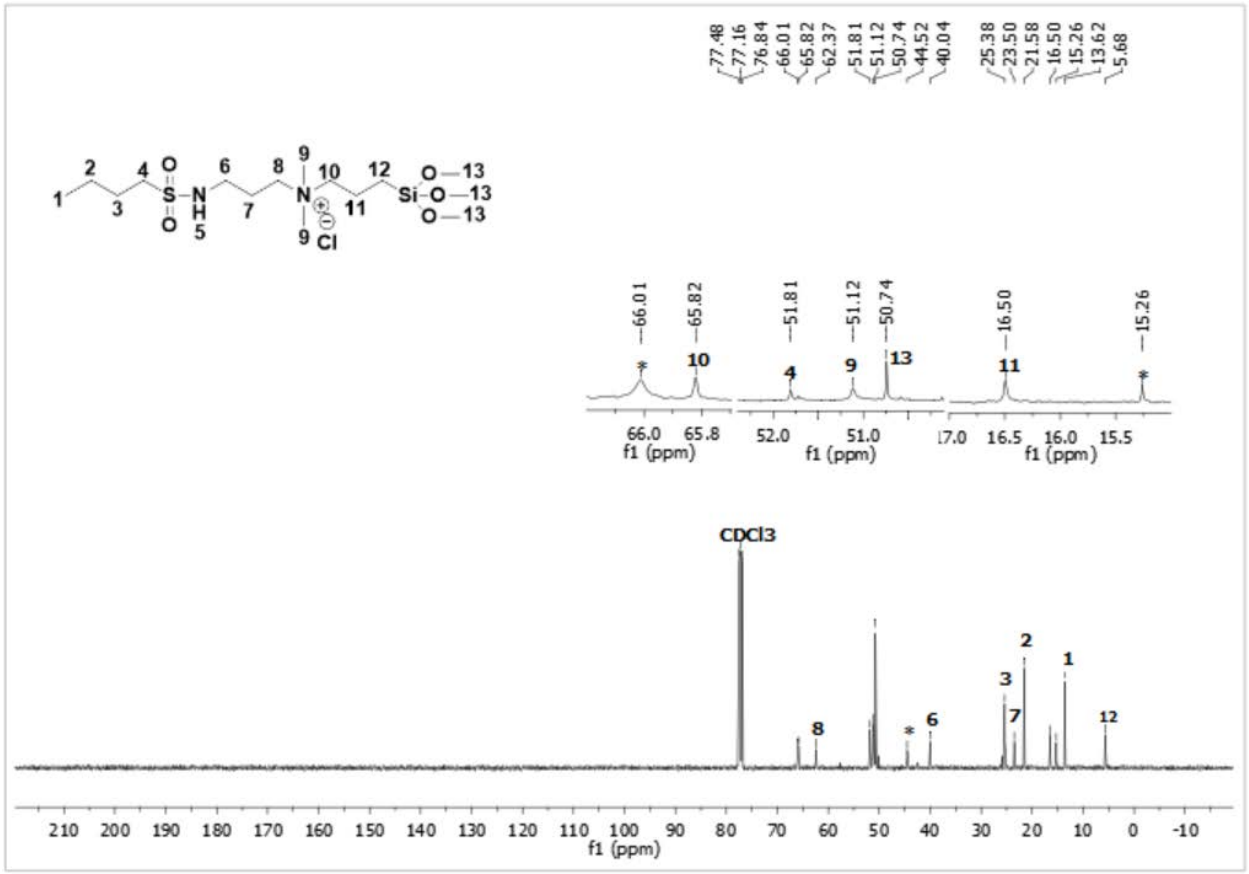


Figure S 121. ^{13}C NMR (101 MHz, $CDCl_3$) spectrum of **8b**.

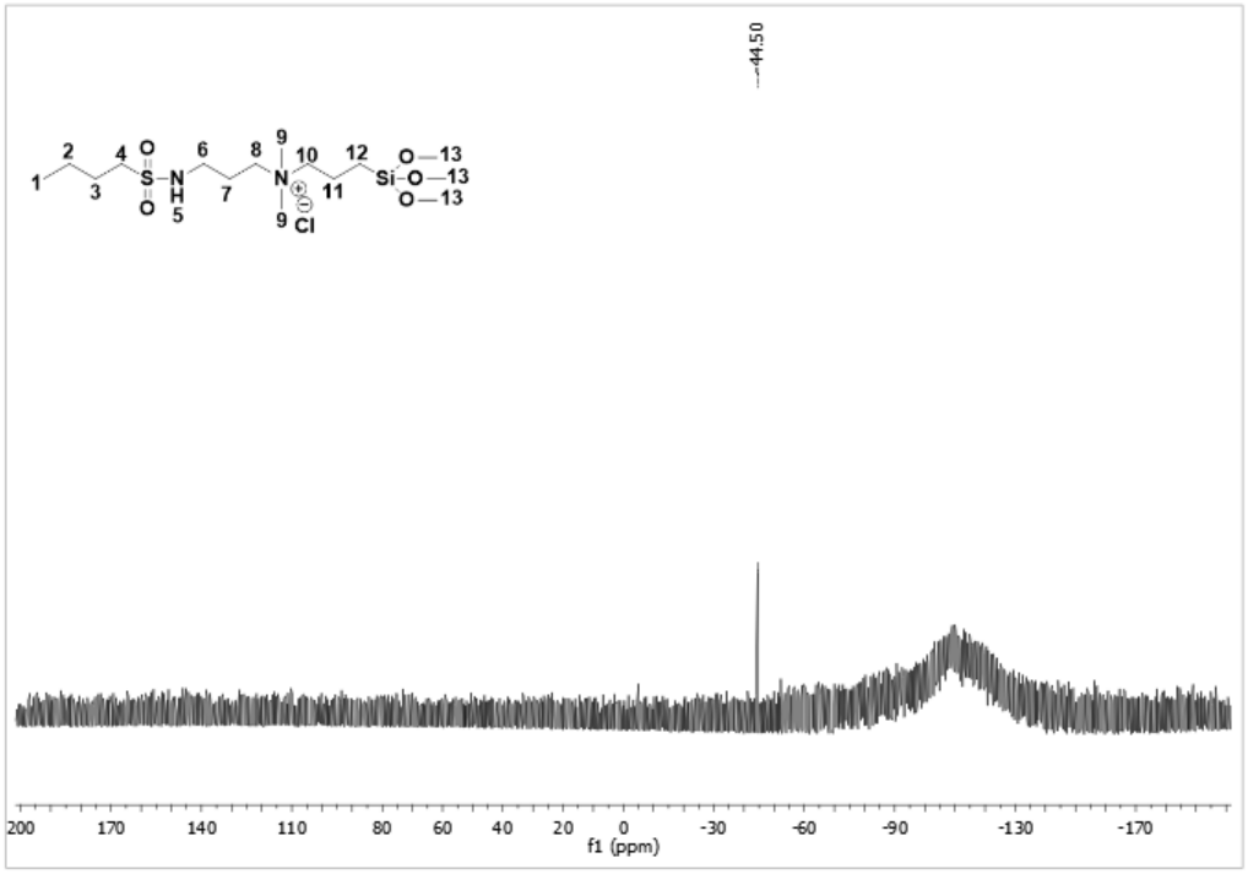


Figure S 122. ^{29}Si NMR (79 MHz, $CDCl_3$) spectrum of **8b**.

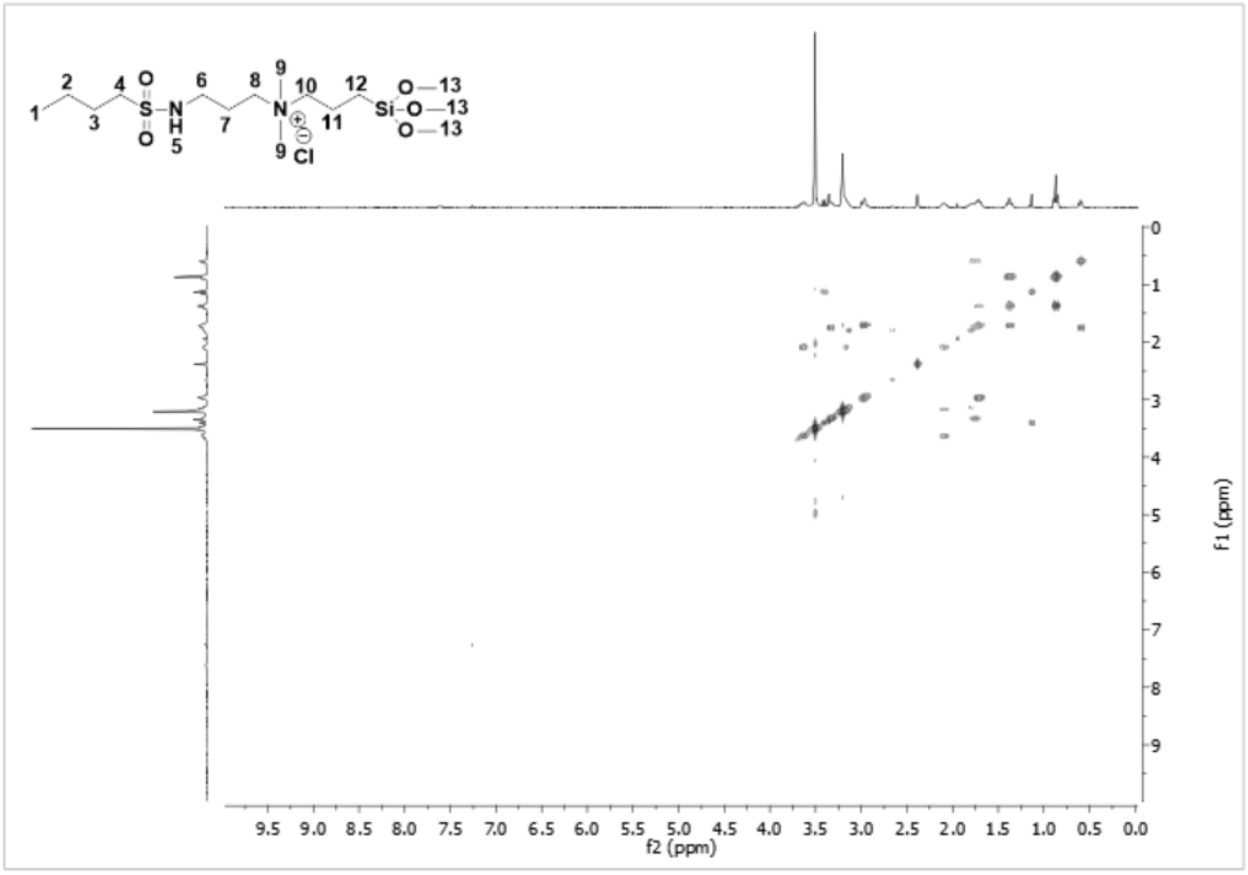


Figure S 123. COSY 2D NMR ($CDCl_3$) spectrum of **8b**.

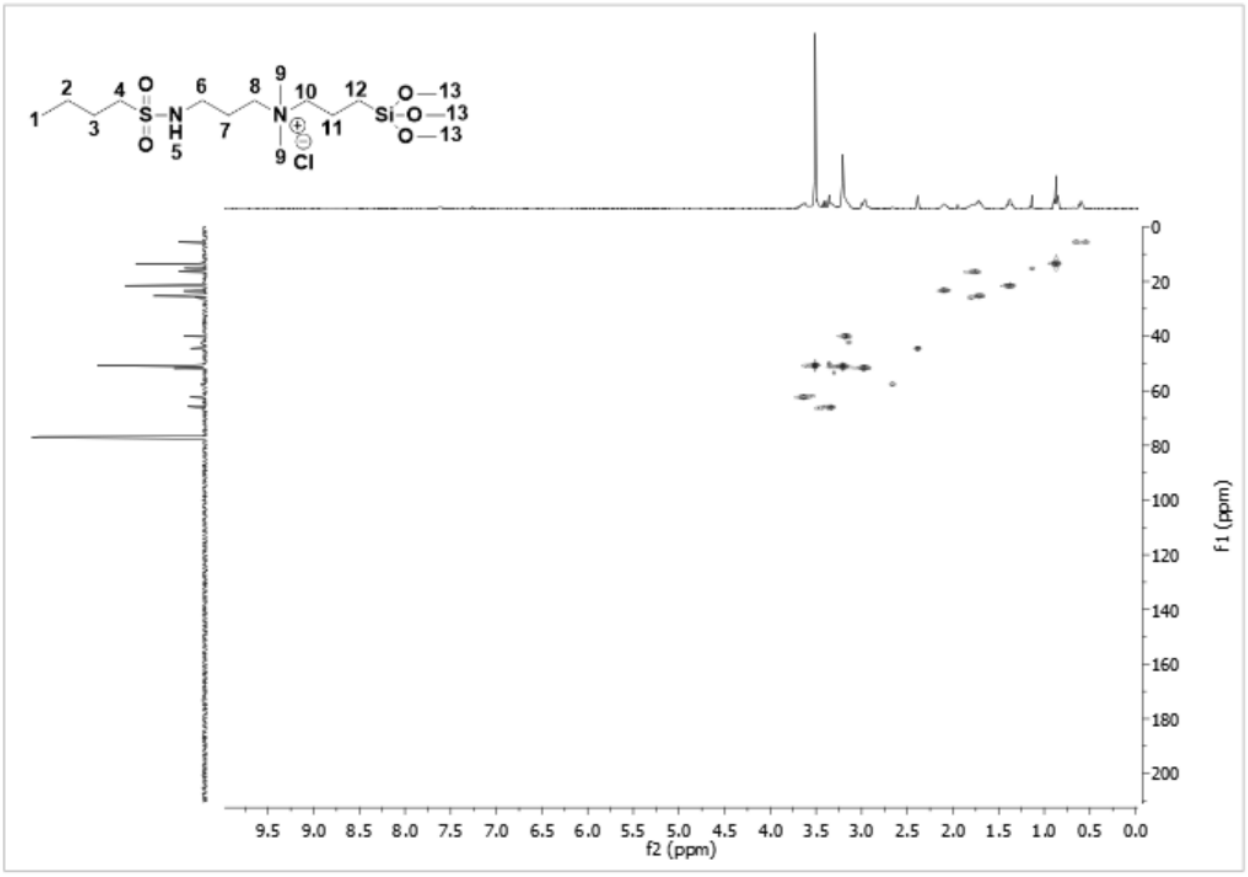


Figure S 124. HSQC 2D NMR ($CDCl_3$) spectrum of **8b**.

References

(23) Porosa, L.; Caschera, A.; Bedard, J.; Mocella, A.; Ronan, E.; Lough, A. J.; Wolfaardt, G.; Foucher, D. A. UV-Curable Contact Active Benzophenone Terminated Quaternary Ammonium Antimicrobials for Applications in Polymer Plastics and Related Devices. *ACS Appl. Mater. Interfaces* **2017**, *9*, 27491–27503.