Supporting Information

Flash Synthesis of TAC-101 and Its Analogues from 1,3,5-Tribromobenzene Using Integrated Flow Microreactor Systems

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General

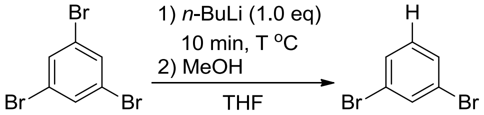
GC analysis was performed on a SHIMADZU GC-2014 gas chromatograph equipped with a flame ionization detector using a fused silica capillary column (column, CBPI; 0.25 mm x 25 m). ^{1}H and ^{13}C spectra were recorded on Varian MERCURYplus-400 (^{1}H 400 MHz, ^{13}C 100 MHz) spectrometer with Me_4Si or $CDCl_3$ as a standard in $CDCl_3$. EI mass spectra were recorded on JMS-SX102A spectrometer. ESI mass spectra were recorded on Exactive spectrometer. Gel permeation chromatography (GPC) was carried out on Japan Analytical Industry LC-9201. THF and Et_2O were purchased from Kanto Chemical Co., Inc. as a dry solvent and used without further purification. Hexane was purchased from Wako, distilled before use, and stored over molecular sieves 4A. 1,3,5-Tribromobenzene, *n*-BuLi, trimethylsilyl triflate, triethylsilyl triflate, chlorodimethylhydrosilane, chlorodimethylphenylsilane, methyl 4-isocyanatobenzoate, 1,3-dibromobenzene and 1,3-dibromo-5-(trimethylsilyl)benzene were commercially available. All solutions used for reactions were prepared under the argon atmosphere using dry solvents.

Stainless steel (SUS304) T-shaped micromixers with inner diameter of 250 and 500 μm were manufactured by Sanko Seiki Co., Inc. Stainless steel (SUS316) microtube reactors with inner diameter of 1000 μm were purchased from GL Sciences. The micromixers and microtube reactors were connected with stainless steel fittings (GL Sciences, 1/16 OUW). The flow microreactor system was dipped in a cooling bath to control the temperature. Solutions were introduced to the flow microreactor system using syringe pumps, Harvard Model 11 plus and PHD2000, equipped with gastight syringes purchased from SGE.

Typical Procedure for the Br/Li Exchange Reaction of 1,3,5-Tribromobenzene Followed by the Reaction with Methanol in a Batch Reactor (Flask).

A solution of 1,3,5-tribromobenzene (0.100 M, 6.0 mL in THF) was stirred in a flask (20 mL round bottom glass flask with a magnetic stirrer). A solution of *n*-BuLi (0.50 M in hexane, 1.2 mL) was added dropwise for 1.0 min. After stirring for 10 min, methanol (neat, 3.0 mL) was added dropwise for 1.0 min. After stirring for 10 min, a cooling bath was removed. The mixture was analyzed by GC. The results are summarized in Table S-1.

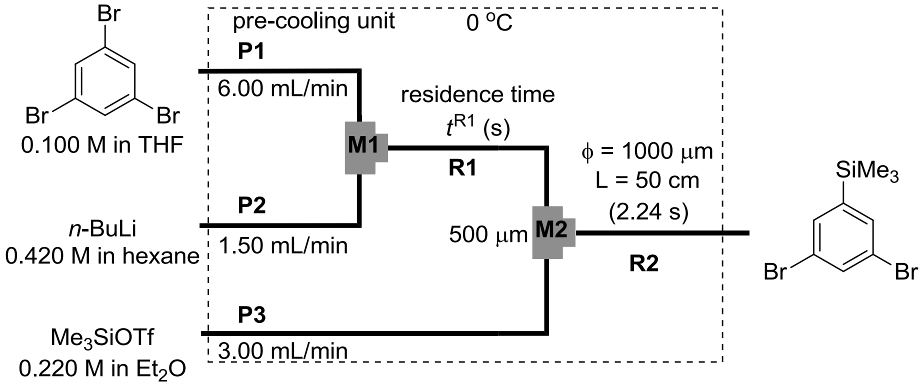
Table S-1. Br/Li exchange of 1,3,5-tribromobenzene with *n*-BuLi followed by the reaction with methanol using a conventional macrobatch system.



temperature (°C)	conversion of 1,3,5-tribromobenzene (%)	yield of 1,3-dibromobenzene (%)	yield of bromobenzene (%)
-78	89	76	6
-78	100	48[a]	15
24	100	26	0

[a] After a solution of *n*-BuLi was added to a solution of 1,3,5-tribromobenzene, the reaction mixture was stirred for 60 min.

Typical Procedure for the Br/Li Exchange Reaction of 1,3,5-Tribromobenzene Followed by the Reaction with Trimethylsilyl Triflate in a Flow Microreactor System.



A flow microreactor system consisting of two T-shaped micromixers (**M1** and **M2**), two microtube reactors (**R1** and **R2**), and three tube pre-cooling units (**P1** (inner diameter ϕ = 1000 μm, length L = 100 cm), **P2** (ϕ = 1000 μm, L = 50 cm) and **P3** (ϕ = 1000 μm, L = 50 cm)) was used. A solution of 1,3,5-tribromobenzene (0.100 M in THF) (flow rate: 6.00 mL min^{-1}) and a solution of *n*-BuLi (0.420 M in hexane) (flow rate: 1.50 mL min^{-1}) were introduced to **M1** (ϕ = 250 μm) by syringe pumps. The resulting solution was passed through **R1** and was mixed with a solution of trimethylsilyl triflate (0.220 M in Et_2O) (flow rate: 3.00 mL min^{-1}) in **M2** (ϕ = 500 μm). The resulting solution was passed through **R2** (ϕ = 1000 μm, L = 50 cm). The flow microreactor system was dipped in a cooling bath of 0 °C. After a steady state was reached, an aliquot of the product solution was collected for 30 s and was treated with saturated aqueous solution of NH_4Cl. The reaction mixture was analyzed by GC. The results obtained with varying the residence time in **R1** are summarized in Table S-2.

Table S-2. Effects on the residence time in **R1** in the Br/Li exchange reaction of 1,3,5-tribromobenzene followed by the reaction with trimethylsilyl triflate in the flow microreactor system.

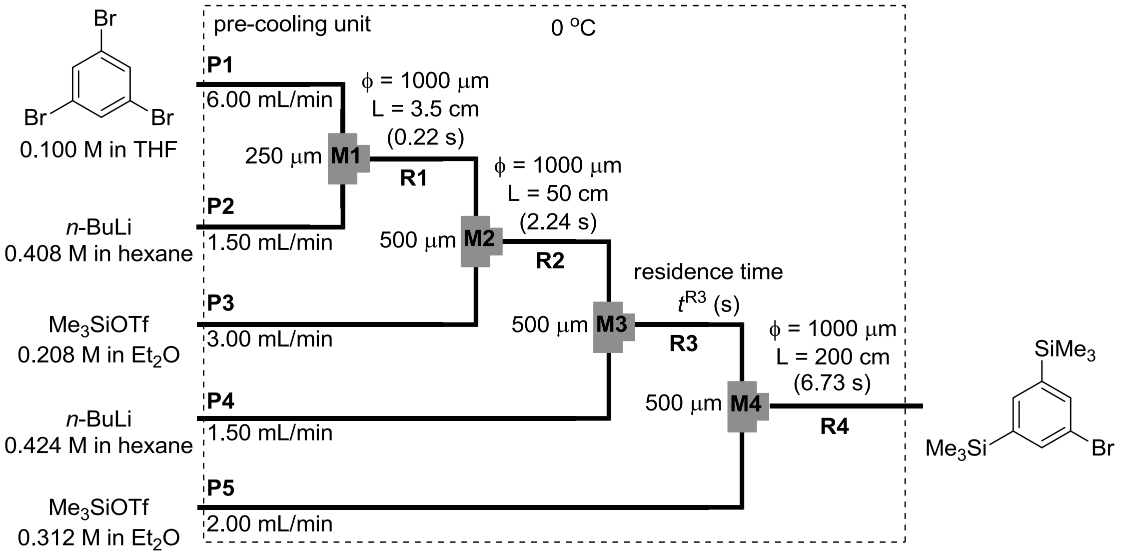
residence time in R1 (s)	inner diameter of R1 (μm)	length of R1 (cm)	conversion of 1,3,5-tribromobenzene (%)	yield of 1,3-dibromo-5-(trimethylsilyl)benzene (%)
0.22	1000	3.5	94	88
0.38		6.0	95	87
0.75		12	94	88
1.57		25	94	86
3.14		50	93	76
6.28		100	86	35
12.57		200	88	22

1,3-Dibromo-5-(triethylsilyl)benzene. Obtained with triethylsilyl triflate: 83% yield, GC ^tR 23.5 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.78 (q, *J* = 7.8 Hz, 6H), 0.95 (t, *J* = 7.8 Hz, 9H), 7.47-7.49 (m, 2H), 7.63-7.65 ppm (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 3.1, 7.2, 123.2, 134.2, 135.1, 143.3 ppm; HRMS (EI) *m/z* calcd for $C_{12}H_{18}Br_2Si$: 347.9545, found: 347.9532.

1,3-Dibromo-5-(dimethylsilyl)benzene. Obtained with dimethylsilyl chloride: 84% yield, GC ^tR 18.7 min, The spectral data were identical to those reported in the literature.[1]

1,3-Dibromo-5-(dimethylphenylsilyl)benzene. Obtained with dimethylphenylsilyl chloride: 79% yield, GC ^tR 26.0 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.55 (s, 6H), 7.35-7.42 (m, 3H), 7.47-7.52 (m, 4H), 7.64-7.66 ppm (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -2.7, 123.3, 128.1, 129.6, 134.0, 134.5, 135.2, 136.3, 144.0 ppm; HRMS (EI) *m/z* calcd for $C_{14}H_{14}Br_2Si$: 367.9232, found: 367.9221.

Typical Procedure for Sequential Introduction of Two Silyl Groups to 1,3,5-Tribromobenzene.



An integrated flow microreactor system consisting of four T-shaped micromixers (**M1, M2, M3** and **M4**), four microtube reactors (**R1, R2, R3** and **R4**), and five tube pre-cooling units (**P1** (inner diameter ϕ = 1000 μm, length L = 100 cm), **P2** (ϕ = 1000 μm, L = 50 cm), **P3** (ϕ = 1000 μm, L = 50 cm), **P4** (ϕ = 1000 μm, L = 50 cm) and **P5** (ϕ = 1000 μm, L = 50 cm)) was used. A solution of 1,3,5-tribromobenzene (0.100 M in THF) (flow rate: 6.00 mL min^{-1}) and a solution of *n*-BuLi (0.408 M in hexane) (flow rate: 1.50 mL min^{-1}) were introduced to **M1** (ϕ = 250 μm) by syringe pumps. The resulting solution was passed through **R1** (ϕ = 1000 μm, L = 3.5 cm) and was mixed with a solution of trimethylsilyl triflate (0.208 M in Et$_2$O) (flow rate: 3.00 mL min^{-1}) in **M2** (ϕ = 500 μm). The resulting solution was passed through **R2** (ϕ = 1000 μm, L = 50 cm) and was mixed with a solution of *n*-BuLi (0.424 M in hexane) (flow rate: 1.50 mL min^{-1}) in **M3** (ϕ = 500 μm). The resulting solution was passed through **R3** and was mixed with a solution of trimethylsilyl triflate (0.312 M in Et$_2$O) (flow rate: 2.00 mL min^{-1}) in **M4** (ϕ = 500 μm). The resulting solution was passed through **R4** (ϕ = 1000 μm, L = 200 cm). The integrated flow microreactor system was dipped in a cooling bath of 0 °C. After a steady state was reached, an aliquot of the product solution was collected for 30 s and was treated with saturated aqueous solution of NH$_4$Cl. The reaction mixture was analyzed by GC. The results obtained with varying the residence time in **R3** are summarized in Table S-3.

Table S-3. Effects on the residence time in **R3** in sequential introduction of two trimethylsilyl groups in the integrated flow microreactor system.

residence time in R3 (s)	inner diameter of R3 (μm)	length of R3 (cm)	yield of 1-bromo-3,5-bis(trimethylsilyl)benzene (%)
0.14	1000	3.5	83
0.24		6.0	82
0.47		12	83
0.98		25	82
1.96		50	78
3.93		100	75
7.85		200	71

1-Bromo-3,5-bis(trimethylsilyl)benzene. Obtained with trimethylsilyl triflate and trimethylsilyl triflate: 83% yield, GC ^{t}R 19.6 min. The spectral data were identical to those reported in the literature.[2]

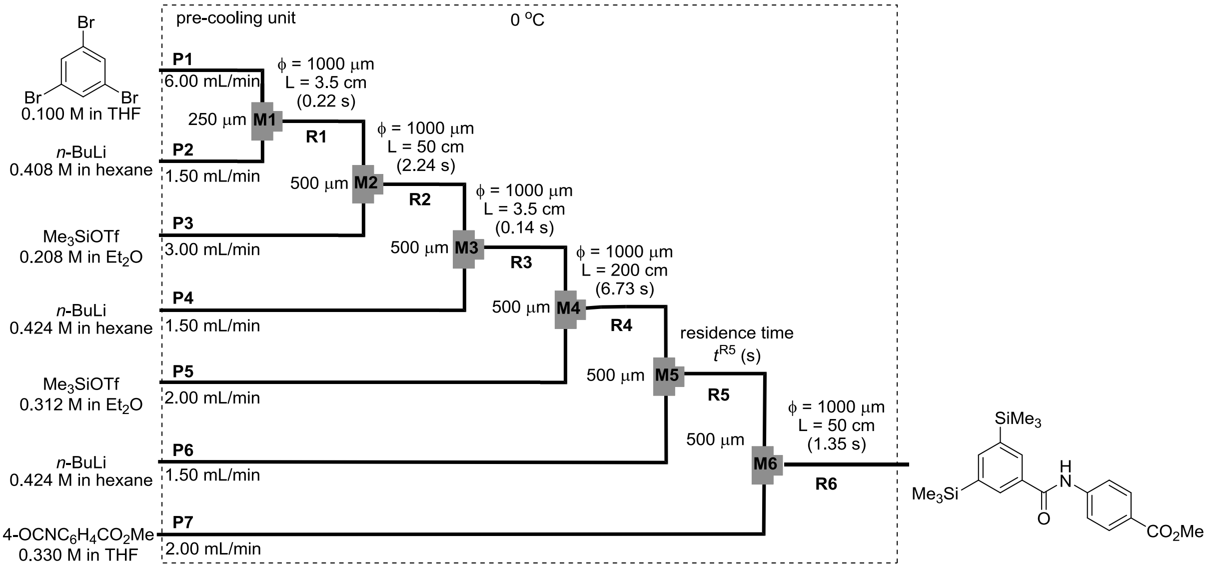
1-Bromo-3-(triethylsilyl)-5-(trimethylsilyl)benzene. Obtained with trimethylsilyl triflate and triethylsilyl triflate: 70% yield, GC ^{t}R 23.2 min, ^{1}H NMR (400 MHz, CDCl$_3$) δ 0.26 (s, 9H), 0.79 (q, *J* = 7.9 Hz, 6H), 0.97 (t, *J* = 7.6 Hz, 9H), 7.48-7.52 (m, 1H), 7.54-7.56 (m, 1H), 7.57-7.60 ppm (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -1.2, 3.3, 7.3, 123.3, 136.2, 136.9, 137.2, 140.0, 142.7 ppm; HRMS (EI) *m/z* calcd for $C_{15}H_{27}BrSi_2$: 342.0835, found: 342.0842.

1-Bromo-3-(dimethylsilyl)-5-(trimethylsilyl)benzene. Obtained with trimethylsilyl triflate and dimethylsilyl chloride: 75% yield, GC ^{t}R 19.1 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.27 (s, 9H), 0.35 (d, J = 4.0 Hz, 6H), 4.40 (sept, J = 3.7 Hz, 1H) 7.53-7.56 (m, 1H), 7.59-7.63 ppm (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -3.8, -1.2, 123.4, 136.7, 136.9, 137.0, 139.9, 143.2 ppm; HRMS (EI) *m/z* calcd for $C_{11}H_{19}BrSi_2$: 286.0209, found: 286.0219.

1-Bromo-3-(dimethylphenylsilyl)-5-(trimethylsilyl)benzene. Obtained with trimethylsilyl triflate and dimethylphenylsilyl chloride: 89% yield, GC ^{t}R 25.5 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.24 (s, 9H), 0.55 (s, 6H), 7.33-7.40 (m, 3H), 7.48-7.54 (m, 3H), 7.57-7.58 (m, 1H), 7.59-7.61 ppm (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -2.5, -1.2, 123.4, 127.9, 129.3, 134.1, 136.6, 137.0, 137.1, 137.4, 140.8, 143.0 ppm; HRMS (EI) *m/z* calcd for $C_{17}H_{23}BrSi_2$: 362.0522, found: 362.0529.

1-Bromo-3-(dimethylsilyl)-5-(dimethylphenylsilyl)benzene. Obtained with dimethylsilyl chloride and dimethylphenylsilyl chloride: 68% yield, GC ^{t}R 25.1 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.32 (d, J = 4.0 Hz, 6H), 0.55 (s, 6H), 4.38 (sept, J = 3.7 Hz, 1H), 7.33-7.40 (m, 3H), 7.48-7.52 (m, 2H), 7.54-7.57 (m, 1H), 7.58-7.61 (m, 1H), 7.61-7.64 ppm (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -3.9, -2.5, 123.4, 127.9, 129.4, 134.1, 137.2, 137.3, 137.4, 137.9, 140.0, 141.0 ppm; HRMS (EI) *m/z* calcd for $C_{16}H_{21}BrSi_2$: 348.0365, found: 348.0366.

Typical Procedure for Sequential Introduction of Two Silyl Groups and a Amide Functionality to 1,3,5-Tribromobenzene.



An integrated flow microreactor system consisting of six T-shaped micromixers (**M1, M2, M3, M4, M5** and **M6**), six microtube reactors (**R1, R2, R3, R4, R5** and **R6**), and seven tube pre-cooling units (**P1** (inner diameter ϕ = 1000 μm, length L = 100 cm), **P2** (ϕ = 1000 μm, L = 50 cm), **P3** (ϕ = 1000 μm, L = 50 cm), **P4** (ϕ = 1000 μm, L = 50 cm), **P5** (ϕ = 1000 μm, L = 50 cm), **P6** (ϕ = 1000 μm, L = 50 cm) and **P7** (ϕ = 1000 μm, L = 50 cm)) was used. A solution of 1,3,5-tribromobenzene (0.100 M in THF) (flow rate: 6.00 mL min^{-1}) and a solution of *n*-BuLi (0.408 M in hexane) (flow rate: 1.50 mL min^{-1}) were introduced to **M1** (ϕ = 250 μm) by syringe pumps. The resulting solution was passed through **R1** (ϕ = 1000 μm, L = 3.5 cm) and was mixed with a solution of trimethylsilyl triflate (0.208 M in Et_2O) (flow rate: 3.00 mL min^{-1}) in **M2** (ϕ = 500 μm). The resulting solution was passed through **R2** (ϕ = 1000 μm, L = 50 cm) and was mixed with a solution of *n*-BuLi (0.424 M in hexane) (flow rate: 1.50 mL min^{-1}) in **M3** (ϕ = 500 μm). The resulting solution was passed through **R3** (ϕ = 1000 μm, L = 3.5 cm) and was mixed with a solution of trimethylsilyl triflate (0.312 M in

Et_2O) (flow rate: 2.00 mL min^{-1}) in **M4** (ϕ = 500 μm). The resulting solution was passed through **R4** (ϕ = 1000 μm, L = 200 cm) and was mixed with a solution of *n*-BuLi (0.424 M in hexane) (flow rate: 1.50 mL min^{-1}) in **M5** (ϕ = 500 μm). The resulting solution was passed through **R5** and was mixed with a solution of methyl 4-isocyanatobenzoate (0.330 M in THF) (flow rate: 2.00 mL min^{-1}) in **M6** (ϕ = 500 μm). The resulting solution was passed through **R6** (ϕ = 1000 μm, L = 50 cm). The integrated flow microreactor system was dipped in a cooling bath of 0 ^{o}C. After a steady state was reached, an aliquot of the product solution was collected for 30 s and was treated with saturated aqueous solution of NH_4Cl. The reaction mixture was analyzed by GC unless otherwise noted. The results obtained with varying the residence time in **R5** are summarized in Table S-4.

Table S-4. Effects on the residence time in **R5** in sequential introduction of three electrophiles in the integrated flow microreactor system.

residence time in R5 (s)	inner diameter of R5 (μm)	length of R5 (cm)	yield of 1-bromo-3,5-bis(trimethylsilyl)benzene (%)	yield of methyl 4-[3,5-bis(trimethylsilyl)benzamido] benzoate (%)
0.11	1000	3.5	50	27
0.18		6.0	39	38
0.36		12	26	51
0.76		25	14	68
1.52		50	8	77
6.08		200	5	76

Methyl 4-[3,5-bis(trimethylsilyl)benzamido]benzoate. Obtained with trimethylsilyl triflate, trimethylsilyl triflate, and methyl 4-isocyanatobenzoate: 77% yield, GC ^{t}R 33.7 min. The spectral data were identical to those reported in the literature.[3]

The reaction system was stable at least 5 min for continous operation.

Table S-5. Continuous operation of the synthesis of methyl 4-[3,5-bis(trimethylsilyl)-benzamido]benzoate

sample (every 30 s operation)	1	2	3	4	5	6	7	8	9	10
% yield	78	76	75	76	76	74	73	74	73	72

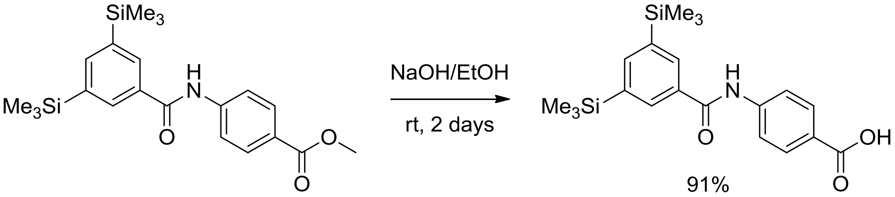
Methyl 4-[3-(triethylsilyl)-5-(trimethylsilyl)benzamido]benzoate. Obtained with trimethylsilyl triflate, triethylsilyl triflate, and methyl 4-isocyanatobenzoate: 62% yield, GC ^{t}R 38.6 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.32 (s, 9H), 0.85 (q, *J* = 7.9 Hz, 6H), 0.99 (t, *J* = 7.8 Hz, 9H), 3.92 (s, 3H), 7.73-7.78 (m, 2H), 7.81-7.83 (m, 1H), 7.86-7.95 (m, 3H), 8.05-8.10 ppm (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$ some of the ^{13}C NMR signals were the same places) δ -1.3, 3.2, 7.3, 51.9, 119.3, 125.5, 130.7, 132.1, 133.1, 137.6, 140.3, 142.4, 142.8, 166.6, 167.1 ppm; HRMS (ESI) *m/z* calcd for $C_{24}H_{36}NO_3Si_2$ ($[M+H]^+$): 442.2228, found: 442.2219.

Methyl 4-[3-(dimethylsilyl)-5-(trimethylsilyl)benzamido]benzoate. Obtained with trimethylsilyl triflate, chlorodimethylhydrosilane, and methyl 4-isocyanatobenzoate: 61% yield, GC ^{t}R 33.4 min, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.33 (s, 9H), 0.40 (d, *J* = 4.0 Hz, 6H), 3.92 (s, 3H), 4.49 (sept, *J* = 3.7 Hz, 1H), 7.74-7.79 (m, 2H), 7.85-7.87 (m, 1H), 7.88-7.93 (s br, 1H), 7.95-8.00 (m, 2H), 8.05-8.10 ppm (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$ some of the ^{13}C NMR signals were the same places) δ -3.9, -1.3, 51.9, 119.3, 125.6, 130.7, 132.8, 133.2, 137.5, 140.8, 142.4, 142.5, 166.6, 166.9 ppm; HRMS (ESI) *m/z* calcd for $C_{20}H_{28}NO_3Si_2$ ($[M+H]^+$): 386.1602, found: 386.1592.

Methyl 4-[3-(dimethylphenylsilyl)-5-(trimethylsilyl)benzamido]benzoate. Obtained with trimethylsilyl triflate, dimethylphenylsilyl chloride, and methyl 4-isocyanatobenzoate. After extraction, the crude product was purified by silica-gel flash chromatography (hexane/ethyl acetate=5/1): 70% isolated yield, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.30 (s, 9H), 0.61 (s, 6H), 3.91 (s, 3H), 7.34-7.43 (m, 3H), 7.50-7.55 (m, 2H), 7.70-7.74 (m, 2H), 7.82-7.87 (m, 2H), 7.89-7.92 (m, 1H), 7.96-7.98 (m, 1H), 8.04-8.08 ppm (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -2.5, -1.3, 51.9, 119.3, 125.6, 127.9, 129.3, 130.7, 132.6, 132.9, 133.2, 134.0, 137.3, 138.4, 140.7, 142.3, 142.6, 166.6, 166.8 ppm; HRMS (ESI) *m/z* calcd for $C_{26}H_{32}NO_3Si_2$ ($[M+H]^+$): 462.1915, found: 462.1905.

Methyl 4-[3-[dimethyl(phenyl)silyl]-5-(dimethylsilyl)benzamido]benzoate. Obtained with dimethylsilyl chloride, dimethylphenylsilyl chloride, and methyl 4-isocyanatobenzoate. After extraction, the crude product was filtered through a short column of silica gel and purified by GPC: 49% isolated yield, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.38 (d, *J* = 3.6 Hz, 6H), 0.61 (s, 6H), 3.91 (s, 3H), 4.47 (sept, *J* = 3.8 Hz, 1H) 7.34-7.42 (m, 3H), 7.50-7.55 (m, 2H), 7.70-7.75 (m, 2H), 7.84-7.89 (m, 2H), 7.94-7.97 (m, 1H), 7.98-8.01 (m, 1H), 8.03-8.08 ppm (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -3.9, -2.5, 52.0, 119.3, 125.7, 127.9, 129.4, 130.8, 133.2, 133.3, 133.4, 134.1, 137.3, 137.8, 138.8, 142.2, 143.3, 166.6, ppm; HRMS (ESI) *m/z* calcd for $C_{25}H_{30}NO_3Si_2$ ($[M+H]^+$): 448.1759, found: 448.1751.

Typical Procedure for Hydrolysis of Methyl Esters.



To a solution of methyl 4-[3,5-bis(trimethylsilyl)benzamido]benzoate (19.8 mg, 0.0495 mmol) in EtOH (0.85 mL) was added 1 M NaOH solution (0.102 mL) and the reaction was monitored by TLC. After 2 days the reaction was quenched with 0.1 M HCl to pH 3, as indicated by pH paper. The quenched reaction was extracted with CH_2Cl_2 five times and the combined extracts were dried over Na_2SO_4. The solvent was removed under reduced pressure to produce **4-[3,5-bis(trimethylsilyl)benzamido]benzoic acid** (17.4 mg, 91% yield). The spectral data were identical to those reported in the literature.[4]

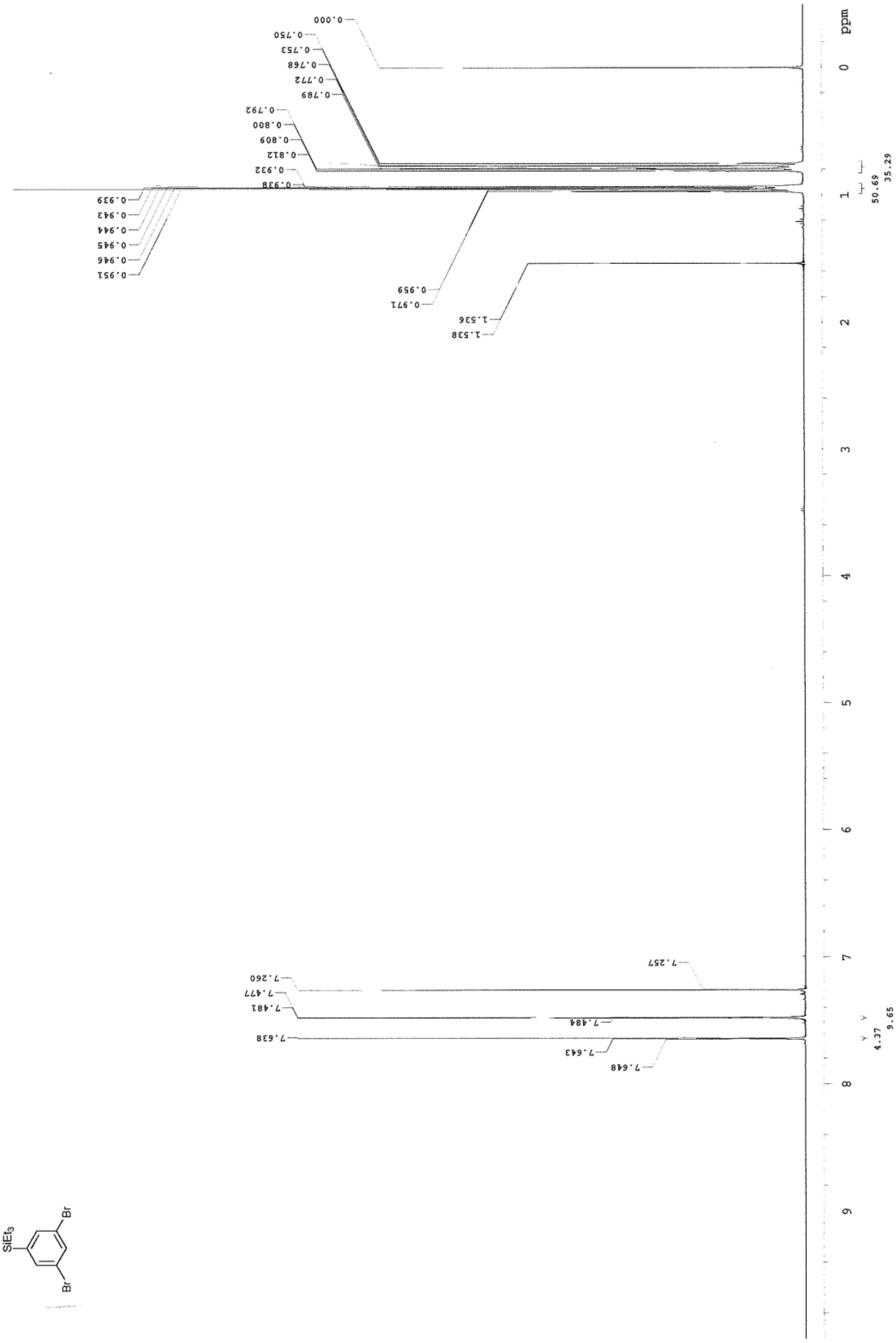
4-[3-(Triethylsilyl)-5-(trimethylsilyl)benzamido]benzoic acid: room temperature, 4 days, 99% yield, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.33 (s, 9H), 0.85 (q, *J* = 8.0 Hz, 6H), 0.99 (t, *J* = 7.8 Hz, 9H), 7.78-7.83 (m, 3H), 7.90-7.95 (m, 3H), 8.12-8.17 ppm (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -1.2, 3.3, 7.4, 119.2, 124.9, 131.6, 132.0, 133.0, 133.1, 137.9, 140.5, 142.9, 143.0, 167.0, 171.2 ppm; HRMS (ESI) *m/z* calcd for $C_{23}H_{34}NO_3Si_2$ ($[M+H]^+$): 428.2072, found: 428.2066.

4-[3-[Dimethyl(phenyl)silyl]-5-(trimethylsilyl)benzamido]benzoic acid: room temperature, 4 days, 97% yield, ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.30 (s, 9H), 0.61 (s, 6H), 7.34-7.42 (m, 3H), 7.51-7.56 (m, 2H), 7.76 (d, *J* = 8.4 Hz, 2H), 7.84-7.89 (m, 2H), 7.90-7.94 (m, 1H), 7.96-8.00 (m, 1H), 8.12 ppm (d, *J* = 8.4 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ -2.4, -1.2, 119.3, 124.9, 128.0, 129.4, 131.6, 132.6, 132.8, 133.2, 134.1, 137.3, 138.6, 140.9, 142.7, 142.9, 166.8, 171.3 ppm; HRMS (ESI) *m/z* calcd for $C_{25}H_{30}NO_3Si_2$ ($[M+H]^+$): 448.1759, found: 448.1752.

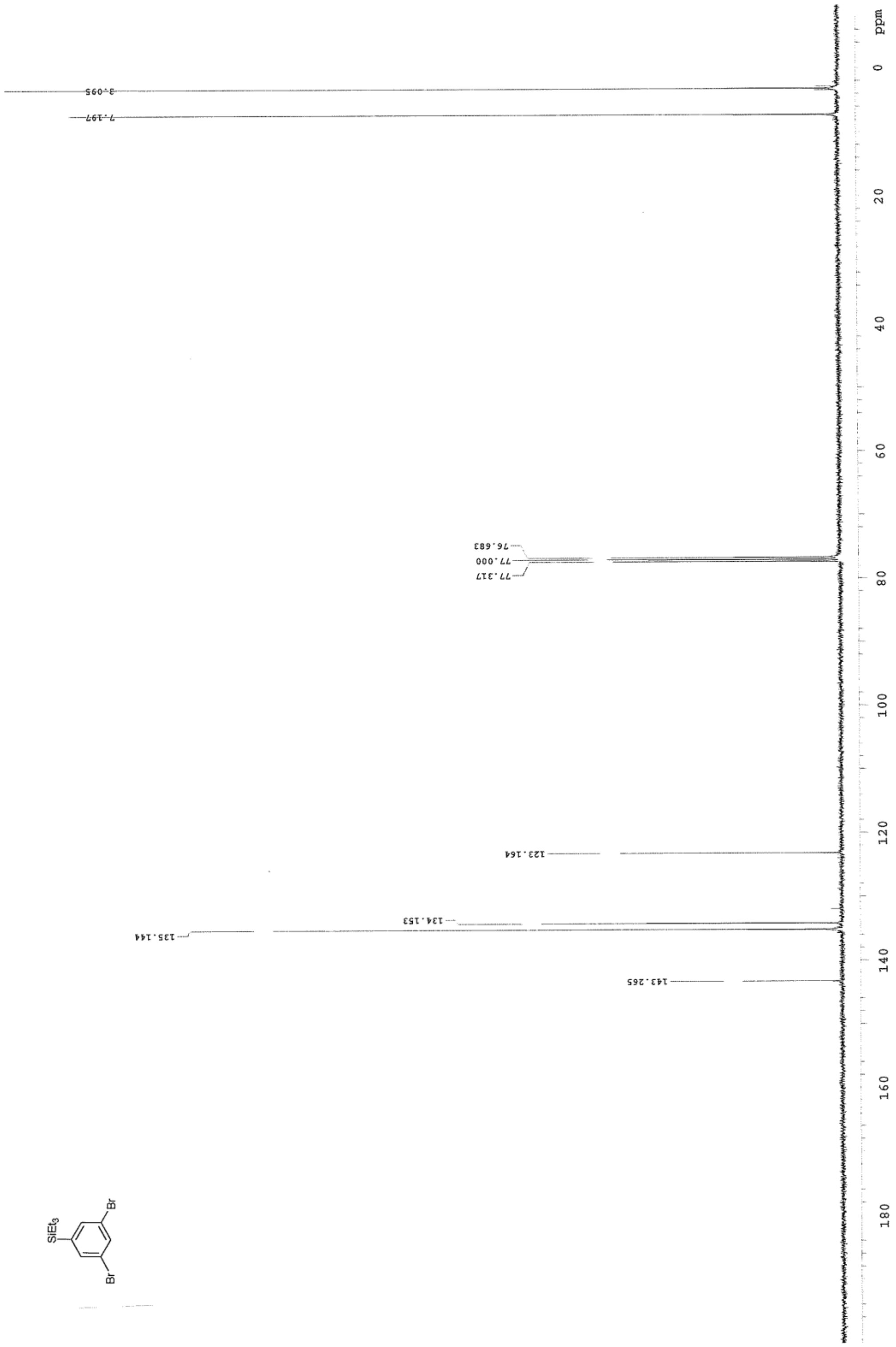
Reference

1) G. Cheng, N. R. Vautravers, R. E. Morris and D. J. Cole-Hamilton, *Org. Biomol. Chem.*, 2008, **6**, 4662.
2) M. Beinhoff, B. Karakaya and A. D. Schluter, *Synthesis*, 2003, **1**, 79.
3) K. Shudo, *Eur. Pat. Appl.*, 1989, 21 pp.

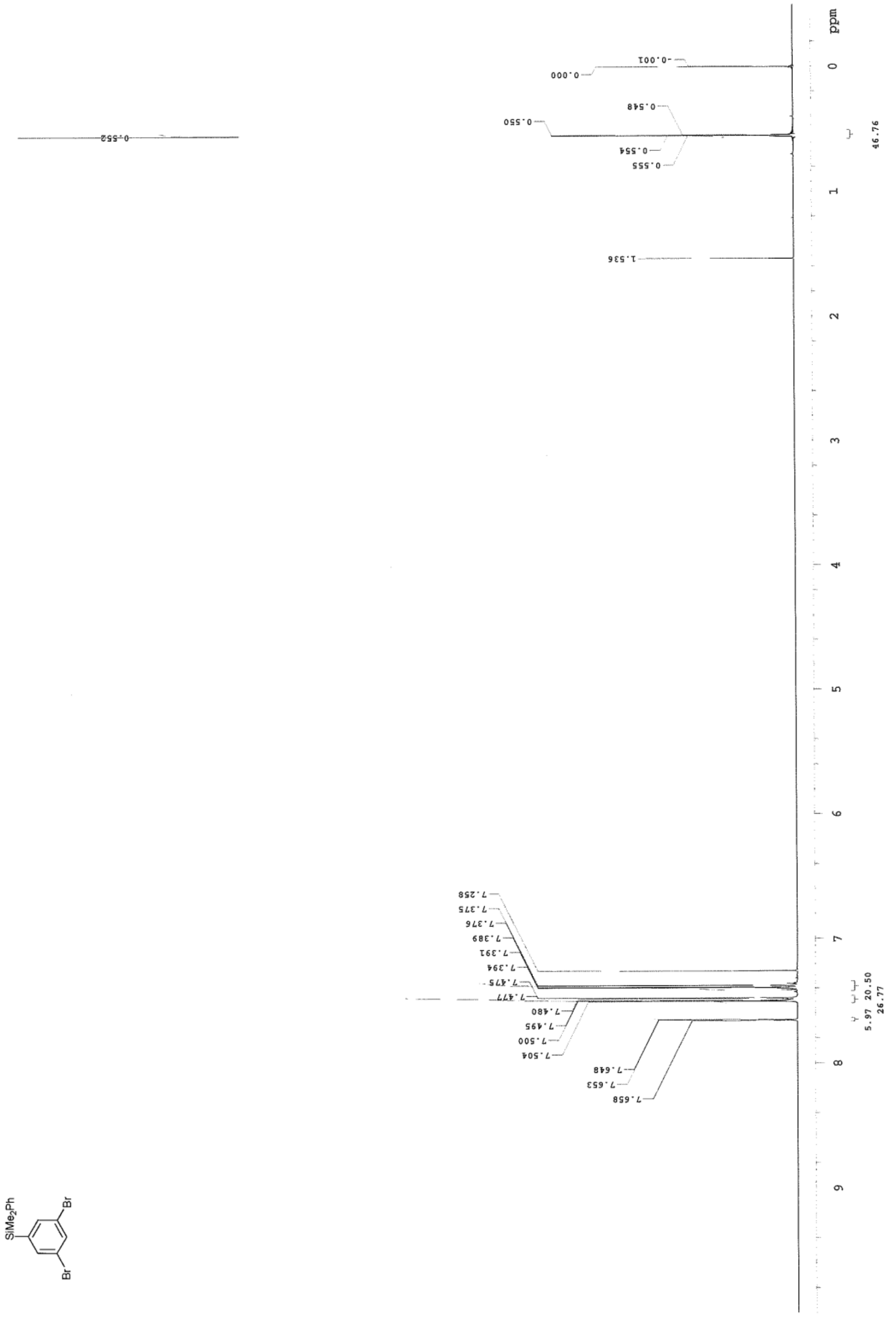
4) T. Yamakawa, H. Kagechika, E. Kawachi, Y. Hashimoto and K. Shudo, *J. Med. Chem.*, 1990, **33,** 1430.



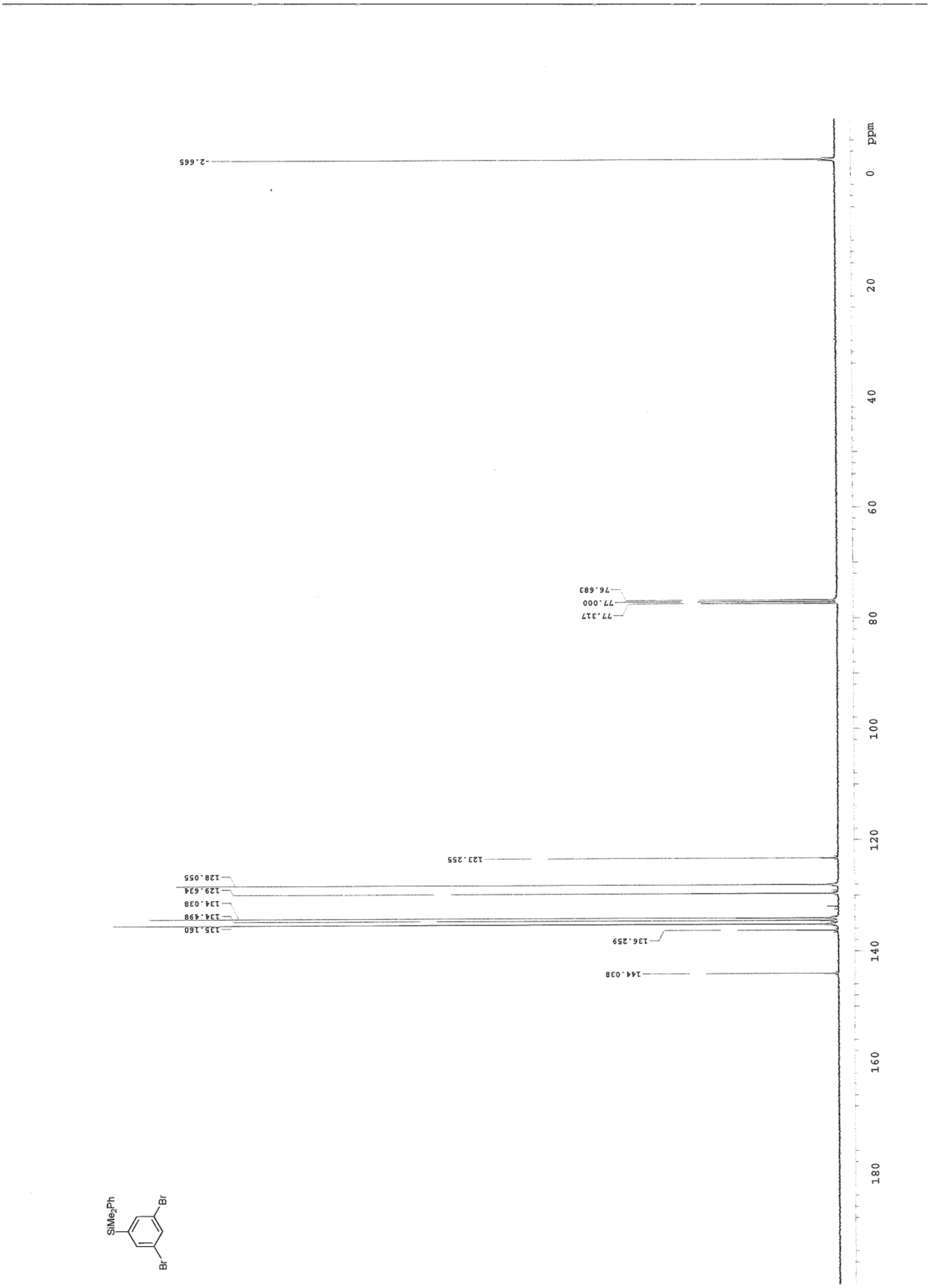
^{1}H NMR spectrum of 1,3-dibromo-5-(triethylsilyl)benzene.



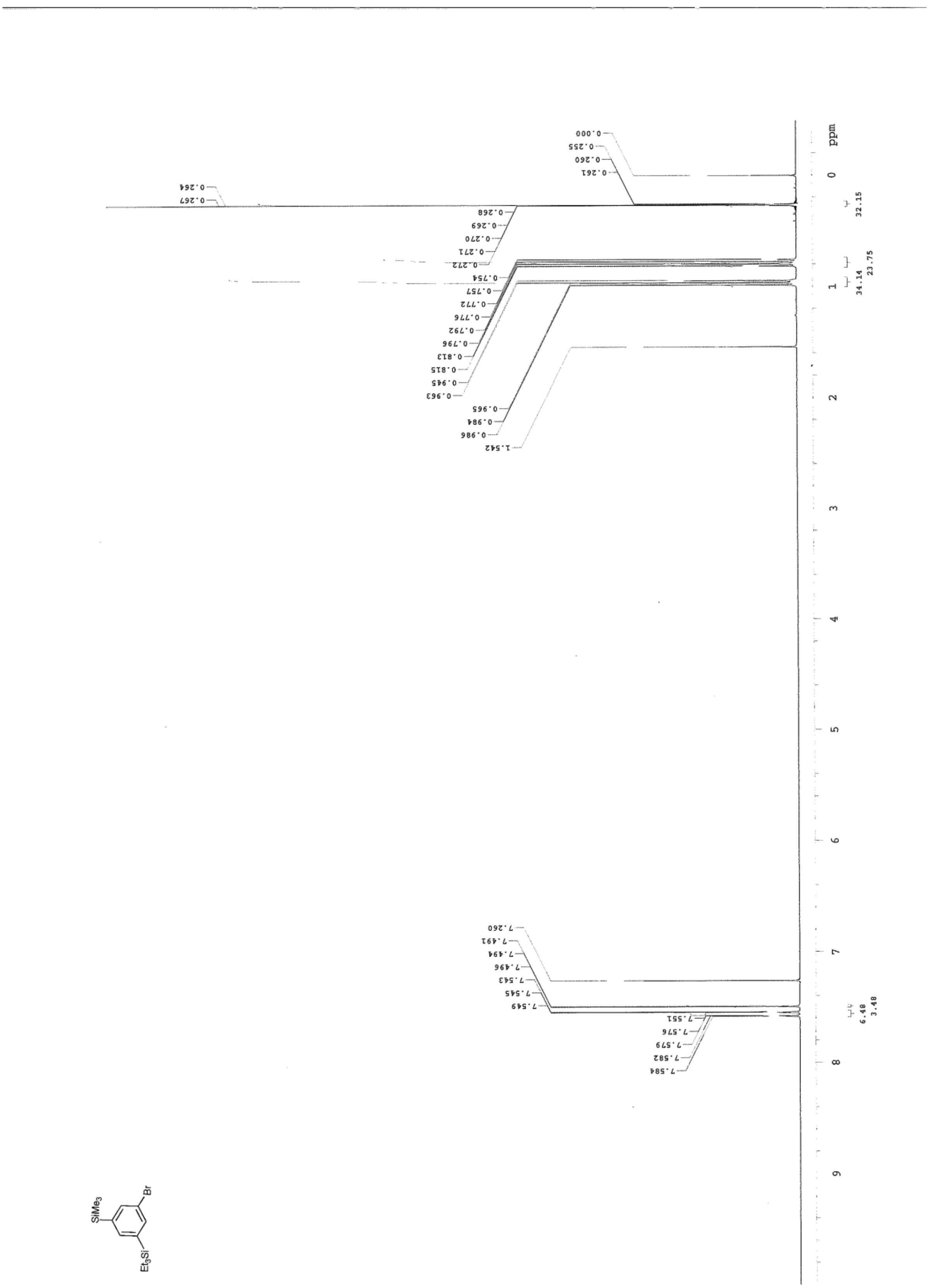
^{13}C NMR spectrum of 1,3-dibromo-5-(triethylsilyl)benzene.



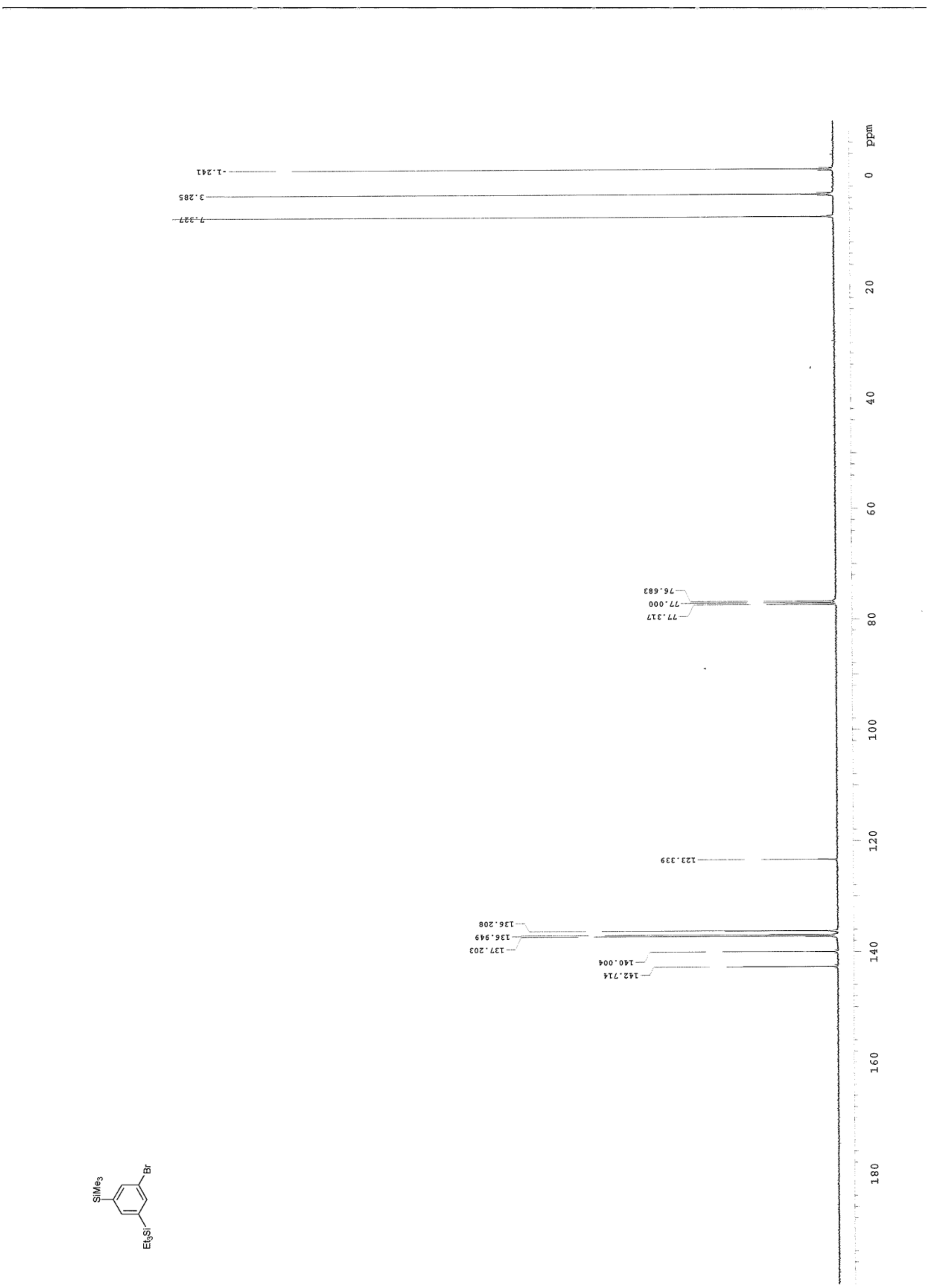
^{1}H NMR spectrum of 1,3-dibromo-5-(dimethylphenylsilyl)benzene.



^{13}C NMR spectrum of 1,3-dibromo-5-(dimethylphenylsilyl)benzene.



^{1}H NMR spectrum of 1-bromo-3-(triethylsilyl)-5-(trimethylsilyl)benzene.



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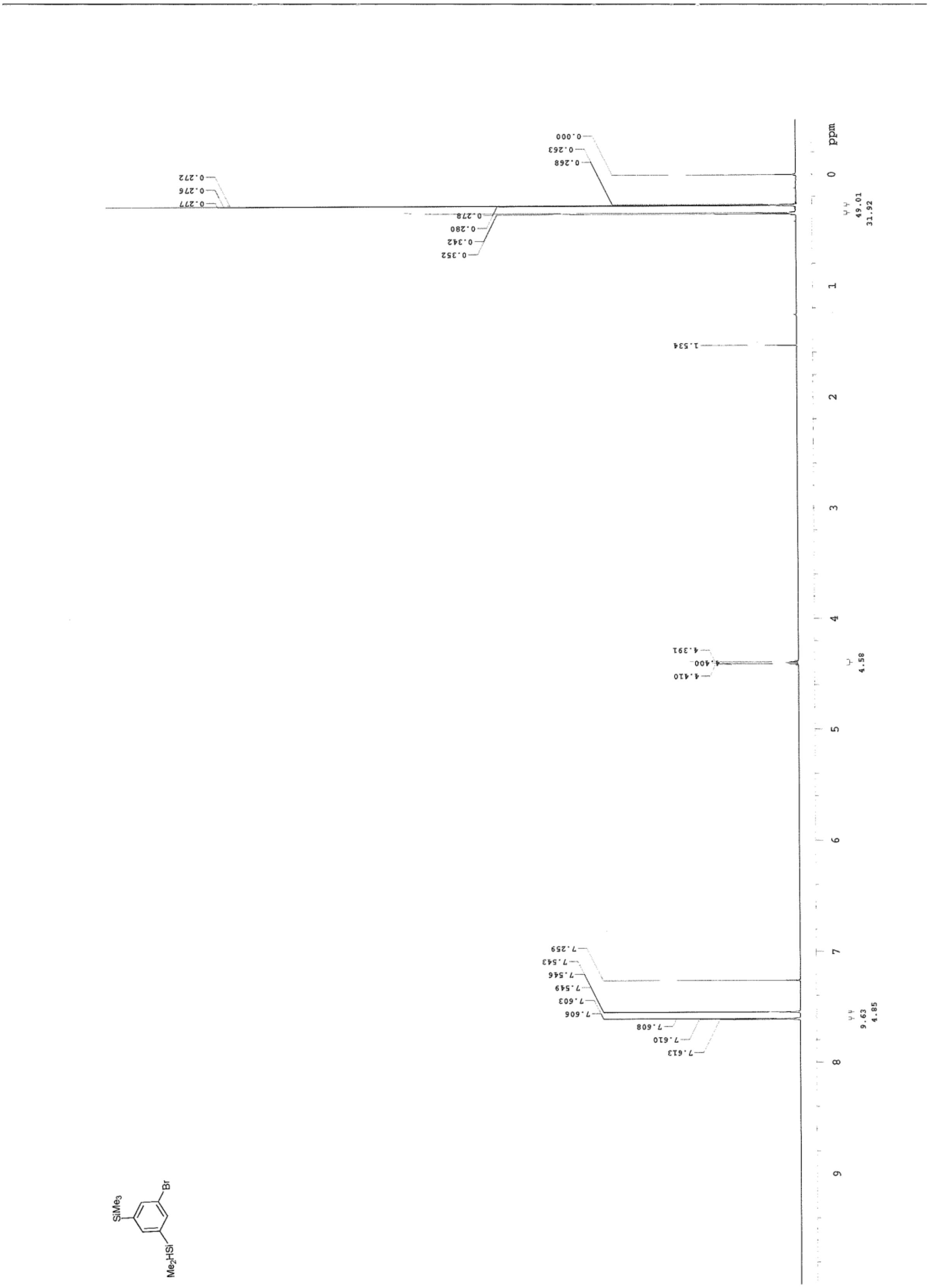

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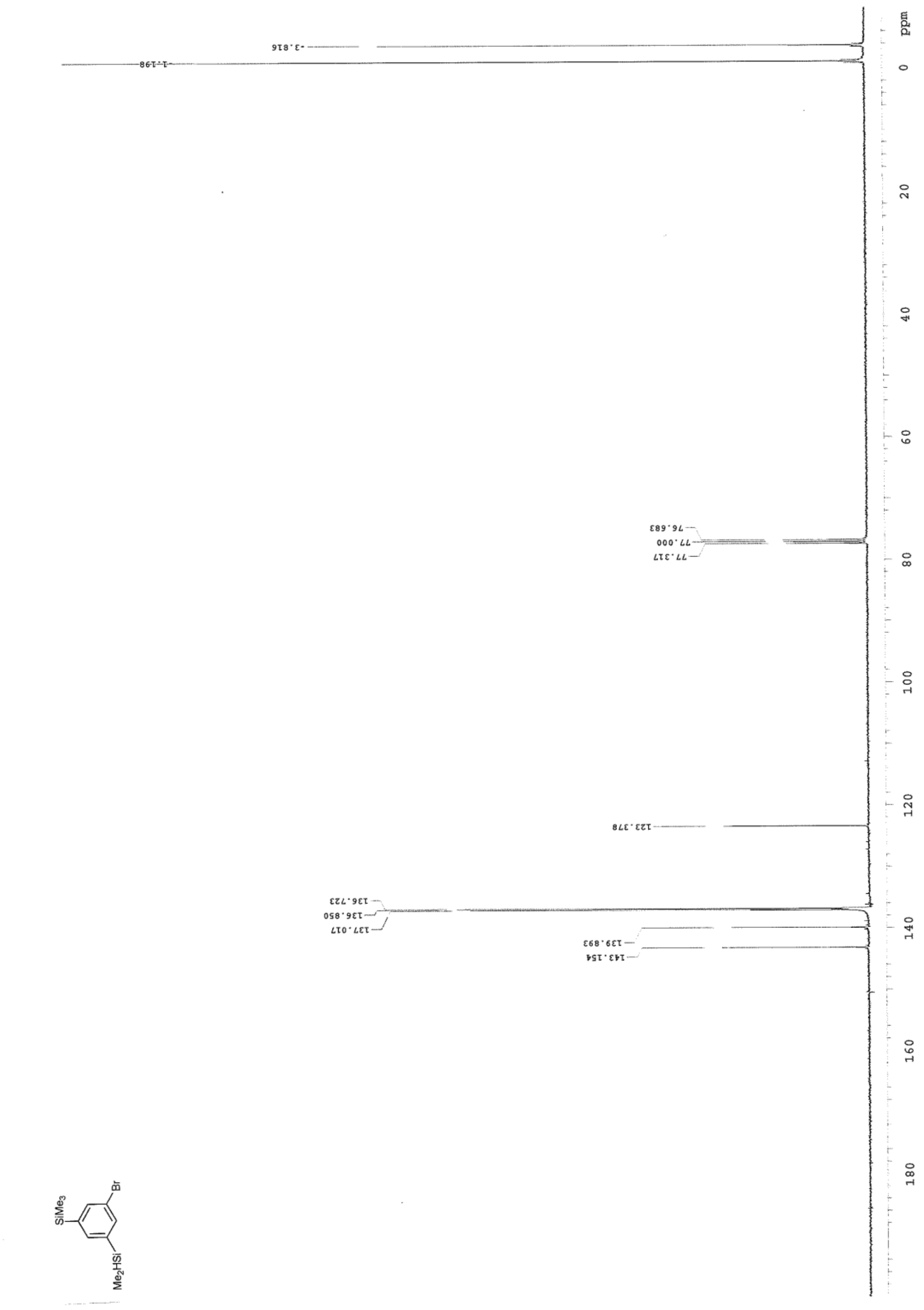

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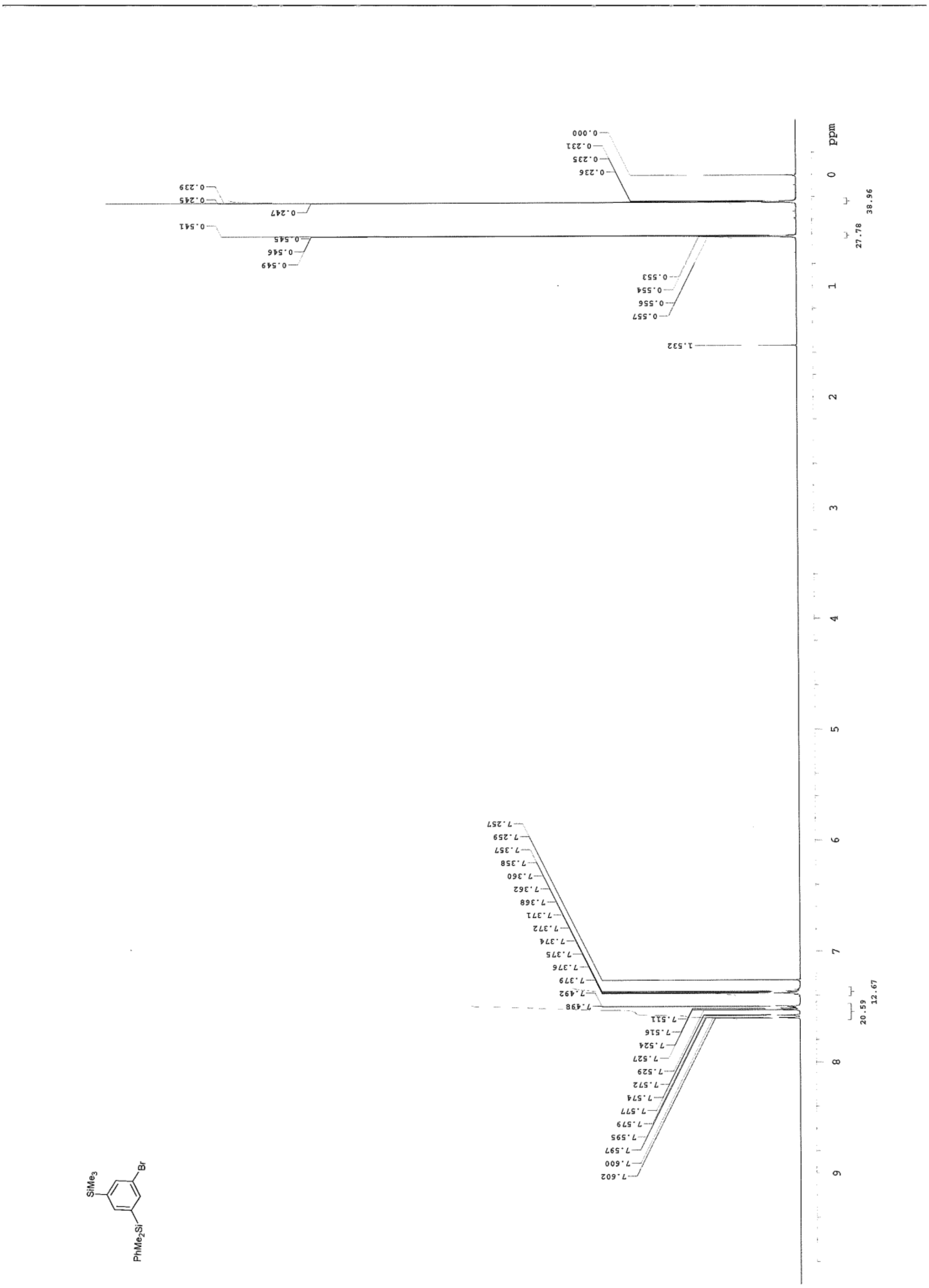

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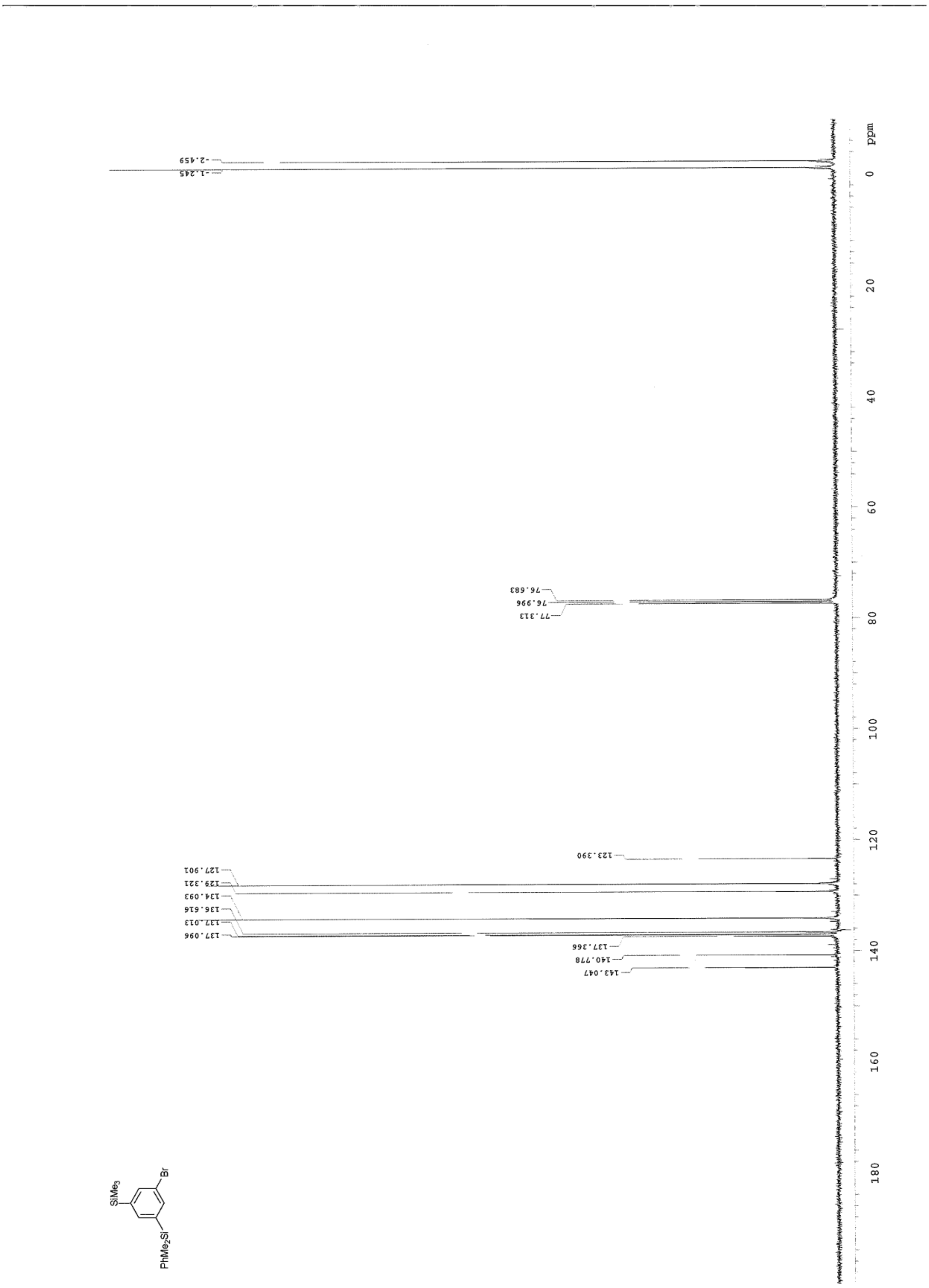

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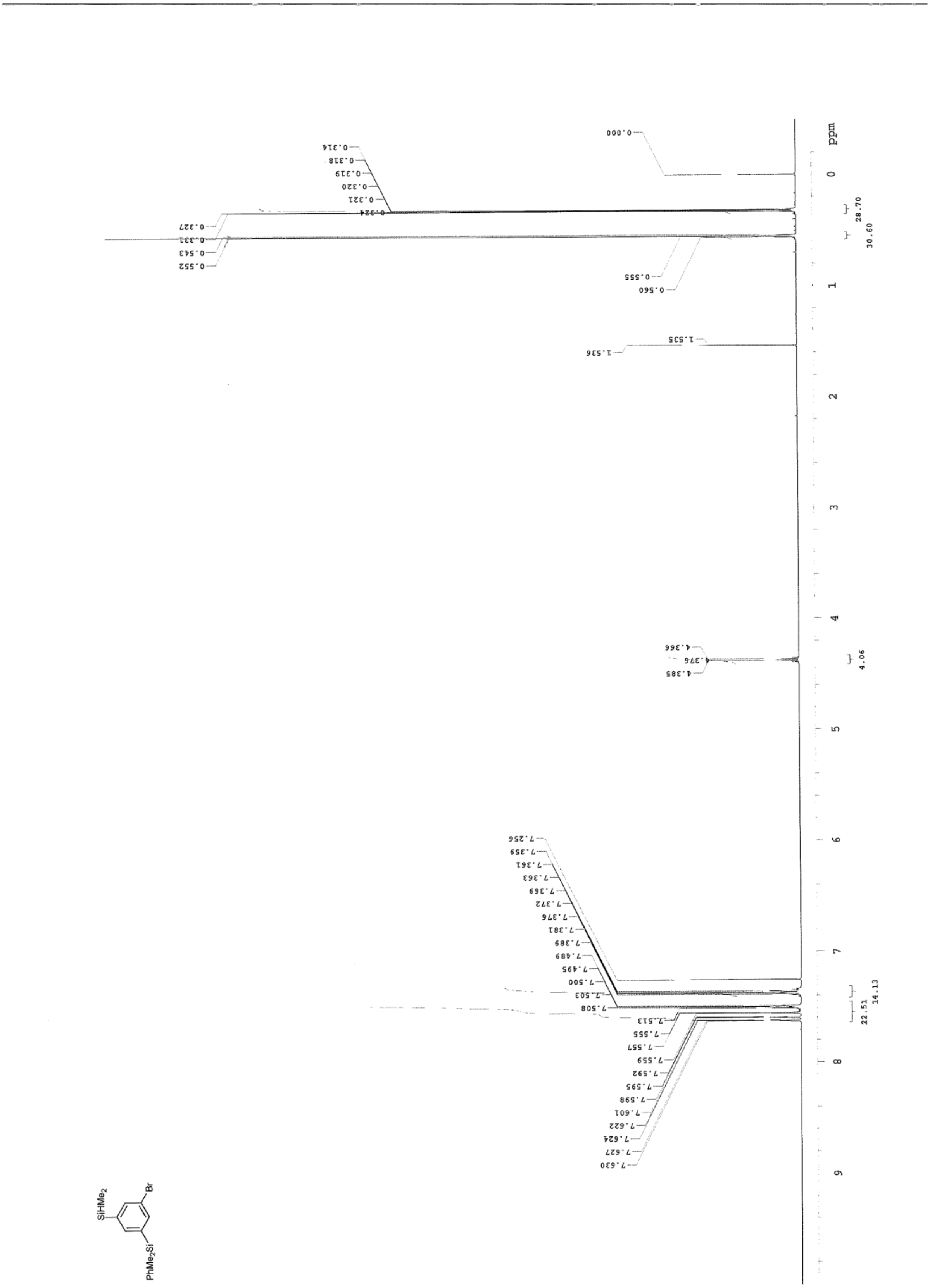

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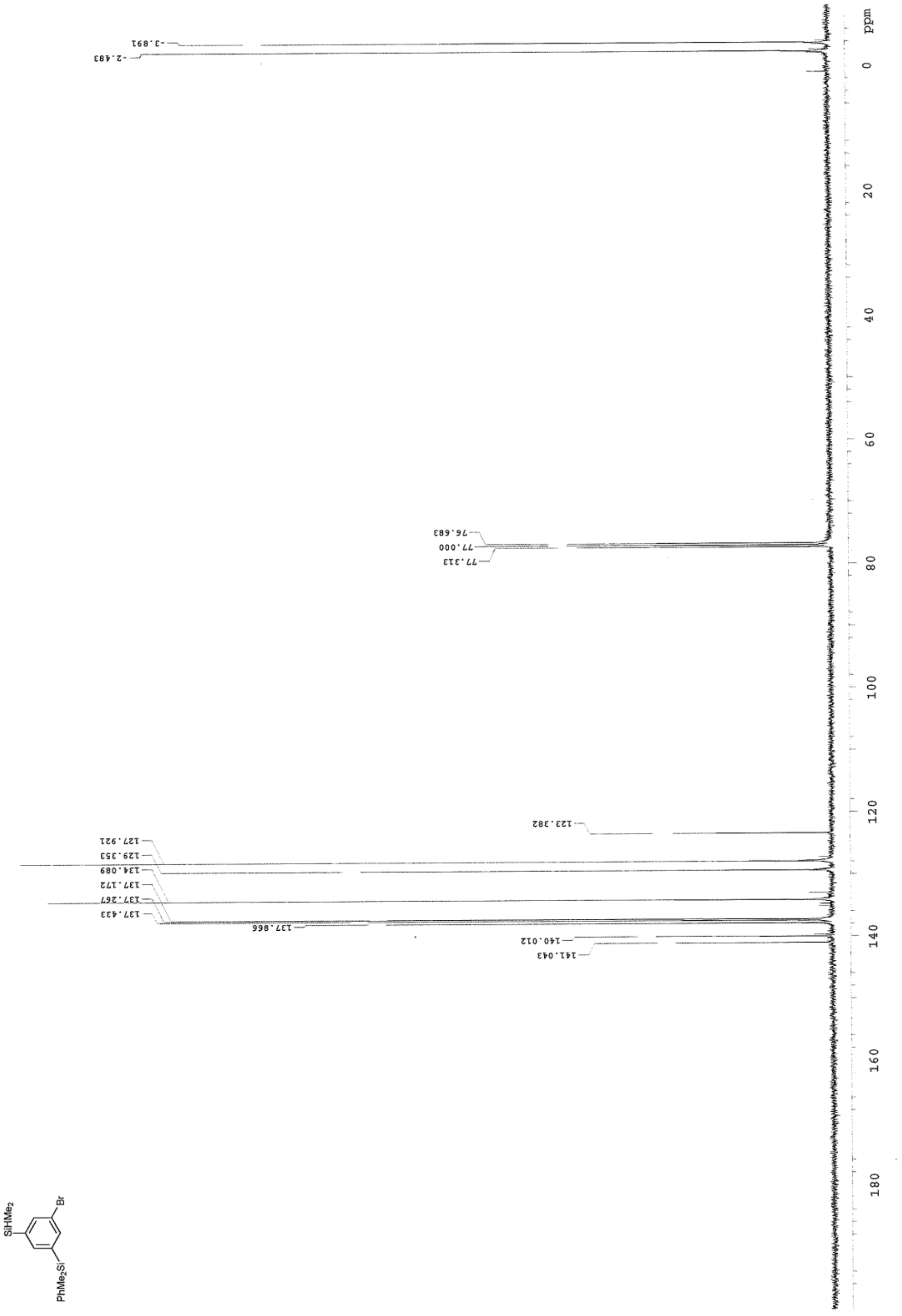

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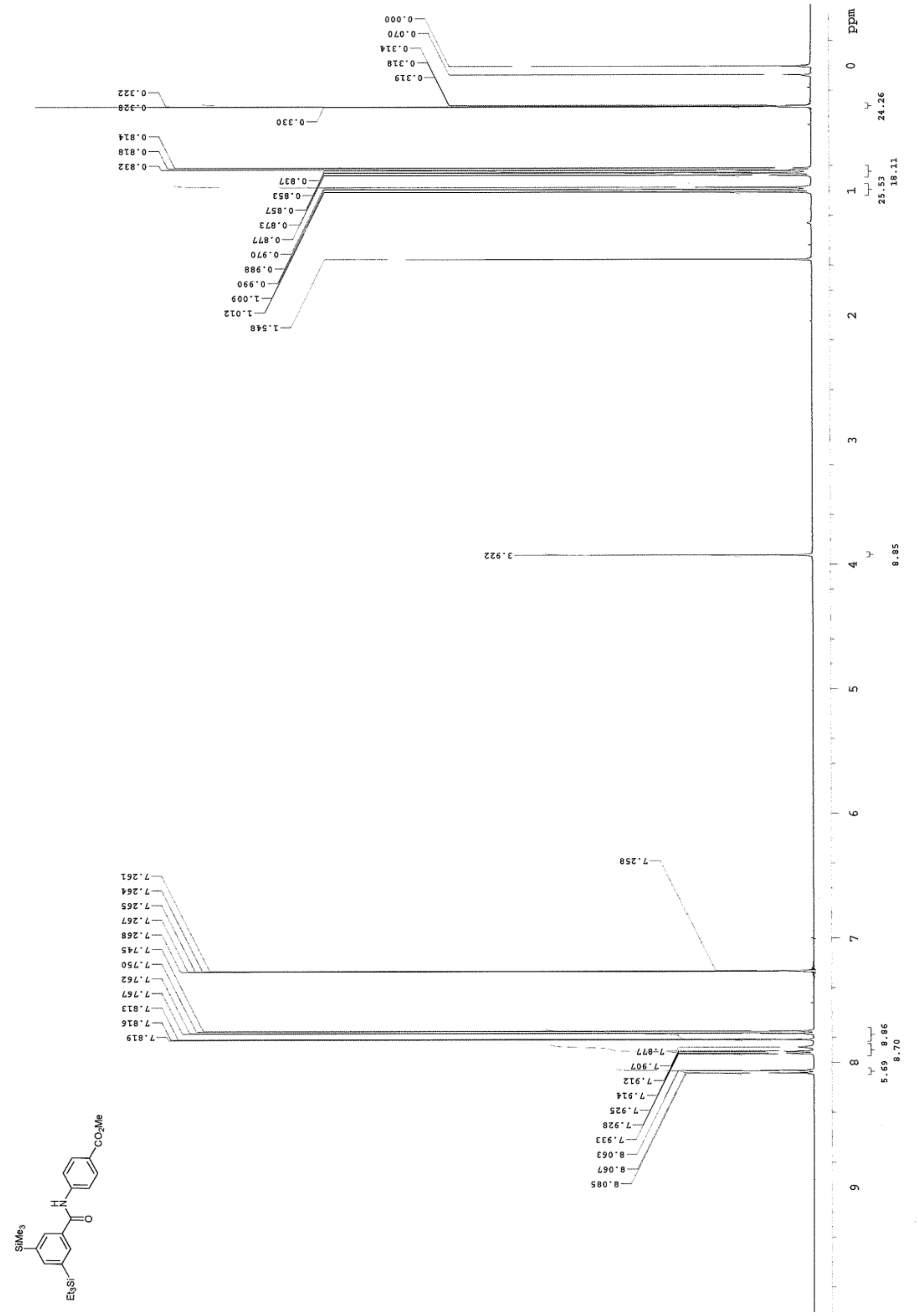
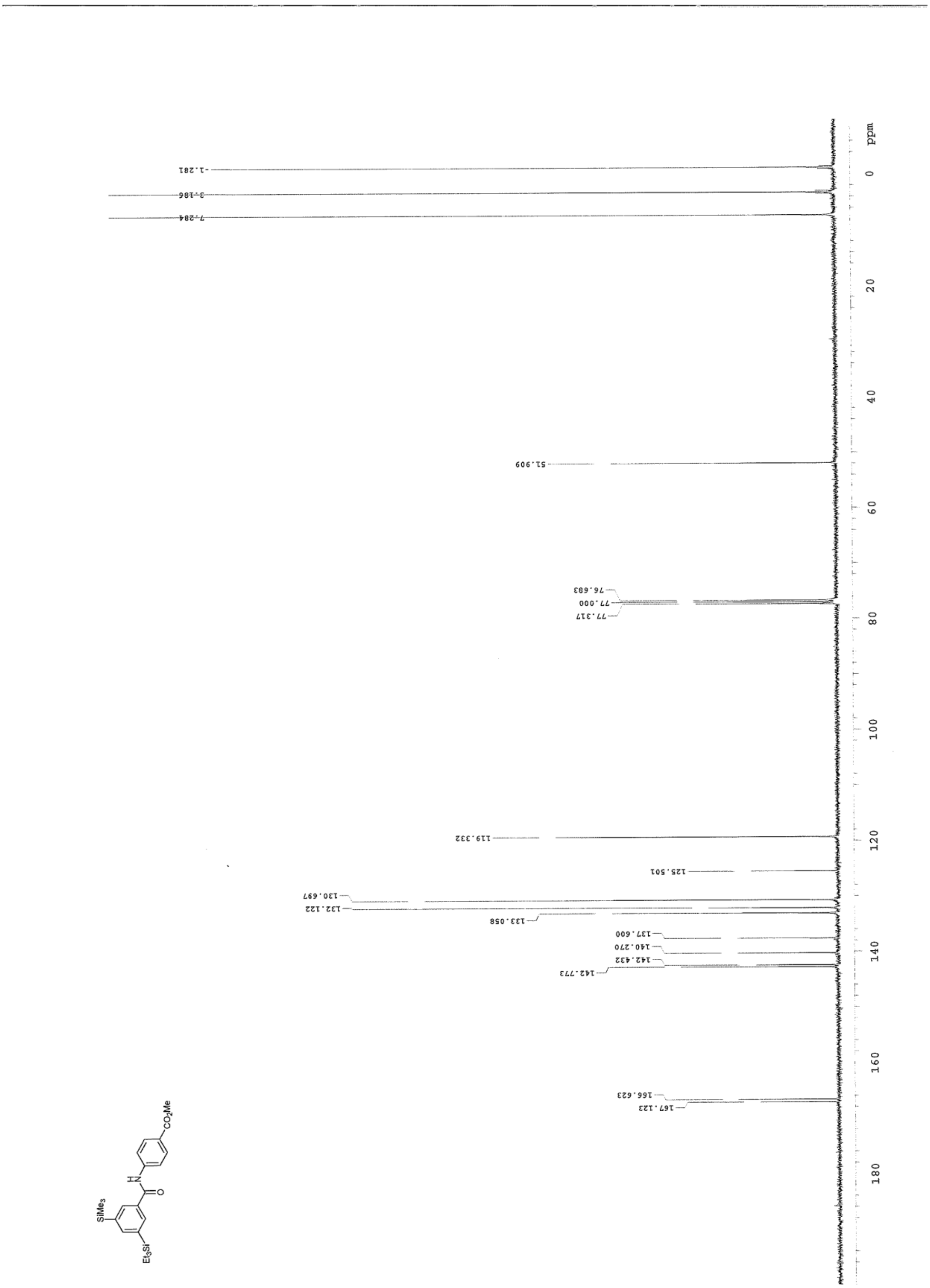


^{1}H NMR spectrum of methyl 4-[3-(triethylsilyl)-5-(trimethylsilyl)benzamido]benzoate.



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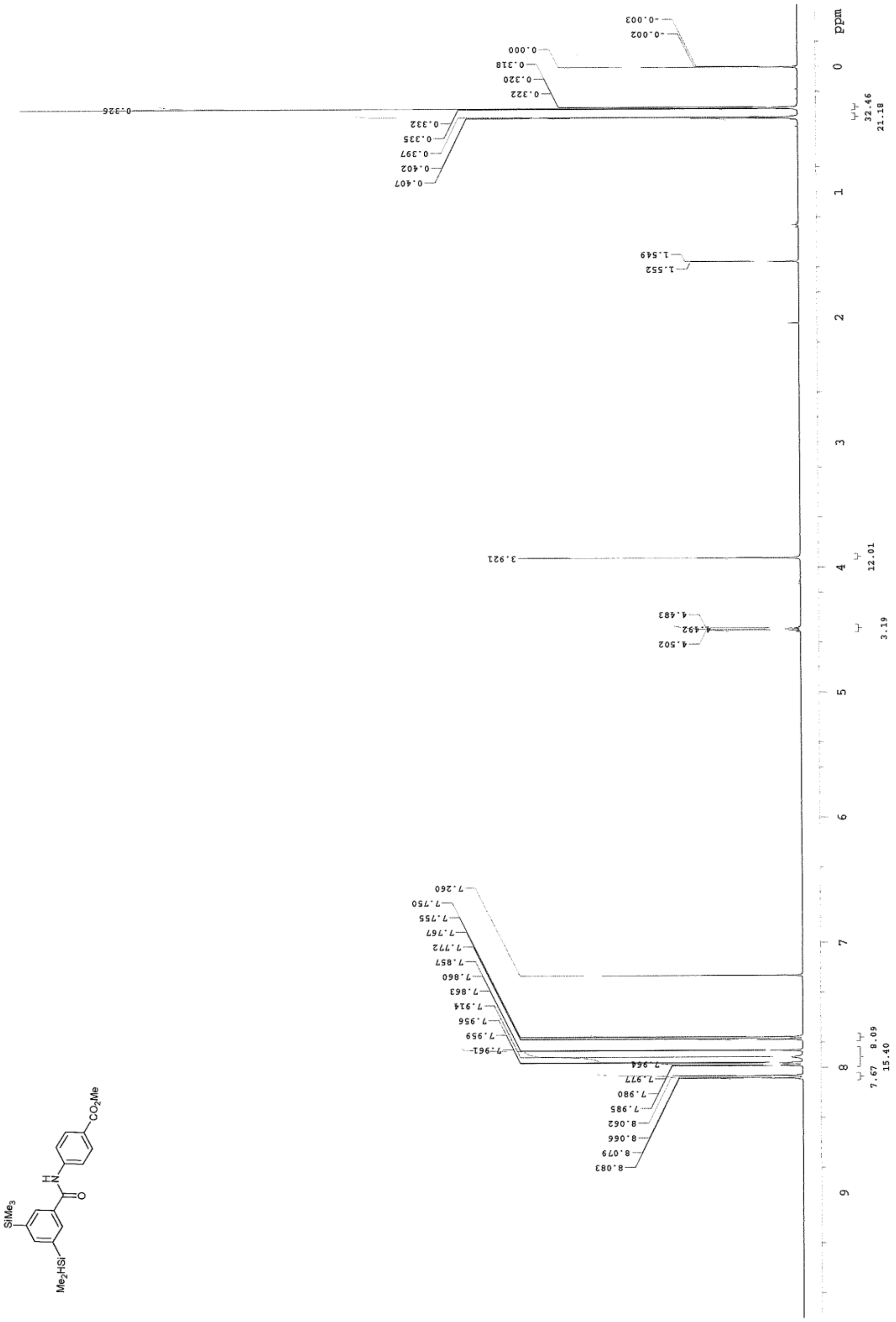

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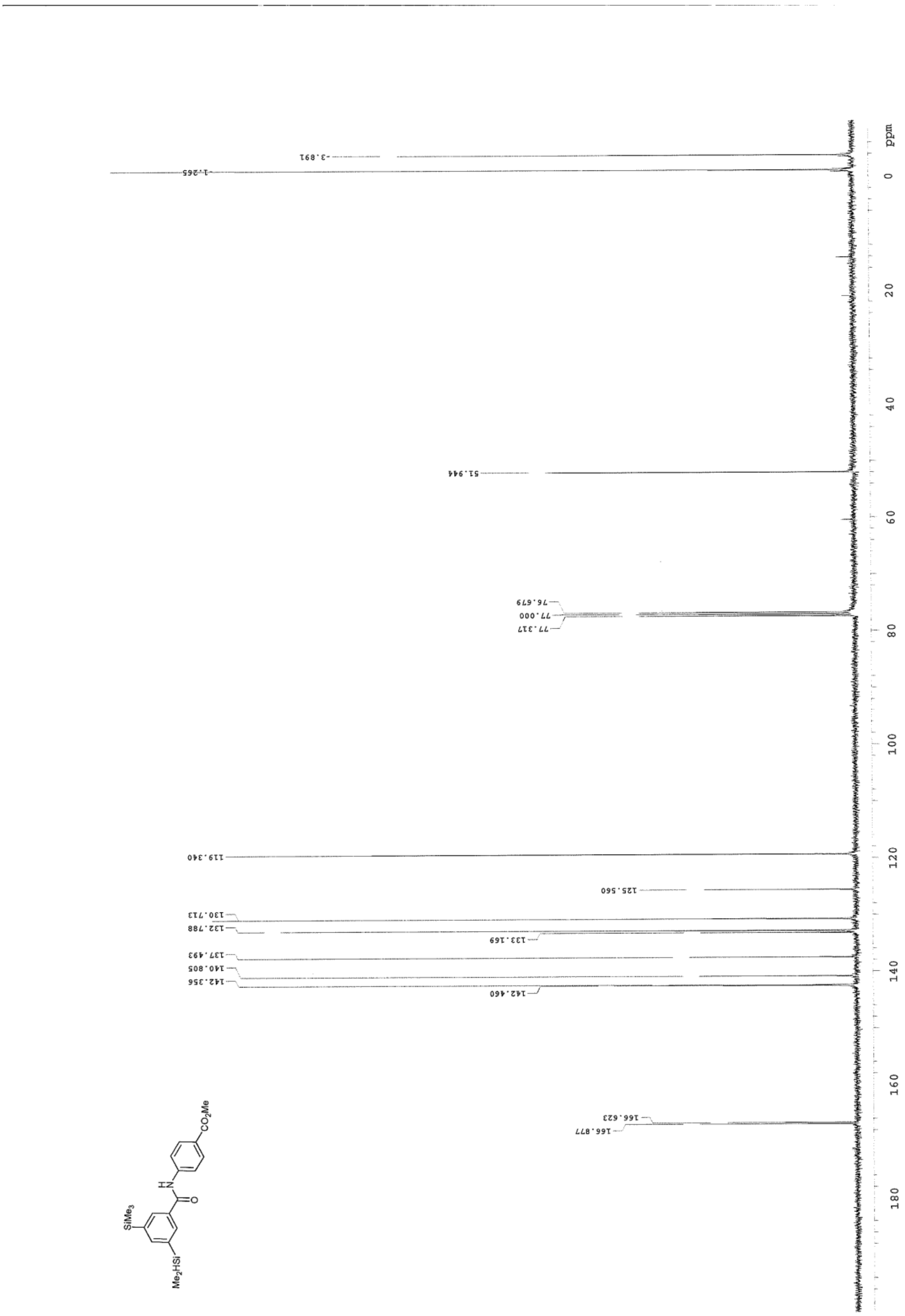

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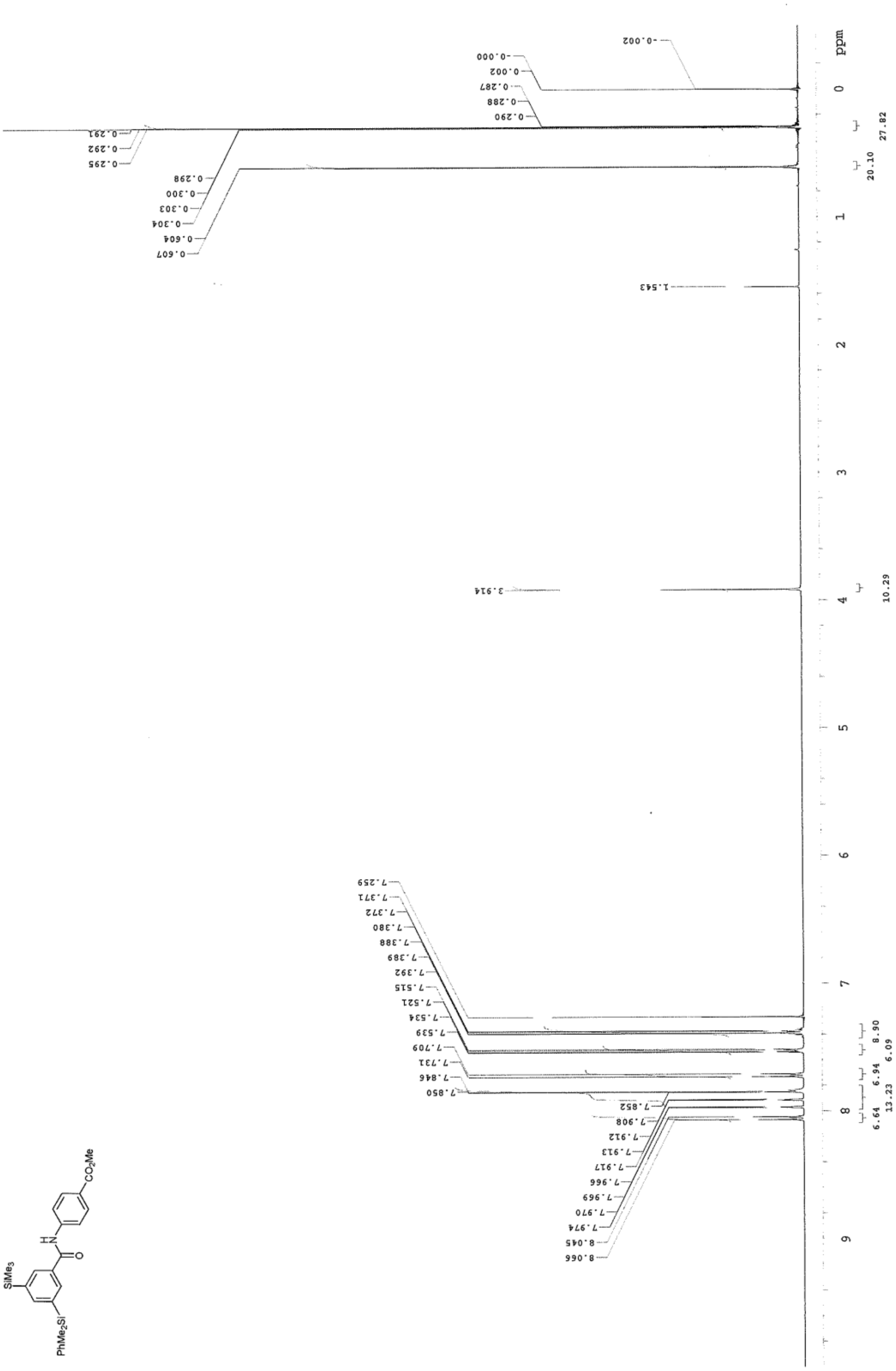

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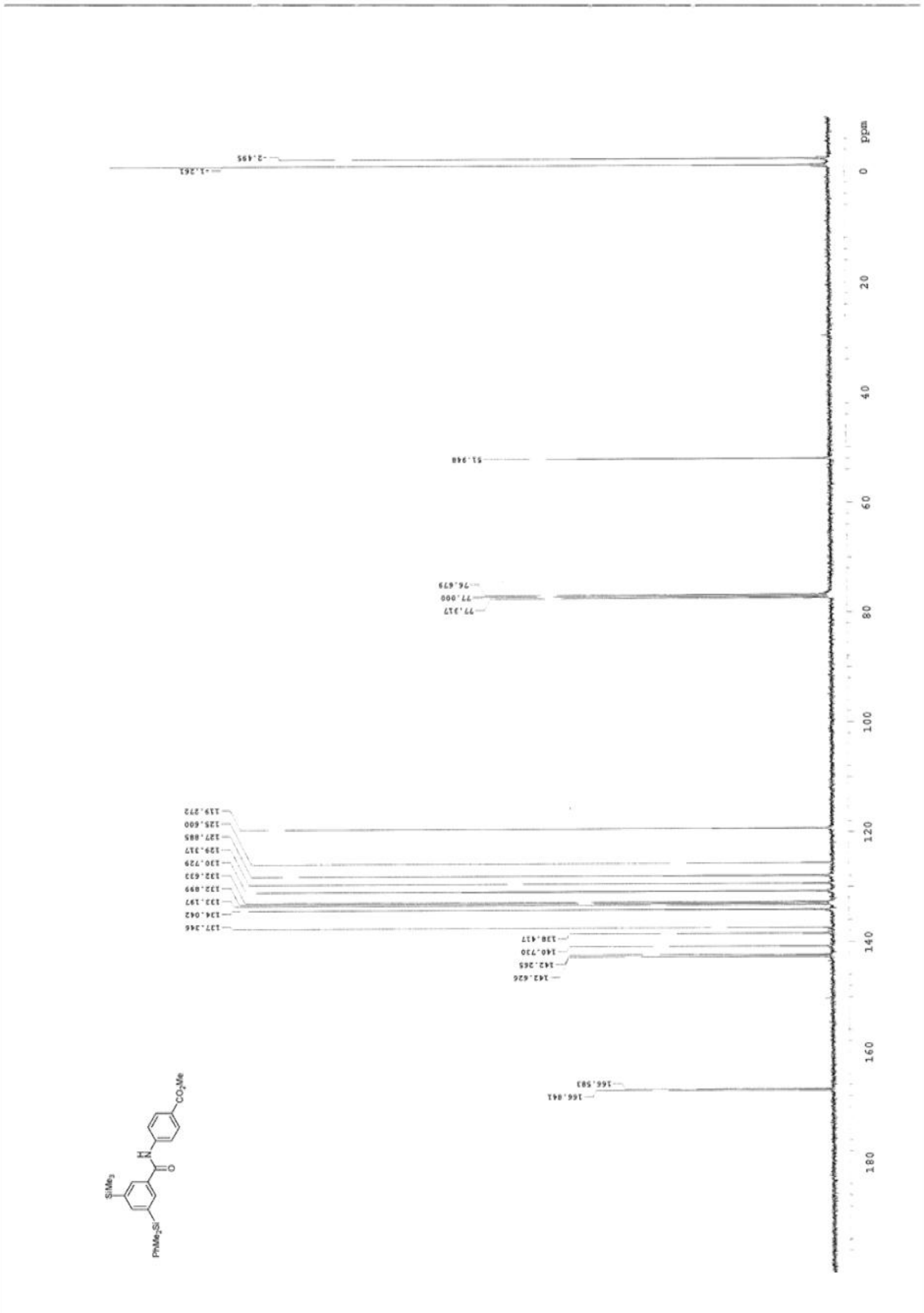

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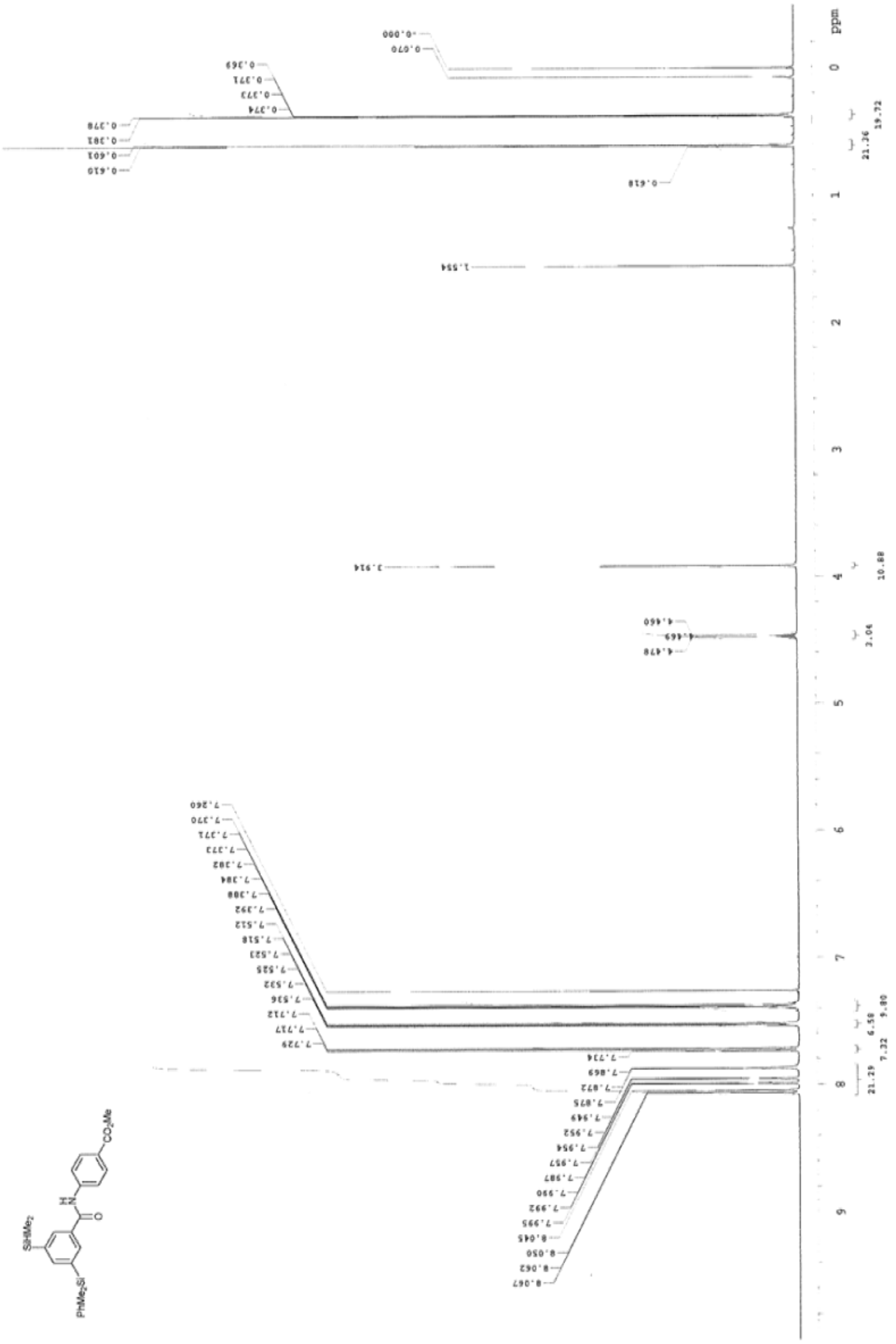

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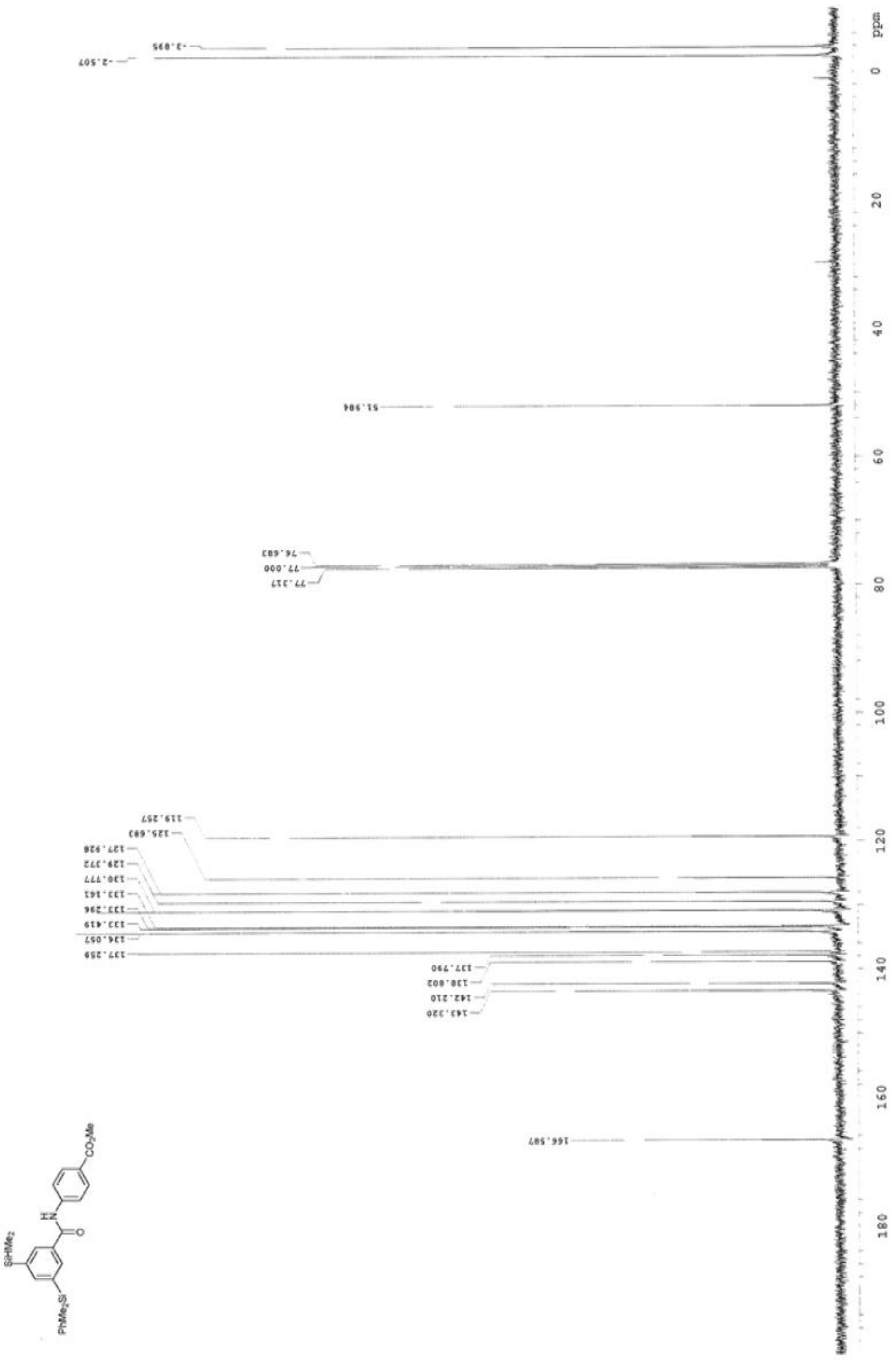

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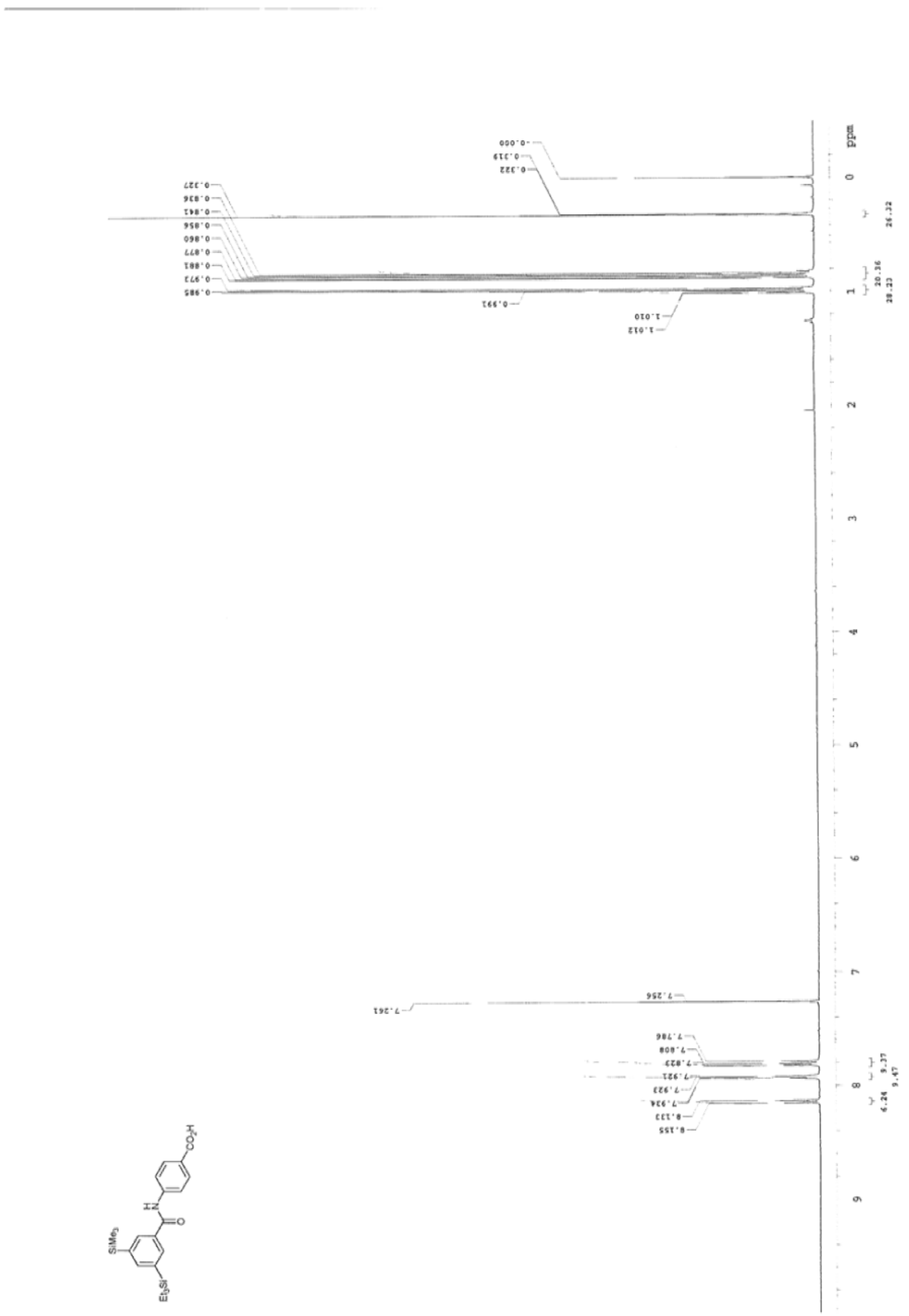

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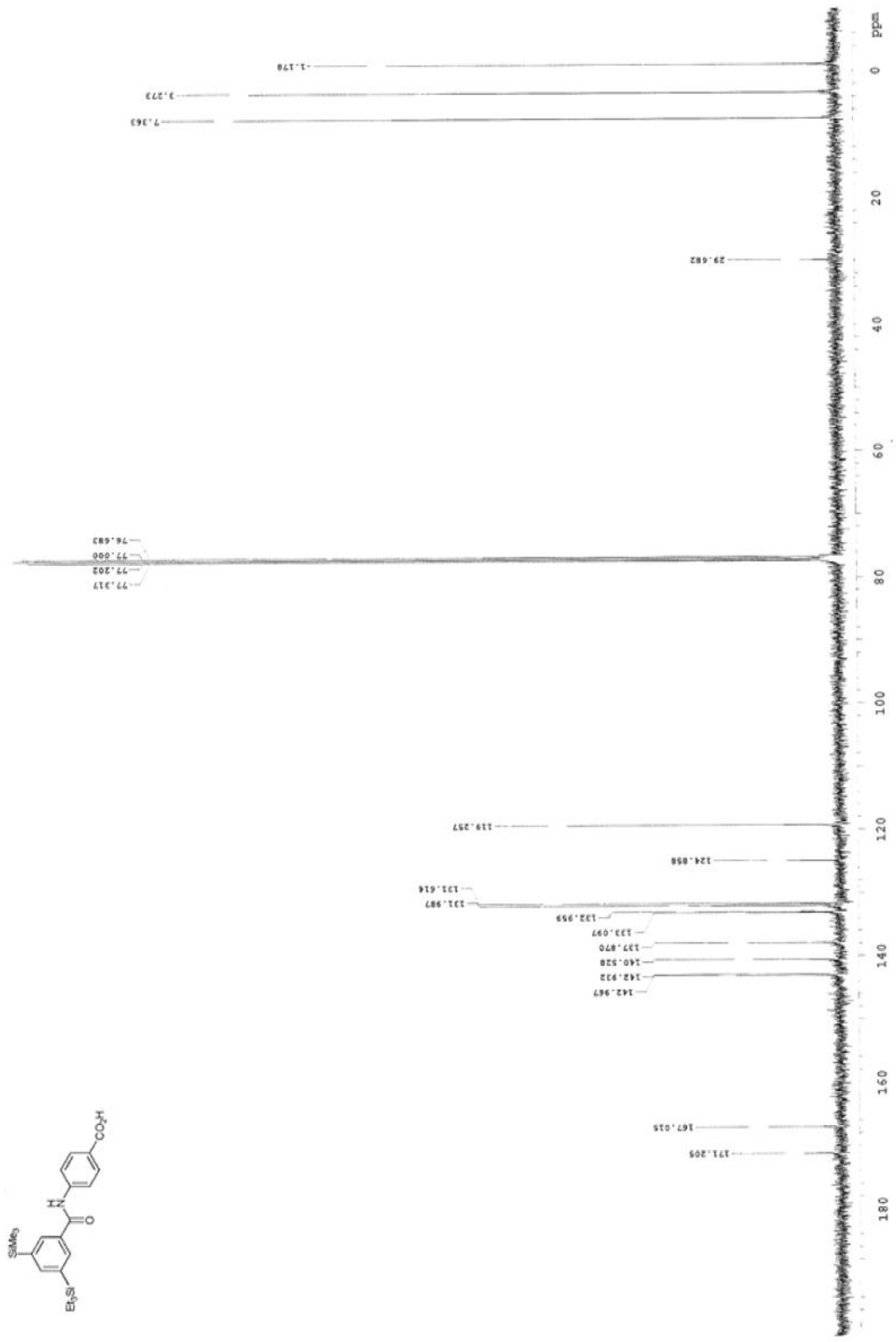

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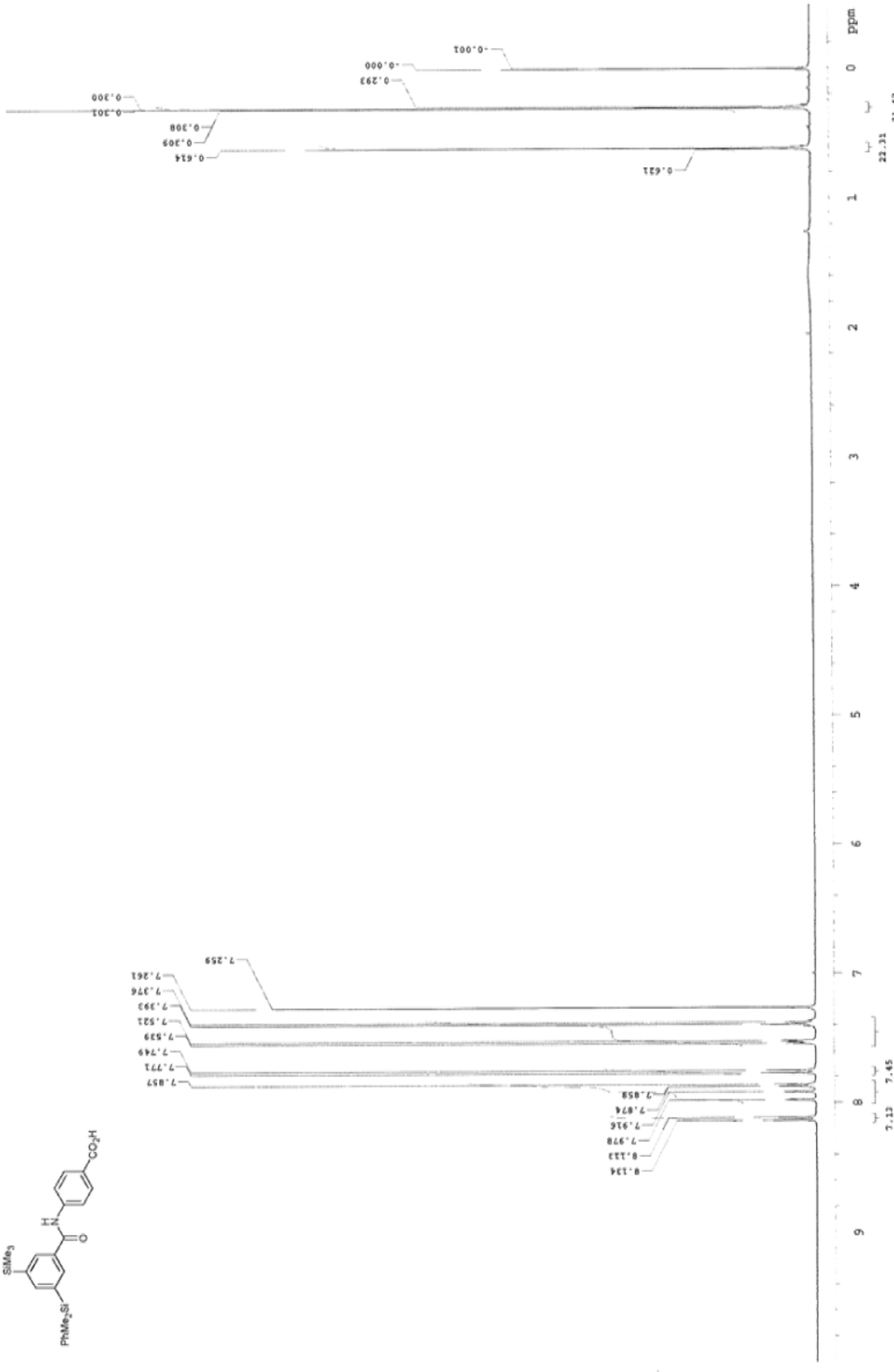

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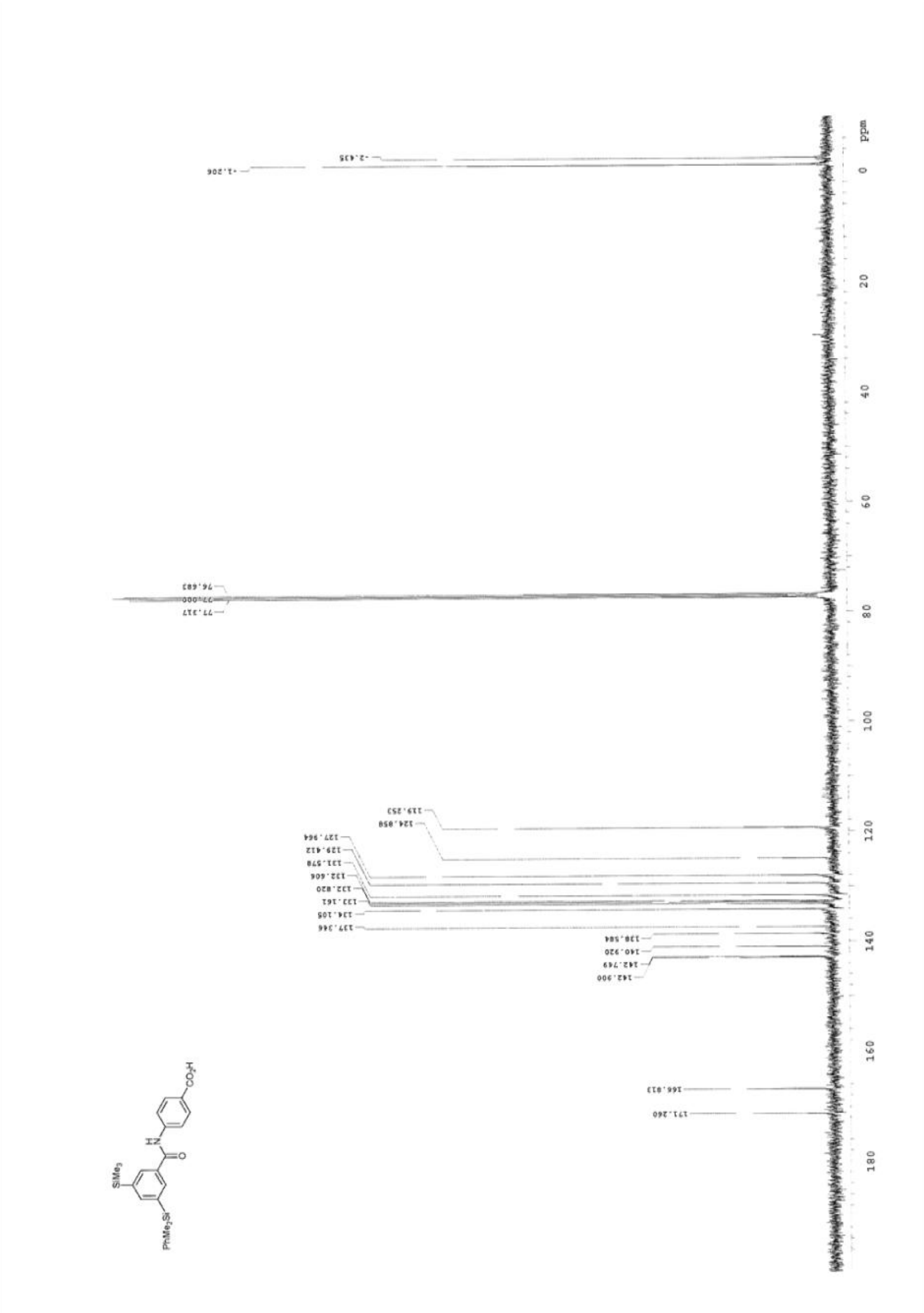

^{13}C NMR spectrum of 4-[3-(dimethylphenylsilyl)-5-(trimethylsilyl)benzamido]benzoic acid.