Supporting Information

Relay Palladium/Copper Catalysis Enabled Silylative [5+1] Benzannulation Using Terminal Alkynes as One-Carbon Units

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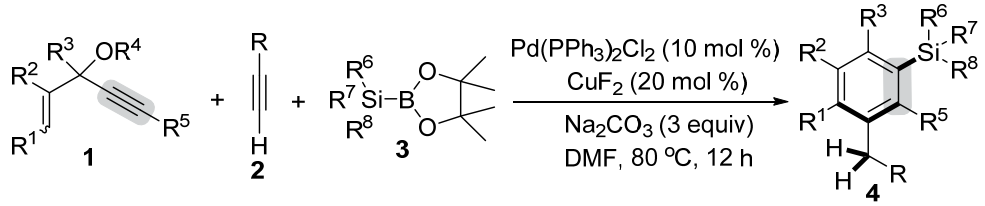
(A) General Information

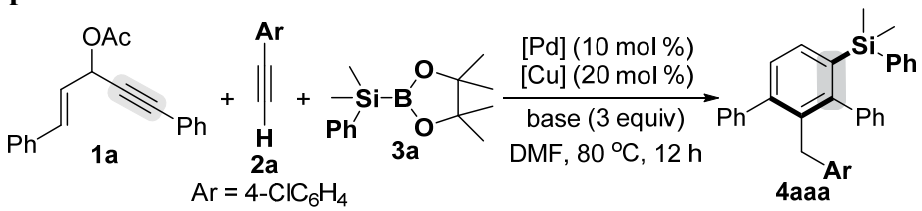
^{1}H NMR and ^{13}C NMR spectra were recorded on a Bruker 400 MHz or 500 MHz advance spectrometer at room temperature in $CDCl_3$ with tetramethylsilane as internal standard. Low-resolution mass spectra (LRMS) data weremeasured on GCMS-QP2010 Ultra. High-resolution mass spectra (HRMS) was recorded on an electrospray ionization (ESI) apparatus using time-of-flight (TOF) mass spectrometry. Melting Point were recorded on Hanon MP100 Apparatus. All products were identified by ^{1}H and ^{13}C NMR, LRMS, HRMS. Unless otherwise noted, all reactions were carried out using standard Schlenk techniques. 3-Acetoxy-1,4-enynes were prepared according to the literature,[1] and the other starting materials and solvents were commercially available and were used without further purification. Columnchromatography was performed on silica gel (300-400 mesh) using petroleum ether/ethyl acetate. The X-ray crystal structure data were collected at room temperature on a Bruker APEX II area detector diffractometer equipped with a graphite-monochromator, using MoKα radiation (λ= 0.71073 Å) and ψ-ω scans.

(a) Typical Experimental Procedure for the Synthesis of Arylsilanes 4:



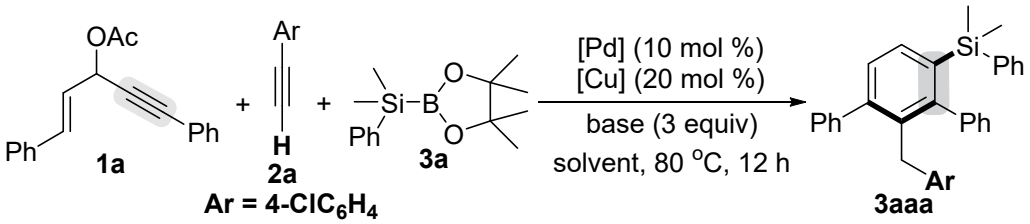
To a Schlenk tube were added 3-Acetoxy-1,4-enynes **1** (0.2 mmol), terminal alkynes **2** (0.3 mmol), silylboranes **3** (0.4 mmol), $Pd(PPh_3)_2Cl_2$ (10 mol %; 0.02 mmol), CuF_2 (20 mol %; 0.04 mmol), Na_2CO_3 (0.6 mmol) and DMF (2 mL). Then the tube was charged with argon, and the mixture was stirred at 80 °C (oil bath temperature) for 12 h until complete consumption of starting material as monitored by TLC and/or GC-MS analysis. After the reaction was finished, the concentrated in vacuum, and the resulting residue was purified by silica gel column chromatography (1% EtOAc/hexanes) to afford the desired products **4.**

(c) Experimental Procedure for the 1 mmol Scale.



To a Schlenk tube were added 1,5-diphenylpent-1-en-4-yn-3-yl acetate **1a** (276.1 mg, 1 mmol), 4-chloro phenylacetylene **2a** (1.5 equiv), silylboranes **3a** (2.0 equiv), $Pd(PPh_3)_2Cl_2$ (10 mol %), CuF_2 (20 mol %), Na_2CO_3 (3 equiv) and DMF (10 mL). Then the tube was charged with argon, and the mixture was stirred at 80 °C (oil bath temperature) for 24 h until complete consumption of starting material as monitored by TLC and/or GC-MS analysis. After the reaction was finished, the concentrated in vacuum, and the resulting residue was purified by silica gel column chromatography (1% EtOAc/hexanes) to afford the desired product **4aaa** in 65% isolated yield (317.3 mg).

(d) Table S1. Screening of optimal reaction conditions[a]

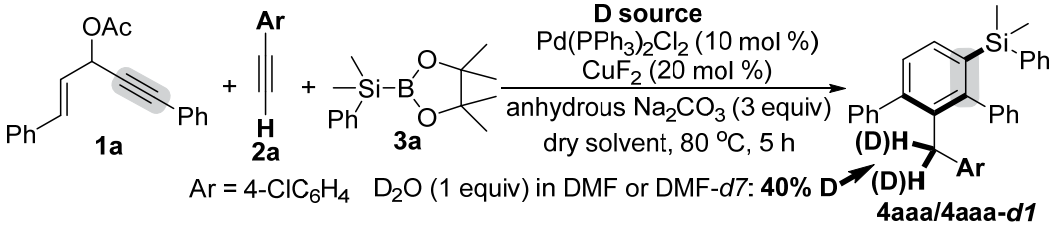


Entry	[Pd] (mol %)	[Cu]	Base	Solvent	T (°C)	Yield (%)[b]
1	$Pd(PPh_3)_2Cl_2$ (10)	CuI	NEt_3	DMF	80	21
2	$PdCl_2$ (10)	CuI	NEt_3	DMF	80	5
3[c]	$PdCl_2$ (10)	CuI	NEt_3	DMF	80	10
4	$Pd(PPh_3)_4$ (10)	CuI	NEt_3	DMF	80	10
5	$Pd(PPh_3)_2Cl_2$ (10)	CuBr	NEt_3	DMF	80	6
6	$Pd(PPh_3)_2Cl_2$ (10)	CuOAc	NEt_3	DMF	80	30
7	$Pd(PPh_3)_2Cl_2$ (10)	$Cu(OAc)_2$	NEt_3	DMF	80	37
8	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	NEt_3	DMF	80	66
9	$Pd(PPh_3)_2Cl_2$ (10)	$Cu(OTf)_2$	NEt_3	DMF	80	trace
10	$Pd(PPh_3)_2Cl_2$ (10)	—	NEt_3	DMF	80	0
11	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	—	DMF	80	trace
12	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	$NaHCO_3$	DMF	80	70
13	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	DMF	80	71
14	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	K_2CO_3	DMF	80	64
15	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Cs_2CO_3	DMF	80	38
16	—	CuF_2	Na_2CO_3	DMF	80	0
17	$Pd(PPh_3)_2Cl_2$ (5)	CuF_2	Na_2CO_3	DMF	80	62
18	$Pd(PPh_3)_2Cl_2$ (15)	CuF_2	Na_2CO_3	DMF	80	66
11[d]	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	DMF	80	40
12[e]	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	DMF	80	58
19	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	dioxane	80	45
20	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	$PhCF_3$	80	49
21	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	DMF	60	43
22	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	DMF	100	68

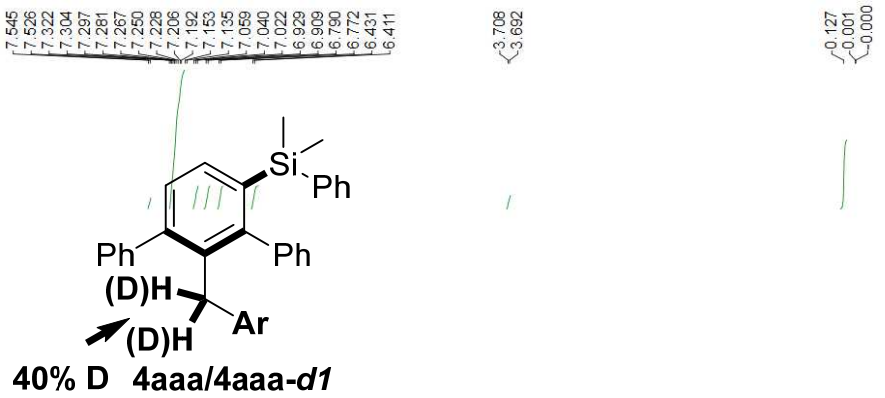
23[f]	$Pd(PPh_3)_2Cl_2$ (10)	CuF_2	Na_2CO_3	DMF	80	65

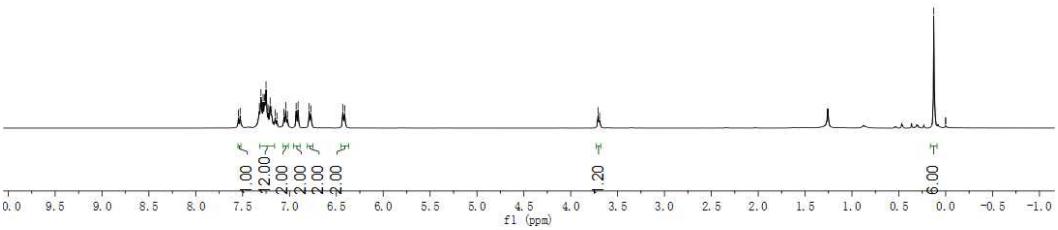
[a] Reaction conditions: **1a** (0.2 mmol), **2a** (1.5 equiv), **3a** (2 equiv), [Pd] (10 mol %), [Cu] (20 mol %), K_2CO_3 (3 equiv), DMF (2 mL), 80 ºC and 12 h. [b] Yield of the isolated product. [c] In the presence or absence of PPh_3 (20 mol%). [d] CuF_2 (10 mol %). [e] CuF_2 (30 mol %). [f] **1a** (1 mmol) and 24 h.

(e) Control Experiments for Mechanistic Study

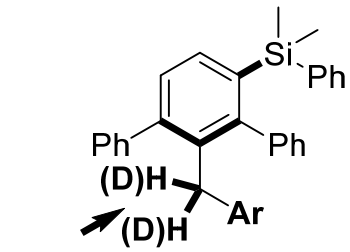


^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.54 (d, *J* = 7.6 Hz, 1H), 7.32-7.19 (m, 12H), 7.04 (t, *J* = 7.6 Hz, 2H), 6.93 (d, *J* = 8.0 Hz, 2H), 6.78 (d, *J* = 7.2 Hz, 2H), 6.42 (d, *J* = 8.0 Hz, 2H), 3.70 (d, *J* = 6.4 Hz, 1.2H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.2, 141.9, 141.4, 140.3 (d, *J* = 5.6 Hz), 139.7, 137.0, 135.3 (d, *J* = 3.2 Hz), 134.0, 133.7, 130.7, 130.3, 129.5, 129.0, 128.7, 128.6, 128.0, 127.6, 127.5, 127.3, 126.9, 35.5, 35.2, -1.14. LRMS (EI, 70 eV) m/z (%): 491 (M^++2, 4), 489 (M^+, 8), 474 (84), 284 (100), 141 (68).

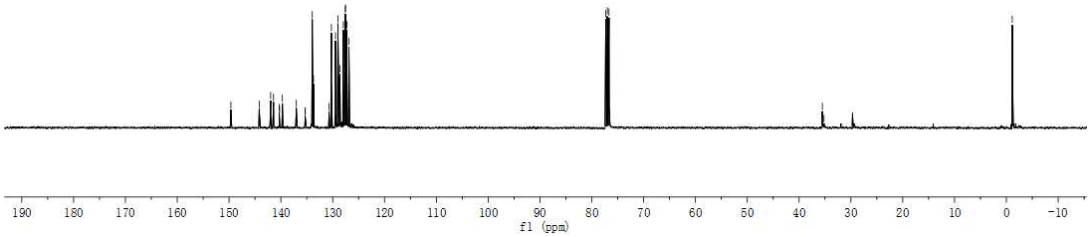




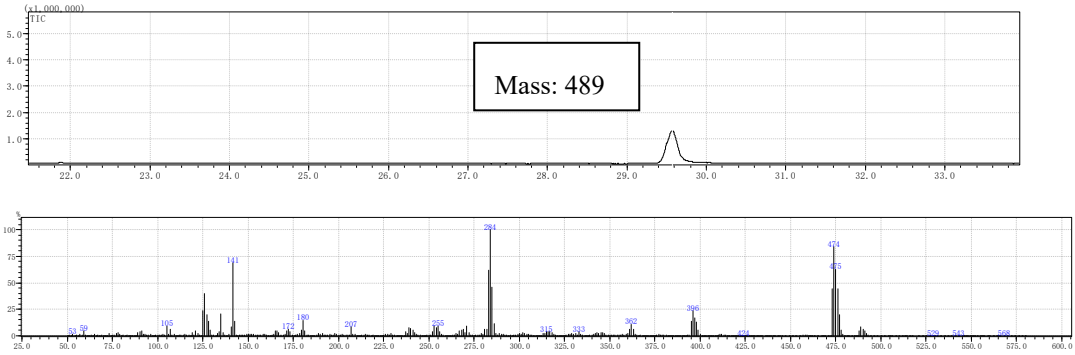
^{1}H NMR (400 MHz, $CDCl_3$)



40% D 4aaa/4aaa-*d1*



^{13}C NMR (100 MHz, $CDCl_3$)



[MS Spectrum]

# of Peaks 484

Raw Spectrum 29.575 (scan : 4316) Base Peak m/z 284.00 (Inten : 99,068)

Background No Background Spectrum

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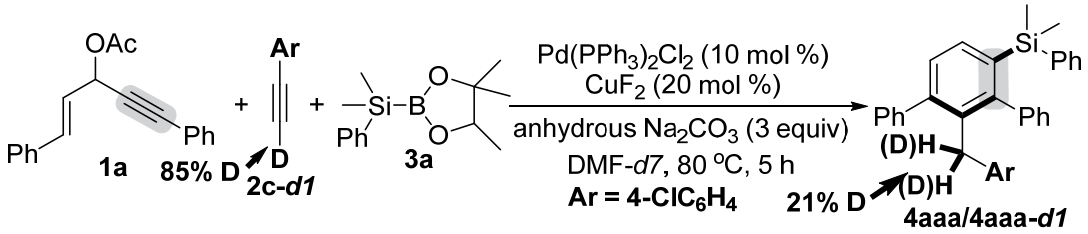
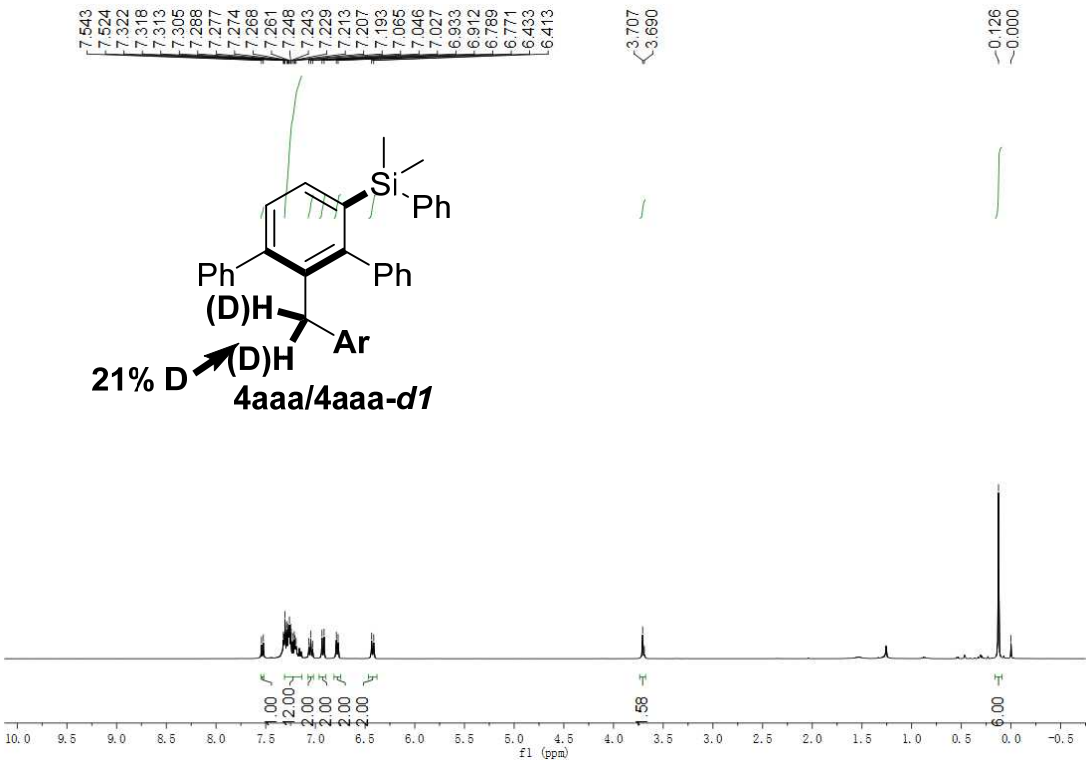
53.05	1572	1.59	78.05	2840	2.87	96.00	1342	1.35
57.10	1500	1.51	79.05	1256	1.27	103.05	1368	1.38
59.10	4828	4.87	89.10	3086	3.12	105.05	8774	8.86
63.10	1074	1.08	90.10	3908	3.94	106.00	1380	1.39
65.05	1213	1.22	91.10	4822	4.87	107.05	6408	6.47
73.10	2063	2.08	92.05	1202	1.21	119.05	3130	3.16
77.05	2218	2.24	93.05	1819	1.84	120.05	1082	1.09

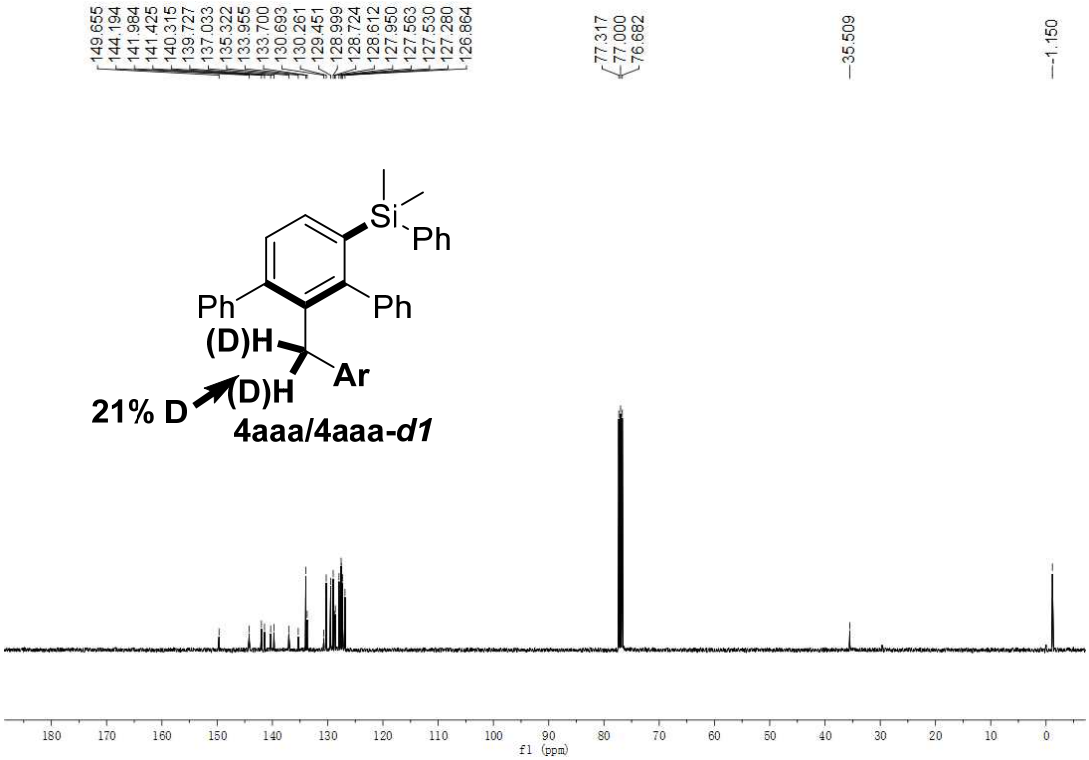
121.05 4887 4.93
122.05 2167 2.19
125.00 23481 23.70
126.05 39030 39.40
127.05 19558 19.74
128.05 13611 13.74
129.05 5098 5.15
133.05 2270 2.29
134.05 3934 3.97
135.05 20124 20.31
136.05 2856 2.88
140.55 8625 8.71
141.45 67979 68.62
142.45 13845 13.98
164.05 1822 1.84
165.05 4798 4.84
166.05 4210 4.25
166.95 2663 2.69
169.35 1028 1.04
170.45 1722 1.74
171.45 4351 4.39
172.40 5918 5.97
173.35 3710 3.74
177.35 1286 1.30
178.45 2500 2.52
179.45 5456 5.51
180.45 14351 14.49
181.35 4561 4.60
207.00 8238 8.32
208.00 1825 1.84
237.00 4022 4.06
237.95 2446 2.47
239.00 7694 7.77
240.00 6916 6.98
241.00 5143 5.19
242.00 2937 2.96
243.00 1353 1.37
252.00 4012 4.05
253.00 8879 8.96
254.00 7334 7.40
255.00 9383 9.47
256.00 3682 3.72
257.00 1388 1.40
265.00 2297 2.32
265.95 1812 1.83
267.00 4766 4.81
268.00 5497 5.55
269.00 5852 5.91
270.00 2678 2.70
271.00 9452 9.54
272.00 2921 2.95
276.00 1110 1.12
277.00 1090 1.10
278.00 799 0.81
279.00 2214 2.23
281.00 5998 6.05
282.00 6191 6.25
283.00 61073 61.65
284.00 99068 100.00
285.00 45578 46.01
286.05 11459 11.57
287.05 2614 2.64
314.05 2332 2.35
315.05 4125 4.16
316.05 3818 3.85
317.00 3410 3.44
318.05 3064 3.09
333.05 3518 3.55
334.05 1676 1.69
341.00 1367 1.38
342.00 1951 1.97
343.00 2706 2.73
344.00 2474 2.50
345.00 2769 2.80
346.05 2889 2.92
347.05 2116 2.14
357.00 1206 1.22
358.00 1108 1.12
359.05 1848 1.87
360.05 2016 2.03
361.05 6284 6.34
362.05 10302 10.40
363.05 5922 5.98
364.05 1846 1.86
377.00 1142 1.15
395.00 13658 13.79
396.00 23438 23.66
397.00 16838 17.00
398.00 12513 12.63
398.95 5397 5.45
472.95 44185 44.60
474.00 83518 84.30
475.00 61810 62.39
476.00 43692 44.10
476.95 19606 19.79
478.00 5401 5.45
478.95 1260 1.27
488.00 4606 4.65
488.95 8376 8.45
490.00 5812 5.87
491.00 4206 4.25
492.00 2076 2.10
493.00 478 0.48
494.00 180 0.18



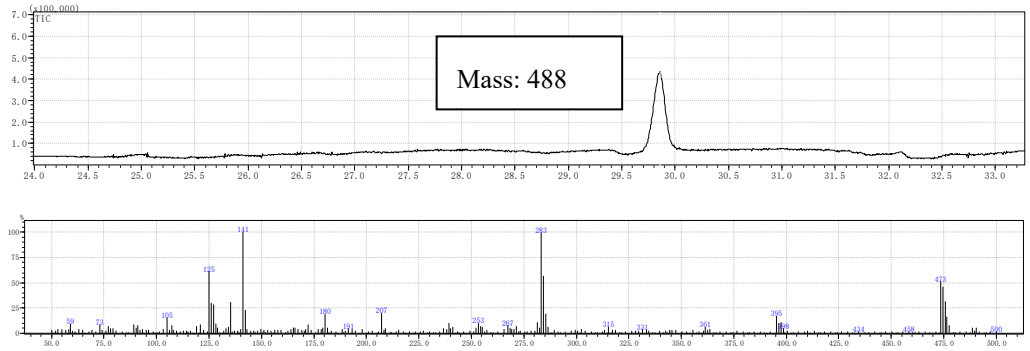
^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.54 (d, *J* = 7.6 Hz, 1H), 7.32-7.21 (m, 12H), 7.05 (t, *J* = 7.6 Hz, 2H), 6.93 (d, *J* = 8.4 Hz, 2H), 6.78 (d, *J* = 7.2 Hz, 2H), 6.42 (d, *J* = 8.0 Hz, 2H), 3.70 (d, *J* = 6.8 Hz, 1.59H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.2, 142.0, 141.4, 140.3, 139.7, 137.0, 135.3, 134.0, 133.7, 130.7, 130.3, 129.5, 129.0, 128.7, 128.6, 128.0, 127.6, 127.5, 127.3, 126.9, 35.5, -1.2；LRMS (EI, 70 eV) m/z (%): 490 (M^++2, 2), 488 (M^+, 1), 474 (52), 396 (24), 283 (99), 141 (100), 126 (39).



^{1}H NMR (400 MHz, $CDCl_3$)



^{13}C NMR (100 MHz, $CDCl_3$)



[MS Spectrum]

# of Peaks 307

Raw Spectrum 29.855 (scan : 4372) Base Peak m/z 141.30 (Inten : 33,486)

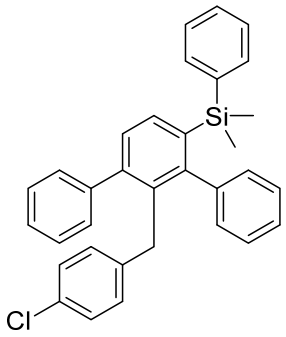
Background No Background Spectrum

m/z	Absolute Intensity	Relative Intensity	m/z	Absolute Intensity	Relative Intensity	m/z	Absolute Intensity	Relative Intensity
50.10	937	2.80	60.05	698	2.08	77.20	2263	6.76
51.80	674	2.01	61.10	537	1.60	78.15	1609	4.80
53.20	1314	3.92	63.05	1285	3.84	79.10	1417	4.23
55.05	1309	3.91	64.80	913	2.73	80.85	830	2.48
56.90	954	2.85	73.10	2884	8.61	83.80	559	1.67
58.15	1241	3.71	74.20	922	2.75	89.05	2732	8.16
59.15	3050	9.11	75.95	811	2.42	90.20	1767	5.28

91.20	2466	7.36	149.60	1215	3.63	253.30	3230	9.65
92.00	977	2.92	156.20	1002	2.99	254.30	2226	6.65
93.25	1152	3.44	158.00	1129	3.37	255.35	2125	6.35
95.15	1147	3.43	159.40	1140	3.40	281.35	3625	10.83
96.35	1049	3.13	161.40	231	0.69	282.30	1762	5.26
103.15	1361	4.06	162.80	734	2.19	283.35	33400	99.74
105.10	5055	15.10	164.15	1237	3.69	284.35	18821	56.21
106.15	1113	3.32	165.15	1756	5.24	285.35	6308	18.84
107.15	2676	7.99	166.10	1863	5.56	286.35	2080	6.21
119.20	2380	7.11	167.30	1162	3.47	299.35	1059	3.16
121.10	2876	8.59	169.15	1017	3.04	313.55	1089	3.25
122.30	1095	3.27	170.35	777	2.32	315.40	2076	6.20
124.15	590	1.76	171.25	1317	3.93	317.20	1006	3.00
125.15	20394	60.90	172.30	2754	8.22	318.50	1039	3.10
126.15	98692	9.47	177.15	1349	4.03	344.30	1089	3.25
127.15	95362	8.48	178.35	1156	3.45	395.50	5514	16.47
128.15	3160	9.44	179.25	1889	5.64	396.45	3376	10.08
129.05	1829	5.46	180.30	6338	18.93	397.45	3673	10.97
132.10	694	2.07	181.25	1665	4.97	398.55	1553	4.64
133.25	1621	4.84	188.35	1365	4.08	473.50	17260	51.54
134.15	2107	6.29	207.25	6645	19.84	474.55	15431	46.08
135.20	10169	30.37	208.20	1082	3.23	475.55	10537	31.47
140.30	1314	3.92	209.25	1481	4.42	476.50	5414	16.17
141.30	33486	100.00	236.70	1486	4.44	477.55	2460	7.35
142.25	7753	23.15	238.15	1192	3.56	**488.65**	**1853**	**5.53**
143.25	1174	3.51	239.35	3216	9.60	**489.60**	**690**	**2.06**
145.00	857	2.56	240.20	1642	4.90	**490.55**	**1861**	**5.56**
146.55	891	2.66	241.30	2071	6.18	492.10	612	1.83
148.20	886	2.65	252.35	1781	5.32			

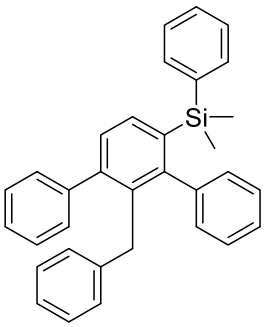
(B) Analytical data

(2'-(4-Chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aaa):



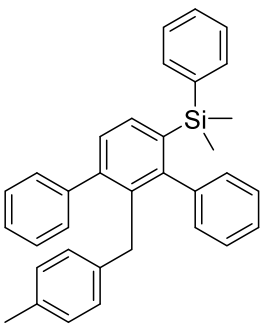
69.3 mg, 71% yield; R_f = 0.3 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.67 (d, *J* = 6.8 Hz, 1H), 7.44-7.34 (m, 11H), 7.29-7.26 (m, 1H), 7.16 (t, *J* = 7.6 Hz, 2H), 7.05 (d, *J* = 7.2 Hz, 2H), 6.91 (d, *J* = 5.6 Hz, 2H), 6.55 (d, *J* = 6.8 Hz, 2H), 3.84 (s, 2H), 0.26 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.6, 144.2, 142.0, 141.4, 140.3, 139.7, 137.0, 135.3, 133.9, 133.7, 130.7, 130.2, 129.4, 129.0, 128.7, 128.6, 127.9, 127.6, 127.5, 127.3, 126.9, 35.5, -1.1; LRMS (EI, 70 eV) m/z (%): 490 (M^++2, 5), 488 (M^+, 11), 473 (100), 395 (29), 283 (99), 141 (60), 125 (37); HRMS *m/z* (ESI) calcd for $C_{33}H_{30}{}^{35}ClSi$ ($[M+H]^+$) 489.1800, found 489.1811.

(2'-Benzyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aba):



52.7 mg, 58% yield; R_f = 0.4 (PE/EA = 100 : 1); White solid; mp 93.6-93.9 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.64 (d, *J* = 7.6 Hz, 1H), 7.45-7.35 (m, 11H), 7.26 (t, *J* = 7.2 Hz, 1H), 7.15 (t, *J* = 7.6 Hz, 2H), 7.08-7.07 (m, 3H), 6.91 (d, *J* = 7.6 Hz, 2H), 6.64-6.62 (m, 2H), 3.88 (s, 2H), 0.24 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.8, 144.3, 142.2, 141.9, 141.6, 139.9, 136.8, 135.8, 134.0, 133.5, 130.3, 129.1, 128.7, 128.5, 128.2, 127.8, 127.5, 127.5, 127.2, 126.7, 126.7, 124.9, 36.1, -1.1; LRMS (EI, 70 eV) m/z (%): 454 (M^+, 16), 439 (100), 361 (34), 283 (62), 91 (34); HRMS *m/z* (ESI) calcd for $C_{33}H_{31}Si$ ($[M+H]^+$) 455.2190, found 455.2197.

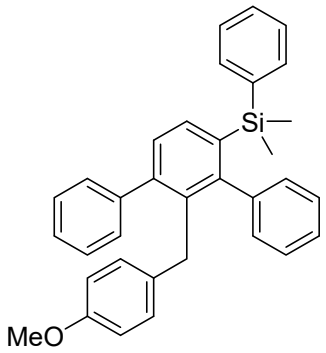
Dimethyl(2'-(4-methylbenzyl)-[1,1':3',1''-terphenyl]-4'-yl)(phenyl)silane (4aca):



58.0 mg, 62% yield; R_f = 0.4 (PE/EA = 100 : 1); White solid; mp 136.6-138.0 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.51 (d, *J* = 7.6 Hz, 1H), 7.34-7.23 (m, 11H), 7.14 (t, *J* = 7.6 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 2H), 6.81-6.76 (m, 4H), 6.40

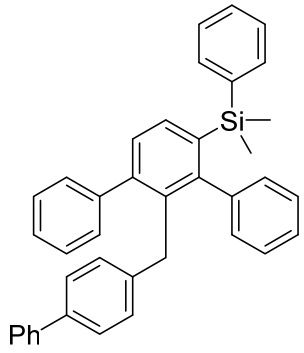
(d, *J* = 7.6 Hz, 2H), 3.71 (s, 2H), 2.19 (s, 3H), 0.12 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.2, 142.2, 141.6, 139.9, 138.7, 136.8, 136.0, 134.2, 134.0, 133.4, 130.4, 129.1, 128.7, 128.5, 128.2, 128.1, 127.8, 127.5, 127.1, 126.7, 126.7, 35.7, 20.9, -1.1; LRMS (EI, 70 eV) m/z (%): 468 (M^+, 13), 453 (62), 283 (100), 141 (15), 105 (19); HRMS *m/z* (ESI) calcd for $C_{34}H_{33}Si$ ($[M+H]^+$) 469.2346, found 469.2353.

(2'-(4-Methoxybenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4ada):



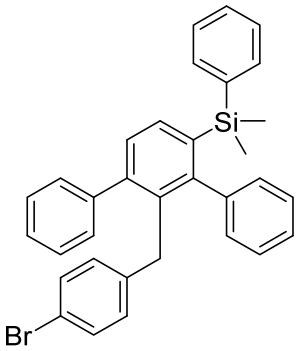
52.3 mg, 54% yield; R_f = 0.2 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.51 (d, *J* = 7.6 Hz, 1H), 7.31-7.24 (m, 10H), 7.15 (t, *J* = 7.2 Hz, 2H), 7.04 (t, *J* = 7.2 Hz, 2H), 6.80 (d, *J* = 7.2 Hz, 2H), 6.52 (d, *J* = 8.0 Hz, 2H), 6.40 (d, *J* = 7.6 Hz, 2H), 3.69 (s, 2H), 3.68 (s, 3H), 0.12 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 157.1, 149.7, 144.2, 142.2, 141.6, 139.9, 136.8, 136.2, 134.0, 134.0, 133.4, 130.3, 129.1, 129.1, 128.7, 128.5, 127.8, 127.5, 127.1, 126.7, 126.7, 113.0, 55.1, 35.1, -1.1; LRMS (EI, 70 eV) m/z (%): 484 (M^+, 43), 469 (35), 361 (20), 283 (100), 121 (16); HRMS *m/z* (ESI) calcd for $C_{34}H_{33}OSi$ ($[M+H]^+$) 485.2295, found 485.2307.

(2'-([1,1'-Biphenyl]-4-ylmethyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aea):



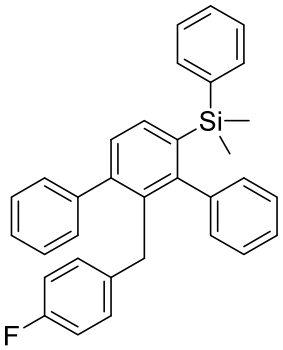
77.4 mg, 73% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 133.2-133.6 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.54 (d, *J* = 7.6 Hz, 1H), 7.49 (d, *J* = 8.0 Hz, 2H), 7.38-7.20 (m, 16H), 7.18-7.13 (m, 1H), 7.03 (t, *J* = 7.6 Hz, 2H), 6.82 (d, *J* = 7.6 Hz, 2H), 6.57 (d, *J* = 7.6 Hz, 2H), 3.80 (s, 2H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.8, 144.3, 142.1, 141.8, 141.1, 139.8, 137.7, 136.9, 135.8, 134.0, 133.5, 130.4, 129.1, 128.7, 128.6, 128.6, 127.9, 127.5, 127.2, 126.8, 126.8, 126.2, 35.8, -1.1; HRMS *m/z* (ESI) calcd for $C_{39}H_{35}Si$ ($[M+H]^+$) 531.2503, found 531.2511.

(2'-(4-Bromobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4afa):



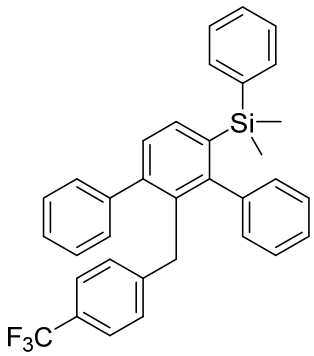
72.4 mg, 68% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 157.5-158.1 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.53 (d, *J* = 7.6 Hz, 1H), 7.30-7.19 (m, 11H), 7.15 (d, *J* = 7.6 Hz, 1H), 7.08-7.03 (m, 4H), 6.78 (d, *J* = 7.2 Hz, 2H), 6.37 (d, *J* = 8.4 Hz, 2H), 3.69 (s, 2H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.6, 144.2, 142.0, 141.4, 140.8, 139.7, 137.0, 135.2, 133.9, 133.7, 130.5, 130.2, 129.9, 129.0, 128.7, 128.6, 128.0, 127.5, 127.3, 126.9, 118.8; 35.6, -1.1; HRMS *m/z* (ESI) calcd for $C_{33}H_{30}{}^{79}BrSi$ ($[M+H]^+$) 533.1295, found 533.1302.

(2'-(4-Fluorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aga):



67.0 mg, 71% yield; R_f = 0.5 (PE/EA = 100 : 1); Yellow solid; mp 92.8-94.3 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.53 (d, *J* = 7.2 Hz, 1H), 7.31-7.14 (m, 12H), 7.06-7.03 (m, 2H), 6.78 (d, *J* = 7.2 Hz, 2H), 6.64 (t, *J* = 8.0 Hz, 2H), 6.44-6.41 (m, 2H), 3.71 (s, 2H), 0.125 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 160.7 (d, *J* = 241.2 Hz), 149.6, 144.2, 142.1, 141.5, 139.8, 137.4, 137.0, 135.7, 134.0, 133.6, 130.3, 129.4 (d, *J* = 7.7 Hz), 129.0, 128.7, 128.6, 127.9, 127.5, 127.2, 126.8, 114.2 (d, *J* = 20.9 Hz), 35.3, -1.1; LRMS (EI, 70 eV) m/z (%): 472 (M^+, 10), 457 (100), 379 (22), 283 (81), 109 (32); HRMS *m/z* (ESI) calcd for $C_{33}H_{30}FSi$ ($[M+H]^+$) 473.2095, found 473.2106.

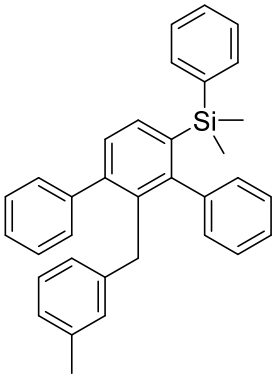
Dimethyl(phenyl)(2'-(4-(trifluoromethyl)benzyl)-[1,1':3',1''-terphenyl]-4'-yl)silane (4aha):



62.6 mg, 60% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 97.1-97.8 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.68 (d, *J* = 6.4 Hz, 1H), 7.44-7.27 (m, 14H), 7.17 (t, *J* = 6.8 Hz, 2H), 6.91 (d, *J* = 6.4 Hz, 2H), 6.73 (d, *J* = 7.2 Hz, 2H), 3.94 (s, 2H), 0.27 (s, 6H); ^{13}C

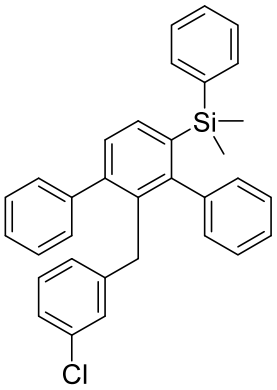
NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 146.0, 144.3, 141.9, 141.4, 139.7, 137.1, 135.0, 134.0, 133.9, 130.2, 129.0, 128.8, 128.6, 128.4, 128.0, 127.6, 127.3, 126.9, 124.4 (q, *J* = 3.7 Hz), 36.1, -1.1; HRMS *m/z* (ESI) calcd for $C_{34}H_{30}F_3Si$ ($[M+H]^+$) 523.2063, found 523.2070.

Dimethyl(2'-(3-methylbenzyl)-[1,1':3',1''-terphenyl]-4'-yl)(phenyl)silane (4aia):



59.0 mg, 63% yield; R_f = 0.6 (PE/EA = 100 : 1); Yellow solid; mp 102.5-102.9 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.53-7.51 (m, 1H), 7.33-7.23 (m, 11H), 7.16-7.12 (m, 1H), 7.02 (t, *J* = 8.0 Hz, 2H), 6.85 (t, *J* = 7.6 Hz, 1H), 6.80-6.75 (m, 3H), 6.34 (d, *J* = 7.6 Hz, 1H), 6.23 (s, 1H), 3.72 (s, 2H), 2.08 (s, 3H), 0.13 (s, 3H), 0.12 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.2, 142.2, 141.7, 141.6, 139.9, 136.8, 136.7, 136.1, 134.0, 133.4, 130.4, 129.2, 129.1, 128.6, 128.5, 127.8, 127.5, 127.3, 127.1, 126.7, 126.6, 125.6, 125.3, 36.0, 21.2, -1.1; LRMS (EI, 70 eV) m/z (%): 468 (M^+, 17), 453 (86), 283 (100), 105 (36); HRMS *m/z* (ESI) calcd for $C_{34}H_{33}Si$ ($[M+H]^+$) 469.2346, found 469.2357.

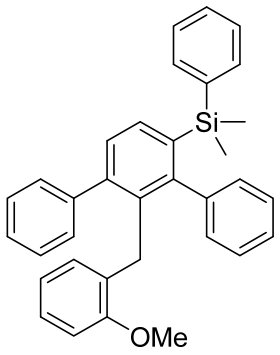
(2'-(3-Chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aja):



61.5 mg, 63% yield; R_f = 0.6 (PE/EA = 100 : 1); Yellow solid; mp 108.3-108.9 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.55-7.51 (m, 2H), 7.33-7.20 (m, 10H), 7.17 (d, *J* = 7.6 Hz, 1H), 7.08-7.04 (m, 2H), 6.93 (d, *J* = 6.8 Hz, 1H), 6.87 (t, *J* = 7.6 Hz, 1H), 6.79 (d, *J* = 8.4 Hz, 2H), 6.43 (s, 1H), 6.40 (d, *J* = 7.2 Hz, 1H), 3.73 (s, 2H), 0.14 (s, 3H), 0.13 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.2, 143.8, 141.9, 141.4, 139.7, 137.0, 135.1, 134.0, 133.8, 133.3, 130.3, 129.0, 128.7, 128.7, 128.6, 128.3, 128.0, 127.5, 127.3, 126.9, 126.4, 125.2, 35.8, -1.1; LRMS (EI, 70 eV) m/z (%): 490 (M^++2, 4), 488 (M^+, 9), 473 (100), 395 (35), 283 (44), 141 (35),

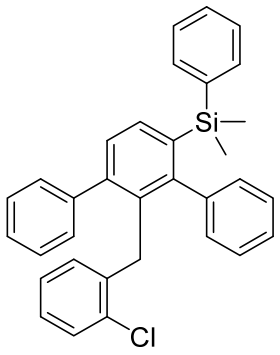
125 (20); HRMS *m/z* (ESI) calcd for $C_{33}H_{30}{}^{35}ClSi$ ($[M+H]^+$) 489.1800, found 489.1809.

(2'-(2-Methoxybenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aka):



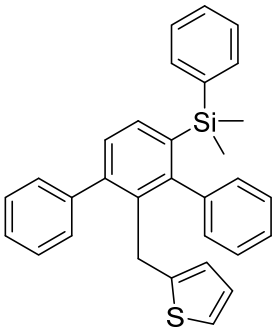
53.2 mg, 55% yield; R_f = 0.6 (PE/EA = 100 : 1); White solid; mp 100.5-101.6 °C (uncorrected); ^{1}H NMR (500 MHz, $CDCl_3$) δ: (ppm) 7.52 (d, *J* = 8.0 Hz, 1H), 7.35-7.21 (m, 11H), 7.11 (t, *J* = 7.5 Hz, 1H), 7.0-6.96 (m, 3H), 6.78 (d, *J* = 7.5 Hz, 2H), 6.71 (t, *J* = 7.5 Hz, 1H), 6.65 (d, *J* = 7.0 Hz, 1H), 6.47 (d, *J* = 8.0 Hz, 1H), 3.68 (s, 2H), 3.39 (s, 3H), 0.12 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: (ppm) 156.4, 149.9, 144.4, 142.0, 141.5, 139.9, 136.6, 136.1, 134.0, 133.3, 130.7, 130.2, 129.5, 128.9, 128.5, 127.7, 127.5, 126.9, 126.5, 126.5, 126.0, 119.8, 109.4, 55.0, 29.3, -1.2; LRMS (EI, 70 eV) m/z (%): 484 (M^+, 14), 469 (16), 283 (22), 121 (100); HRMS *m/z* (ESI) calcd for $C_{34}H_{33}OSi$ ($[M+H]^+$) 485.2295, found 485.2301.

(2'-(2-Chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4ala):



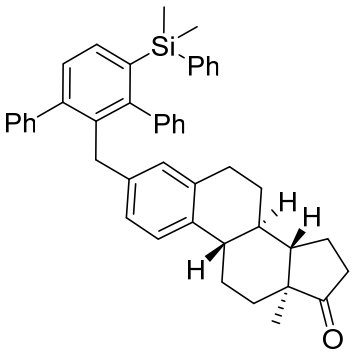
68.3 mg, 70% yield; R_f = 0.6 (PE/EA = 100 : 1); White solid; mp 144.8-145.7 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.56 (d, *J* = 7.6 Hz, 1H), 7.34-7.18 (m, 11H), 7.14 (t, *J* = 7.2 Hz, 1H), 7.02-6.99 (m, 4H), 6.95-6.92 (m, 1H), 6.77-6.72 (m, 3H), 3.78 (s, 2H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.9, 144.4, 141.7, 141.2, 139.8, 139.5, 137.0, 134.9, 134.0, 133.8, 133.5, 130.0, 130.0 128.8, 128.7, 128.6, 128.4, 127.9, 127.5, 127.2, 126.9, 126.4, 125.9, 33.6, -1.2; LRMS (EI, 70 eV) m/z (%): 490 (M^++2, 5), 488 (M^+, 12), 473 (100), 359 (32), 283 (63), 141 (47), 125 (27); HRMS *m/z* (ESI) calcd for $C_{33}H_{30}{}^{35}ClSi$ ($[M+H]^+$) 489.1800, found 489.1805.

Dimethyl(phenyl)(2'-(thiophen-2-ylmethyl)-[1,1':3',1''-terphenyl]-4'-yl)silane (4ama):



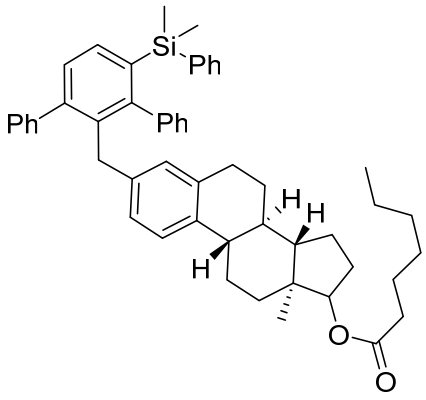
68.1 mg, 74% yield; R_f = 0.6 (PE/EA = 100 : 1); Yellow solid; mp 137.7-138.8 ºC (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.52 (d, *J* = 7.6 Hz, 1H), 7.31-7.17 (m, 12H), 7.09 (t, *J* = 7.6 Hz, 2H), 6.88 (d, *J* = 6.4 Hz, 3H), 6.64-6.61 (m, 1H), 6.05 (s, 1H), 3.85 (s, 2H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.3, 145.0, 143.9, 141.8, 141.3, 139.8, 136.9, 135.6, 134.0, 133.7, 130.3, 129.1, 128.8, 128.6, 127.9, 127.5, 127.2, 126.9, 125.9, 124.6, 122.7, 30.9, -1.1; LRMS (EI, 70 eV) m/z (%): 460 (M^+, 24), 445 (59), 361 (20), 283 (100), 97 (22); HRMS *m/z* (ESI) calcd for $C_{31}H_{29}SSi$ ($[M+H]^+$) 461.1754, found 461.1761.

(8R,9S,13S,14S)-3-((4'-(Dimethyl(phenyl)silyl)-[1,1':3',1''-terphenyl]-2'-yl)methyl)-13-methyl-6,7,8,9,11,12,13,14,15,16-decahydro-17H-cyclopenta[a]phenanthren-17-one (4aoa):



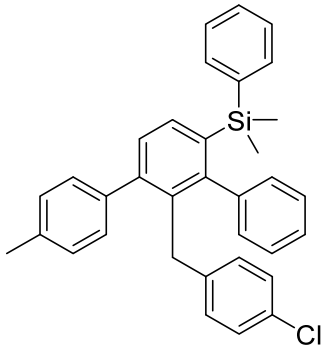
81.9 mg, 65% yield; R_f = 0.4 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.50 (d, *J* = 7.6 Hz, 1H), 7.34-7.22 (m, 11H), 7.17 (t, *J* = 7.6 Hz, 1H), 7.08-7.02 (m, 2H), 6.88 (d, *J* = 8.0 Hz, 1H), 6.82 (d, *J* = 7.6 Hz, 1H), 6.78 (d, *J* = 7.6 Hz, 1H), 6.31 (d, *J* = 8.0 Hz, 1H), 6.09 (s, 1H), 3.68 (s, 2H), 2.64-2.58 (m, 2H), 2.52-2.45 (m, 1H), 2.40-2.34 (m, 1H), 2.17-2.08 (m, 2H), 1.96-1.90 (m, 2H), 1.66-1.57 (m, 3H), 1.49-1.42 (m, 4H), 0.88 (s, 3H), 0.11 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 221.0, 149.7, 144.1, 142.3, 141.6, 139.9, 139.1, 136.7, 136.2, 135.2, 134.0, 133.3, 130.5, 130.5, 129.2, 129.0, 128.6, 128.5, 127.8, 127.5, 127.1, 127.1, 126.7, 126.6, 125.7, 124.4, 50.5, 48.0, 44.1, 38.3, 35.8, 31.6, 29.1, 26.5, 25.7, 21.6, 13.9, -1.1; HRMS *m/z* (ESI) calcd for $C_{45}H_{47}OSi$ ($[M+H]^+$) 631.3391, found 631.3404.

(8R,9S,13S,14S)-3-((4'-(Dimethyl(phenyl)silyl)-[1,1':3',1''-terphenyl]-2'-yl)methyl)-13-methyl-7,8,9,11,12,13,14,15,16,17-decahydro-6H-cyclopenta[a]phenanthren-17-yl heptanoate (4apa):



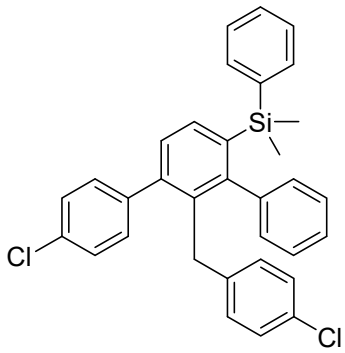
68.4 mg, 46% yield; R_f = 0.2 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.49 (d, *J* = 7.6 Hz, 1H), 7.31-7.21 (m, 11H), 7.15 (d, *J* = 7.6 Hz, 1H), 7.07-7.01 (m, 2H), 6.87 (d, *J* = 8.0 Hz, 1H), 6.82-6.77 (m, 2H), 6.30 (d, *J* = 7.6 Hz, 1H), 6.09 (s, 1H), 4.68 (t, *J* = 8.0 Hz, 1H), 3.69 (s, 2H), 2.57-2.53 (m, 1H), 2.32-2.28 (m, 3H), 2.22-2.15 (m, 2H), 1.84-1.78 (m, 2H), 1.64-1.57 (m, 3H), 1.34-1.26 (m, 14H), 0.90-0.87 (m, 3H), 0.80 (s, 3H), 0.11 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 173.9, 149.7, 144.1, 142.3, 141.6, 139.9, 138.8, 136.7, 136.3, 135.4, 134.0, 133.3, 130.5, 130.5, 129.2, 129.0, 128.6, 128.5, 127.8, 127.5, 127.1, 126.6, 126.6, 125.5, 124.4, 82.4, 49.9, 44.0, 42.9, 38.5, 36.9, 35.6, 34.6, 31.5, 29.2, 28.8, 27.6, 27.2, 26.0, 25.1, 23.3, 22.5, 14.0, 12.1, -1.1, -1.1; HRMS *m/z* (ESI) calcd for $C_{52}H_{61}O_2Si$ ($[M+H]^+$) 745.4435 , found 745.4443.

(2'-(4-Chlorobenzyl)-4-methyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4eaa):



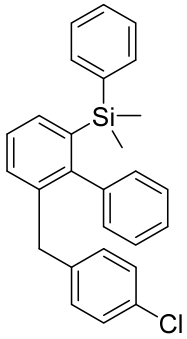
65.3 mg, 65% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 147.4-148.6 ºC (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.52 (d, *J* = 7.6 Hz, 1H), 7.30-7.22 (m, 6H), 7.16-7.08 (m, 5H), 7.03 (t, *J* = 7.2 Hz, 2H), 6.93 (d, *J* = 8.0 Hz, 2H), 6.75 (d, *J* = 7.6 Hz, 2H), 6.44 (d, *J* = 8.0 Hz, 2H), 3.72 (s, 2H), 2.32 (s, 3H), 0.12 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.2, 141.4, 140.4, 139.8, 139.0, 136.8, 136.5, 135.4, 133.9, 133.7, 130.7, 130.3, 129.5, 128.9, 128.8, 128.7, 128.6, 127.5, 127.5, 127.2, 126.8, 35.5, 21.1, -1.1; HRMS *m/z* (ESI) calcd for $C_{34}H_{32}{}^{35}ClSi$ ($[M+H]^+$) 503.1956, found 503.1964.

(4-Chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4faa):



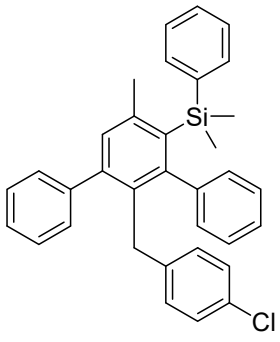
76.2 mg, 73% yield; R_f = 0.5 (PE/EA = 100 : 1); Yellow solid; mp 144.4-145.5 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.53 (d, *J* = 7.6 Hz, 1H), 7.32-7.15 (m, 9H), 7.11 (d, *J* = 8.0 Hz, 2H), 7.05 (t, *J* = 7.6 Hz, 2H), 6.95 (d, *J* = 7.6 Hz, 2H), 6.78 (d, *J* = 7.6 Hz, 2H), 6.44 (d, *J* = 8.0 Hz, 2H), 3.67 (s, 2H), 0.13 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.8, 142.9, 141.2, 140.4, 140.1, 139.6, 137.5, 135.2, 133.9, 133.8, 133.0, 130.9, 130.3, 130.2, 129.4, 128.7, 128.6, 128.1, 127.7, 127.6, 127.3, 127.0, 35.5, -1.2; HRMS *m/z* (ESI) calcd for $C_{33}H_{29}{}^{35}Cl_2Si$ ($[M+H]^+$) 523.1410, found 523.1420.

(6-(4-Chlorobenzyl)-[1,1'-biphenyl]-2-yl)dimethyl(phenyl)silane (4gaa):



55.2 mg, 67% yield; R_f = 0.5 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.47 (d, *J* = 7.2 Hz, 1H), 7.29-7.22 (m, 7H), 7.20-7.09 (m, 5H), 6.82 (d, *J* = 7.2 Hz, 2H), 6.77 (d, *J* = 7.2 Hz, 2H), 3.62 (s, 2H), 0.12 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 148.5, 141.2, 139.7, 139.7, 138.2, 137.7, 133.9, 133.8, 131.4, 130.9, 130.2, 130.2, 128.6, 128.1, 127.5, 127.5, 127.0, 126.8, 39.0, -1.2; LRMS (EI, 70 eV) m/z (%): 414 (M^+ + 2, 1), 412 (M^+, 3), 397 (100), 319 (58), 207 (66), 142 (39), 125 (51); HRMS *m/z* (ESI) calcd for $C_{27}H_{26}{}^{35}ClSi$ ($[M+H]^+$) 413.1487, found 413.1495.

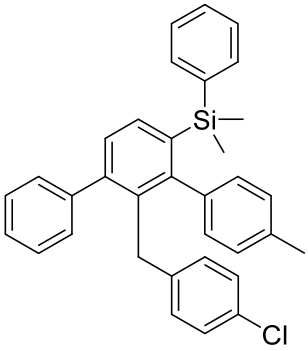
(2'-(4-Chlorobenzyl)-5'-methyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4haa):



40.2 mg, 40% yield; R_f = 0.5 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.50-7.47 (m, 2H), 7.37-7.30 (m, 8H), 7.20-7.14 (m, 4H), 7.06-7.01 (m, 4H), 6.52 (d, *J* = 8.4 Hz, 2H), 3.77 (s, 2H), 2.30 (s, 3H), 0.04 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 150.5, 143.9, 142.9, 142.8, 142.0, 141.8, 140.6, 134.6, 133.9, 133.2, 132.5, 132.0,

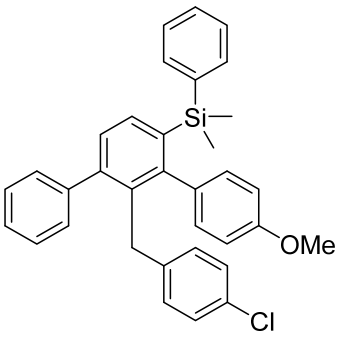
130.5, 129.4, 129.0, 128.3, 127.9, 127.7, 127.5, 127.4, 126.9, 126.8, 35.4, 24.5, 1.1; HRMS *m/z* (ESI) calcd for $C_{34}H_{32}{}^{35}ClSi$ ($[M+H]^+$) 503.1956, found 503.1961.

(2'-(4-Chlorobenzyl)-4''-methyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4iaa):



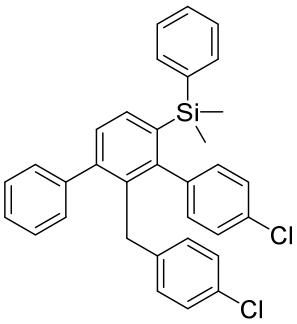
66.3 mg, 66% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 148.5-149.4 ºC (uncorrected); ^{1}H NMR (500 MHz, $CDCl_3$) δ: (ppm) 7.51 (d, *J* = 7.5 Hz, 1H), 7.33-7.16 (m, 11H), 6.93 (d, *J* = 8.0 Hz, 2H), 6.86 (d, *J* = 7.5 Hz, 2H), 6.69 (d, *J* = 8.0 Hz, 2H), 6.44 (d, *J* = 8.0 Hz, 2H), 3.71 (s, 2H), 2.30 (s, 3H), 0.14 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: (ppm) 149.7, 144.1, 142.0, 140.4, 139.8, 138.5, 137.2, 136.4, 135.5, 134.0, 133.6, 130.6, 130.0, 129.5, 129.0, 128.6, 128.6, 127.9, 127.9, 127.5, 127.4, 126.8, 35.46, 21.2, -1.1; HRMS *m/z* (ESI) calcd for $C_{34}H_{32}{}^{35}ClSi$ ($[M+H]^+$) 503.1956, found 503.1969.

(2'-(4-Chlorobenzyl)-4''-methoxy-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4jaa):



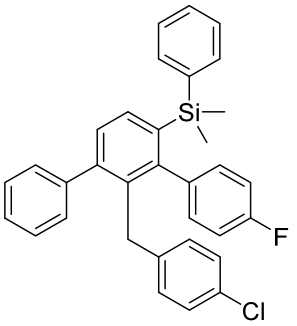
62.2 mg, 60% yield; R_f = 0.2 (PE/EA = 100 : 1); White solid; mp 125.3-127.0 ºC (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.53 (d, *J* = 7.6 Hz, 1H), 7.32-7.18 (m, 11H), 6.93 (d, *J* = 8.4 Hz, 2H), 6.67 (d, *J* = 8.4 Hz, 2H), 6.57 (d, *J* = 8.4 Hz, 2H), 6.44 (d, *J* = 8.0 Hz, 2H), 3.73 (s, 3H), 3.71 (s, 2H), 0.17 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 158.5, 149.4, 144.2, 142.0, 140.4, 139.8, 137.5, 135.8, 133.9, 133.8, 133.6, 131.2, 130.6, 129.4, 129.0, 128.6, 128.6, 127.9, 127.5, 127.5, 126.8, 112.6, 55.1, 35.5, -1.0; HRMS *m/z* (ESI) calcd for $C_{34}H_{32}{}^{35}ClOSi$ ($[M+H]^+$) 519.1905, found 519.1913.

(4''-Chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4kaa):



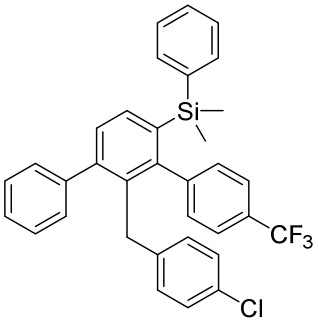
84.6 mg, 81% yield; R_f = 0.4 (PE/EA = 100 : 1); White solid; mp 110.3-110.8 ºC (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.58 (d, *J* = 7.6 Hz, 1H), 7.28-7.19 (m, 11H), 6.96-6.94 (m, 4H), 6.64-6.61 (m, 2H), 6.43 (d, *J* = 8.4 Hz, 2H), 3.67 (s, 2H), 0.20 (s, 3H), 0.19 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 148.3, 144.3, 141.7, 140.0, 139.7, 139.2, 137.2, 135.3, 133.7, 133.7, 132.8, 131.5, 130.9, 129.4, 129.0, 128.9, 128.7, 128.0, 127.7, 127.6, 127.3, 127.0, 35.5, -1.0; HRMS *m/z* (ESI) calcd for $C_{33}H_{29}{}^{35}Cl_2Si$ ($[M+H]^+$) 523.1410, found 523.1423.

(2'-(4-Chlorobenzyl)-4''-fluoro-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4laa):



75.9 mg, 75% yield; R_f = 0.4 (PE/EA = 100 : 1); White solid; mp 106.8-107.8 ºC (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.57 (d, *J* = 8.0 Hz, 1H), 7.27-7.21 (m, 11H), 6.95 (d, *J* = 8.4 Hz, 2H), 6.71-6.63 (m, 4H), 6.43 (d, *J* = 8.4 Hz, 2H), 3.68 (s, 2H), 0.18 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 161.8 (d, *J* = 244.2 Hz), 148.6, 144.3, 141.8, 140.1, 139.4, 137.4, 137.2(d, *J* = 3.5 Hz), 135.5, 133.8, 133.7, 131.8, 131.7, 130.9, 129.4, 129.0, 128.7, 128.0, 127.7, 127.6, 127.0, 114.0 (d, *J* = 21 Hz), 35.5, -1.1; HRMS *m/z* (ESI) calcd for $C_{33}H_{29}{}^{35}ClFSi$ ($[M+H]^+$) 507.1706, found 507.1711.

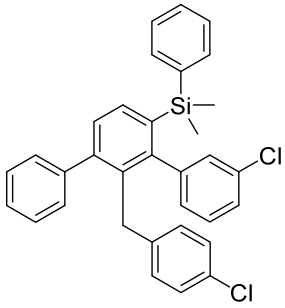
(2'-(4-Chlorobenzyl)-4''-(trifluoromethyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl (phenyl)silane (4maa):



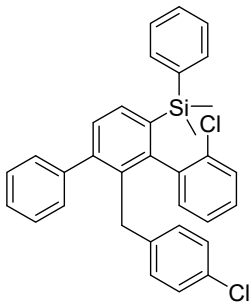
71.2 mg, 64% yield; R_f = 0.4 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.62 (d, *J* = 7.6 Hz, 1H), 7.32-7.28 (m, 5H), 7.25-7.18 (m, 8H), 6.93 (d, *J* = 8.4 Hz, 2H), 6.78 (d, *J* = 8.0 Hz, 2H), 6.40 (d, *J* = 8.4 Hz, 2H), 3.64 (s, 2H), 0.21 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 148.2, 145.0, 144.4, 141.6, 139.9, 139.0,

137.0, 135.1, 133.6, 131.0, 130.5, 129.3, 129.2, 128.9, 128.7, 128.1, 127.7, 127.6, 127.1, 124.0 (q, J = 3.8 Hz), 35.5, -1.1; HRMS *m/z* (ESI) calcd for $C_{34}H_{29}{}^{35}ClF_3Si$ ($[M+H]^+$) 557.1674, found 557.1683.

(3''-Chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4naa):



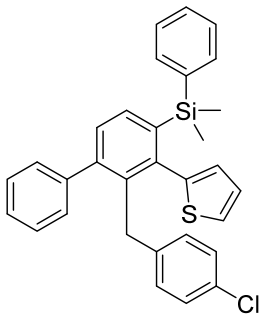
64.7 mg, 62% yield; R_f = 0.5 (PE/EA = 100 : 1); Yellow solid; mp 142.4-143.0 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.58 (d, J = 7.6 Hz, 1H), 7.30-7.21 (m, 12H), 7.12 (d, J = 8.0 Hz, 1H), 6.95 (d, J = 7.6 Hz, 3H), 6.64 (s, 1H), 6.42 (d, J = 8.0 Hz, 2H), 3.69 (s, 2H), 0.21 (s, 3H), 0.18 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 148.1, 144.3, 143.0, 141.7, 140.0, 139.1, 137.1, 135.3, 133.7, 133.7, 133.2, 130.9, 130.6, 129.4, 129.1, 129.0, 128.8, 128.4, 128.3, 128.0, 127.7, 127.6, 127.0, 127.0, 35.5, -1.1, -1.2; HRMS *m/z* (ESI) calcd for $C_{33}H_{29}{}^{35}Cl_2Si$ ($[M+H]^+$) 523.1410, found 523.1417.



(2''-chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4oaa)：

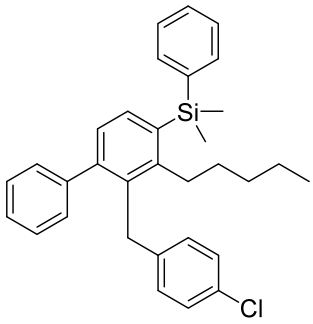
73.1 mg, 70% yield; R_f = 0.5 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (500 MHz, $CDCl_3$) δ: (ppm) 7.59 (d, J = 7.5 Hz, 1H), 7.36-7.25 (m, 12H), 7.59 (t, J = 7.5 Hz, 1H), 6.92 (d, J = 8.0 Hz, 2H), 6.84 (t, J = 7.5 Hz, 1H), 6.53 (d, J = 7.5 Hz, 1H), 6.43 (d, J = 8.0 Hz, 2H), 3.94 (d, J = 16.0 Hz, 1H), 3.54 (d, J = 16.0 Hz, 1H), 0.26 (s, 3H), 0.15 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: (ppm) 146.3, 144.2, 141.8, 140.0, 139.8, 139.1, 136.9, 135.8, 134.1, 134.0, 132.7, 130.7, 129.4, 129.2, 129.0, 128.9, 128.7, 128.0, 127.5, 126.9, 125.7, 35.4, -1.0, -2.1; HRMS *m/z* (ESI) calcd for $C_{33}H_{29}{}^{35}Cl_2Si$ ($[M+H]^+$) 523.1410, found 523.1415.

(2-(4-chlorobenzyl)-3-(thiophen-2-yl)-[1,1'-biphenyl]-4-yl)dimethyl(phenyl)silane (4paa):



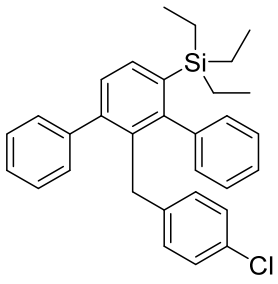
66.2 mg, 67% yield; R_f = 0.6 (PE/EA = 100 : 1); White solid; mp 143.0-144.2 °C (uncorrected); ^{1}H NMR (500 MHz, $CDCl_3$) δ: (ppm) 7.53 (d, *J* = 7.5 Hz, 1H), 7.39 (d, *J* = 6.5 Hz, 2H), 7.34-7.29 (m, 3H), 7.27-7.25 (m, 4H), 7.16-7.13 (m, 3H), 6.98 (d, *J* = 7.5 Hz, 2H), 6.75 (t, *J* = 4.5 Hz, 1H), 6.52 (d, *J* = 8.0 Hz, 2H), 6.33 (d, *J* = 3.5 Hz, 1H), 3.82 (s, 2H), -0.28 (s, 3H), 0.20 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: (ppm) 144.3, 142.1, 141.6, 141.4, 140.5, 139.8, 139.5, 137.7, 133.9, 133.8, 130.8, 129.8, 129.3, 128.9, 128.7, 128.7, 127.9, 127.7, 127.6, 126.9, 126.1, 125.3, 35.7, -1.0, -1.8; LRMS (EI, 70 eV) m/z (%): 494 (M^+, 16), 479 (100), 401 (42), 289 (71), 144 (36), 125 (17); HRMS *m/z* (ESI) calcd for $C_{31}H_{28}{}^{35}ClSSi$ ($[M+H]^+$) 495.1364, found 495.1375.

(2-(4-Chlorobenzyl)-3-pentyl-[1,1'-biphenyl]-4-yl)dimethyl(phenyl)silane (4qaa):



70.4 mg, 73% yield; R_f = 0.6 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.53-7.51 (m, 3H), 7.34-7.31 (m, 3H), 7.25-7.23 (m, 3H), 7.13-7.10 (m, 5H), 6.73 (d, *J* = 8.0 Hz, 2H), 3.95 (s, 2H), 2.48 (t, *J* = 8.4 Hz, 2H), 1.24-1.19 (m, 2H), 1.10-1.02 (m, 4H), 0.76 (t, *J* = 7.2 Hz, 3H), 0.63 (s, 3H), 0.62 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 148.8, 145.2, 142.2, 140.2, 139.5, 136.2, 134.9, 134.3, 134.0, 131.1, 129.2, 128.9, 128.8, 128.1, 127.8, 127.8, 127.6, 126.8, 34.8, 34.4, 32.3, 32.0, 22.4, 14.0, -0.4; LRMS (EI, 70 eV) m/z (%): 482 (M^++2, 2), 482 (M^+, 5), 346 (6), 135 (100); HRMS *m/z* (ESI) calcd for $C_{32}H_{36}{}^{35}ClSi$ ($[M+H]^+$) 483.2269, found 483.2277.

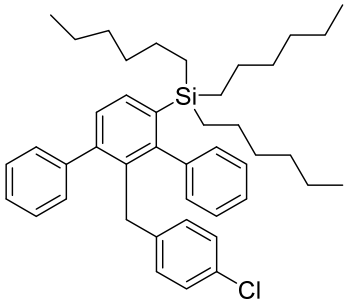
(2'-(4-Chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)triethylsilane (4aab):



46.8 mg, 50% yield; R_f = 0.6 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.52 (d, *J* = 7.6 Hz, 1H), 7.28-7.21 (m, 7H), 7.17 (t, *J* = 7.6 Hz, 2H), 6.99-6.94 (m, 4H), 6.45 (d, *J* = 8.0 Hz, 2H), 3.72 (s, 2H), 0.82 (t, *J* = 8.0 Hz,

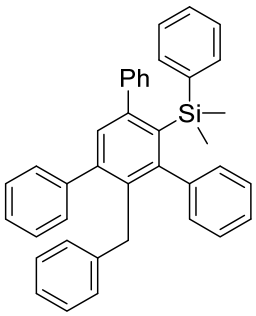
9H), 0.37 (d, *J* = 7.6 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.6, 143.6, 142.1, 142.0, 140.6, 135.7, 135.0, 133.7, 130.7, 129.9, 129.4, 129.0, 128.6, 127.9, 127.6, 127.3, 127.0, 126.8, 35.6, 7.6, 3.9; HRMS *m/z* (ESI) calcd for $C_{31}H_{34}{}^{35}ClSi$ ($[M+H]^+$) 469.2113, found 469.2126.

(2'-(4-Chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)trihexylsilane (4aac):



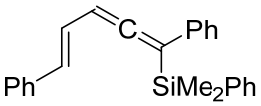
54.7 mg, 43% yield; R_f = 0.6 (PE/EA = 100 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.50 (d, *J* = 7.6 Hz, 1H), 7.32-7.21 (m, 7H), 7.17 (t, *J* = 7.6 Hz, 2H), 6.97-6.94 (m, 4H), 6.45 (d, *J* = 8.4 Hz, 2H), 3.71 (s, 2H), 1.26-1.14 (m, 24H), 0.87 (t, *J* = 7.2 Hz, 9H), 0.37-0.33 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 149.4, 143.6, 142.2, 142.0, 140.6, 136.5, 134.9, 133.6, 130.7, 129.9, 129.5, 129.1, 128.6, 127.9, 127.6, 127.3, 126.9, 126.8, 35.6, 33.4, 31.5, 23.8, 22.6, 14.1, 13.0; HRMS *m/z* (ESI) calcd for $C_{43}H_{58}{}^{35}ClSi$ ($[M+H]^+$) 637.3991, found 637.3998.

(2'-Benzyl-5'-phenyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4rba):



37.1 mg, 35% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 163.0-164.2 °C (uncorrected); ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.26-7.20 (m, 12H), 7.16-7.03 (m, 4H), 6.98-6.96 (m, 6H), 6.88 (d, *J* = 7.6 Hz, 2H), 6.51-6.49 (m, 2H), 3.82 (s, 2H), 0.24 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 151.2, 149.2, 144.9, 143.6, 142.1, 142.0, 141.9, 141.9, 134.9, 134.6, 132.9, 131.7, 131.1, 129.7, 129.2, 128.2, 127.9, 127.5, 127.5, 127.1, 127.0, 126.8, 126.8, 126.6, 124.9, 36.1, 1.7; HRMS *m/z* (ESI) calcd for $C_{39}H_{35}Si$ ($[M+H]^+$) 531.2503, found 531.2515.

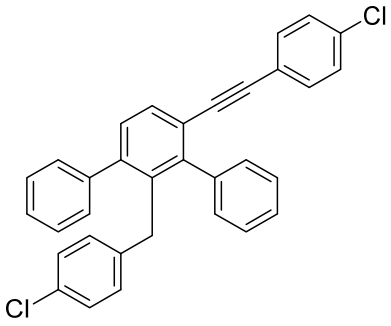
(*E*)-(1,5-diphenylpenta-1,2,4-trien-1-yl)dimethyl(phenyl)silane (5):



29.6 mg, 42% yield; R_f = 0.5 (PE/EA = 200 : 1); Yellow oil; ^{1}H NMR (400 MHz, $CDCl_3$) δ: (ppm) 7.62-7.60 (m, 2H), 7.40-7.35 (m, 5H), 7.30 (t, *J* = 7.2 Hz, 2H), 7.25-7.19 (m, 5H), 7.16-7.14 (m, 1H),

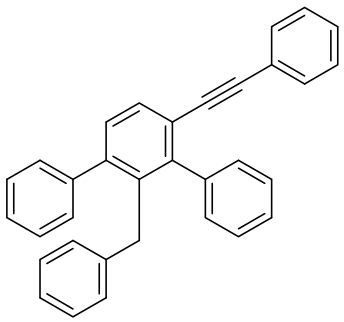
6.70-6.64 (m, 1H), 6.52 (d, *J* = 15.6 Hz, 1H), 6.14 (d, *J* = 10.4 Hz, 1H), 0.49 (s, 3H), 0.48 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: (ppm) 213.6, 138.0, 137.5, 136.2, 133.9, 129.5, 129.3, 128.6, 128.4, 128.0, 127.9, 127.2, 126.5, 126.1, 124.2, 100.8, 92.0, -1.68, -1.7; HRMS *m/z* (ESI) calcd for $C_{25}H_{25}Si$ ($[M+H]^+$) 353.1720, found 353.1715.

2'-(4-Chlorobenzyl)-4'-((4-chlorophenyl)ethynyl)-1,1':3',1''-terphenyl (7):



12.7 mg, 13% yield; R_f = 0.5 (PE/EA = 100 : 1); White solid; mp 146.6-148.2 ºC (uncorrected); ^{1}H NMR (500 MHz, $CDCl_3$) δ: (ppm) 7.56 (d, *J* = 8.0 Hz, 1H), 7.31-7.29 (m, 6H), 7.26 (d, *J* = 8.0 Hz, 1H), 7.21-7.19 (m, 2H), 7.17-7.15 (m, 4H), 6.97-6.93 (m, 4H), 6.48 (d, *J* = 8.5 Hz, 2H), 3.85 (s, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: (ppm) 145.8, 143.6, 141.4, 140.0, 139.7, 136.0, 133.9, 132.5, 131.0, 129.7, 129.6, 129.6, 129.5, 129.0, 128.4, 128.1, 127.7, 127.2, 127.1, 92.2, 90.3, 35.7; HRMS *m/z* (ESI) calcd for $C_{33}H_{23}{}^{35}Cl_2$ ($[M+H]^+$) 489.1171, found 489.1180.

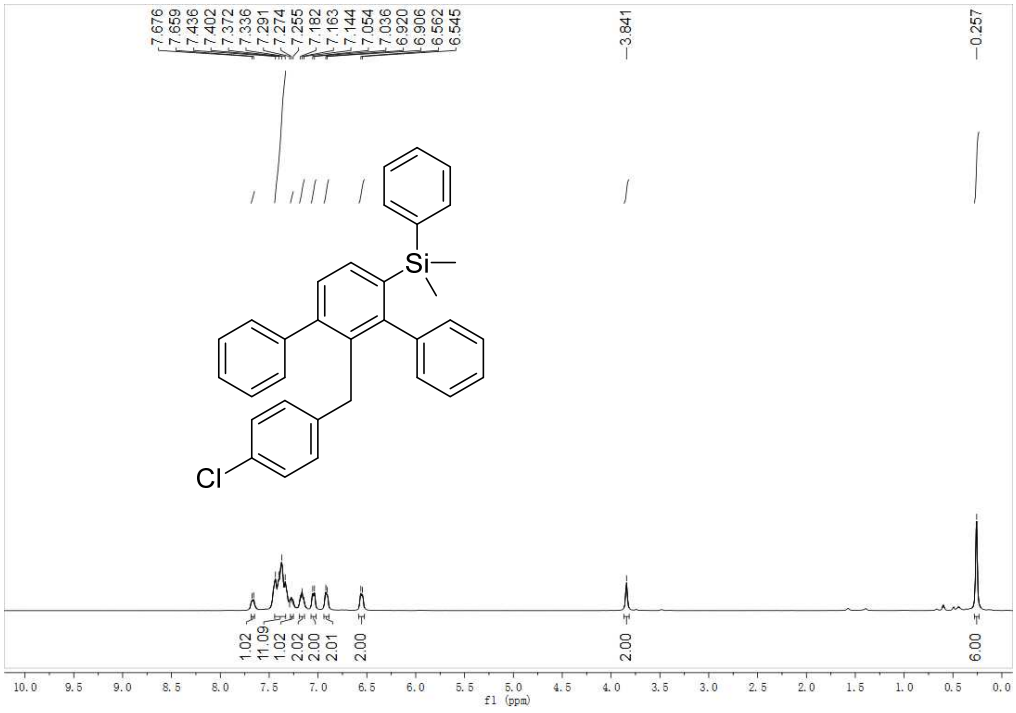
2'-benzyl-4'-(phenylethynyl)-1,1':3',1''-terphenyl (8):



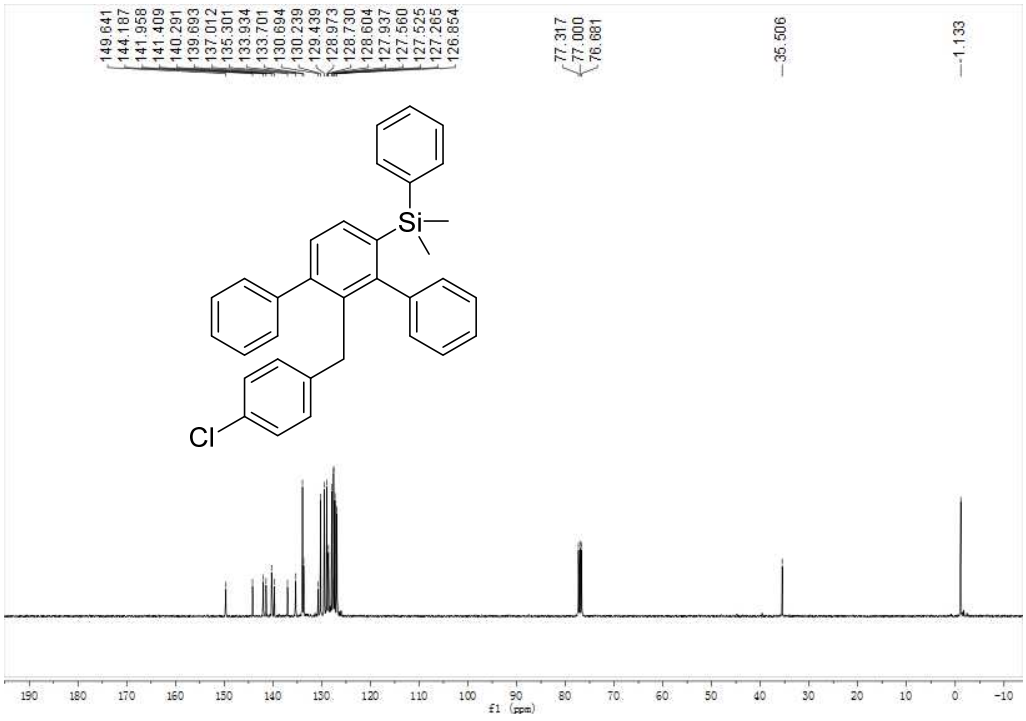
58.8 mg, 70%; Rf = 0.5 (PE/EA = 100 : 1); White solid; mp 92.5-93.6 ºC (uncorrected); ^{1}H NMR (500 MHz, CDCl3) δ: 7.57 (d, J = 7.5 Hz, 1H), 7.29-7.18 (m, 14H), 7.05-7.03 (m, 2H), 7.00-6.99 (m, 3H), 6.58-6.56 (m, 2H), 3.90 (s, 2H); ^{13}C NMR (125 MHz, CDCl3) δ: 145.8, 143.5, 141.6, 141.3, 140.2, 136.5, 131.3, 129.7, 129.5, 129.4, 129.1, 128.2, 128.1, 127.9, 127.9, 127.6, 127.6, 127.0, 126.9, 125.1, 123.4, 123.1, 93.1, 89.5, 36.3; LRMS (EI, 70 eV) m/z (%): 420 (M^+, 100), 342 (95), 265 (77), 170 (29); HRMS m/z (ESI) calcd for $C_{33}H_{25}$ ($[M+H]^+$) 421.1951, found 421.1960.

(C) Spectra

(2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aaa):

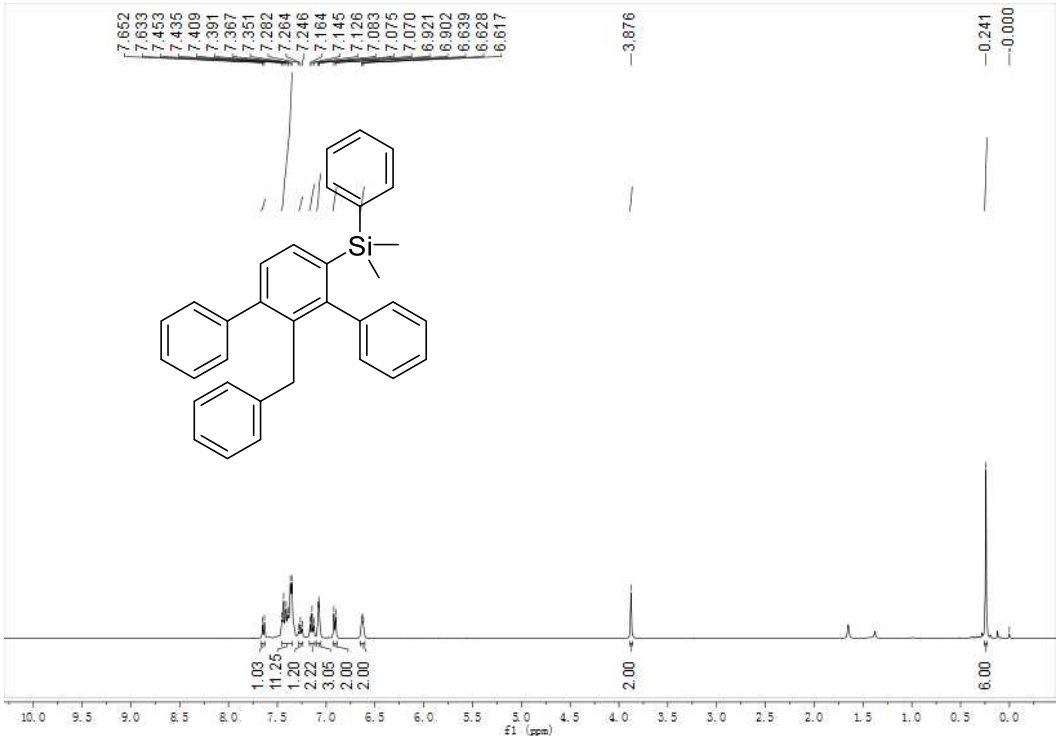


^{1}H NMR (400 MHz, $CDCl_3$)

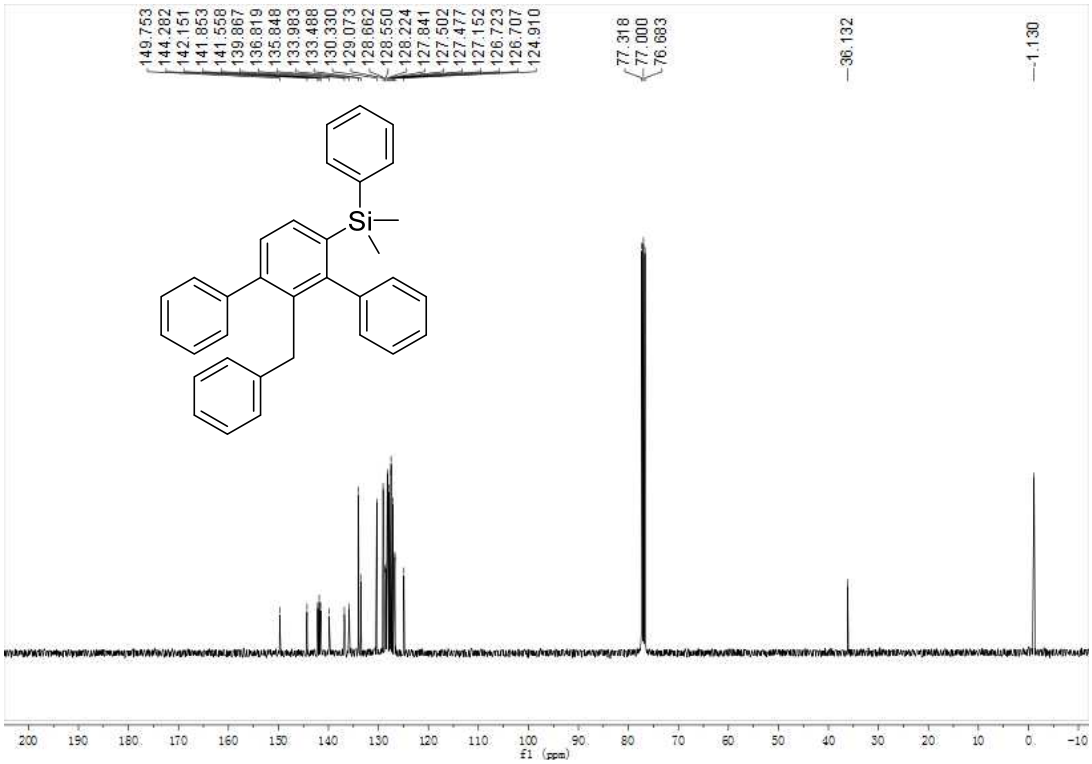


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-benzyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aba):

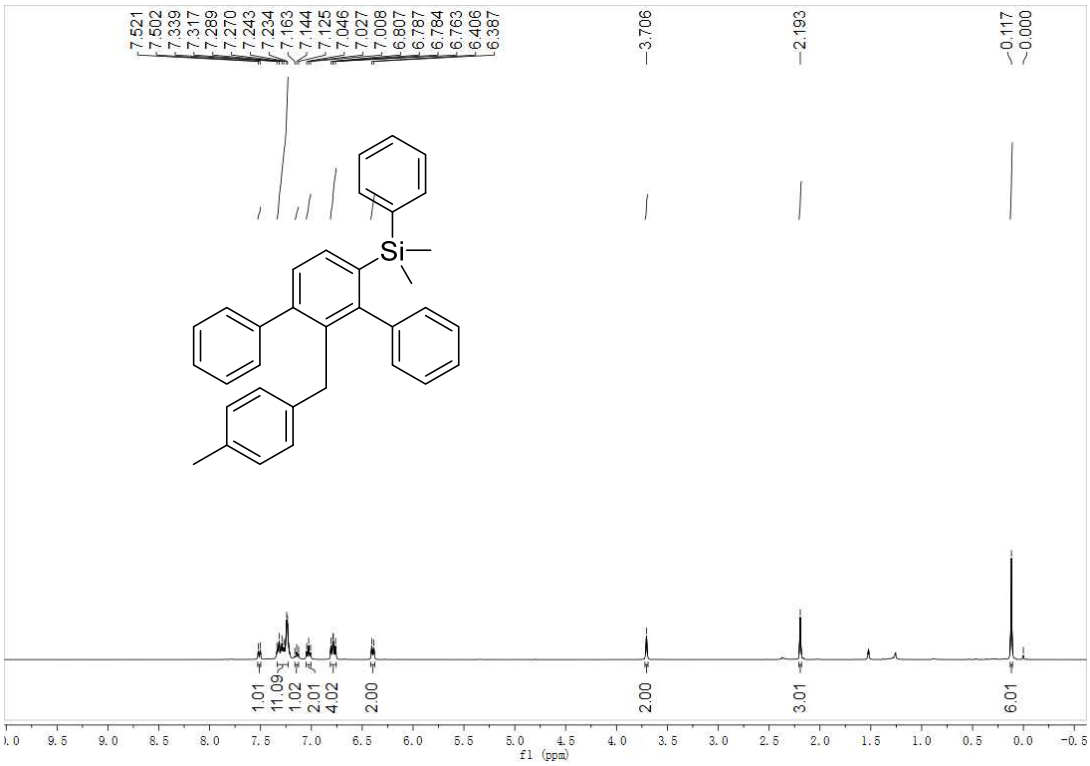


^{1}H NMR (400 MHz, $CDCl_3$)

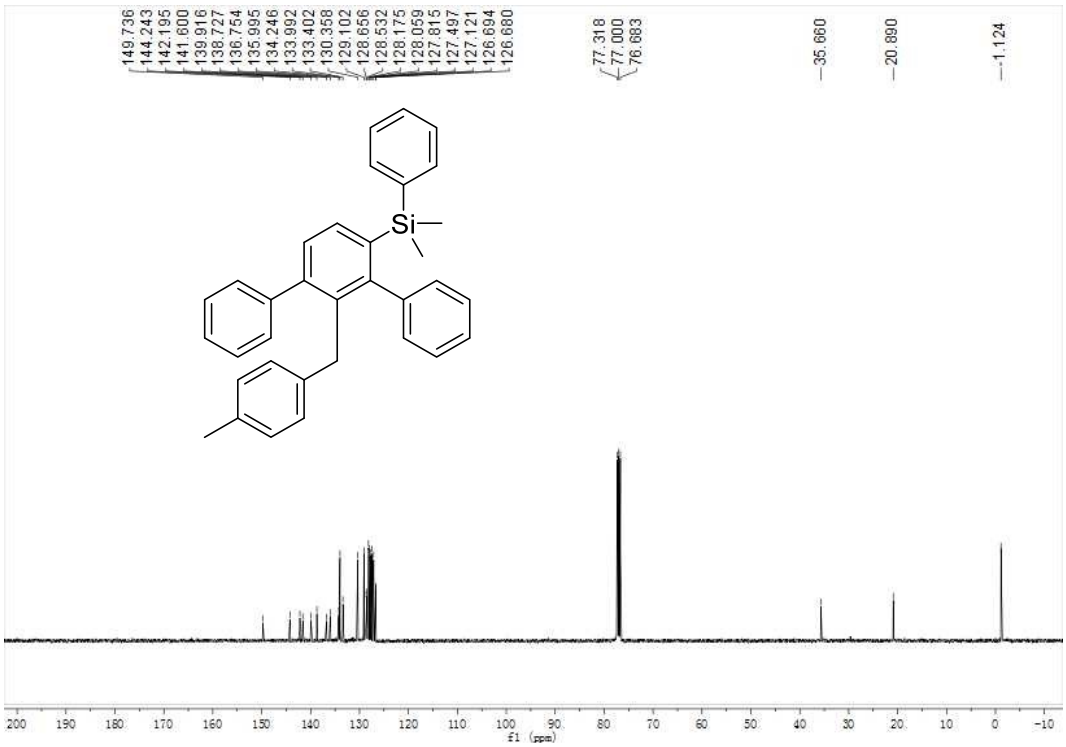


^{13}C NMR (100 MHz, $CDCl_3$)

dimethyl(2'-(4-methylbenzyl)-[1,1':3',1''-terphenyl]-4'-yl)(phenyl)silane (4aca):

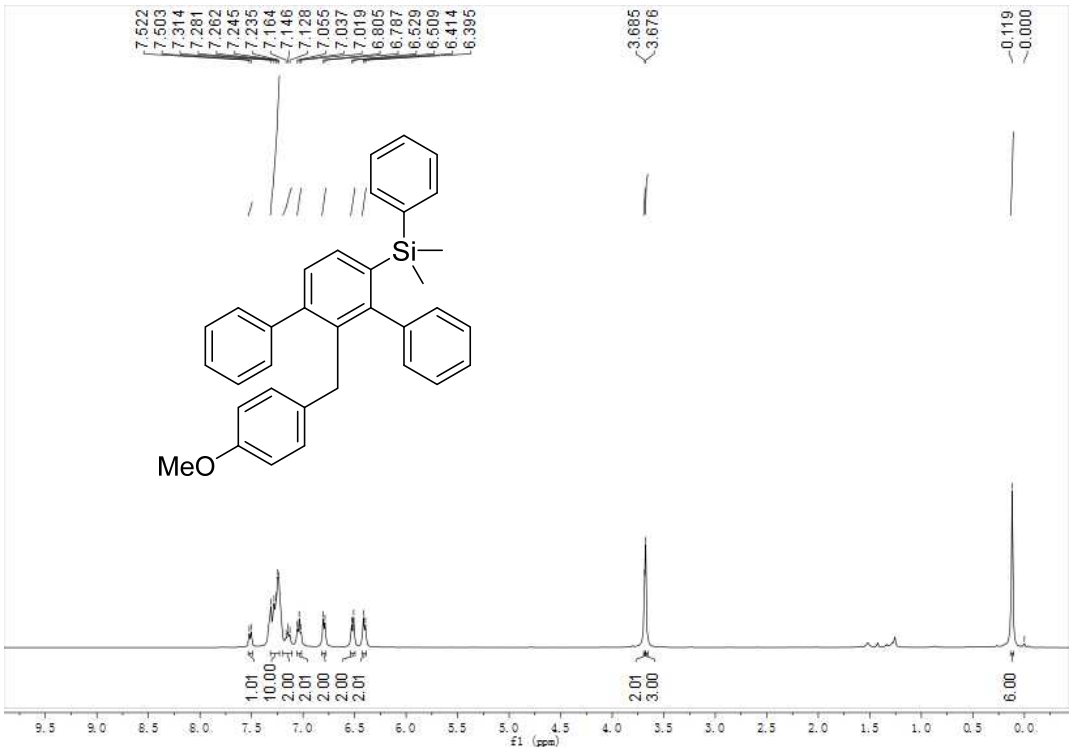


^{1}H NMR (400 MHz, $CDCl_3$)

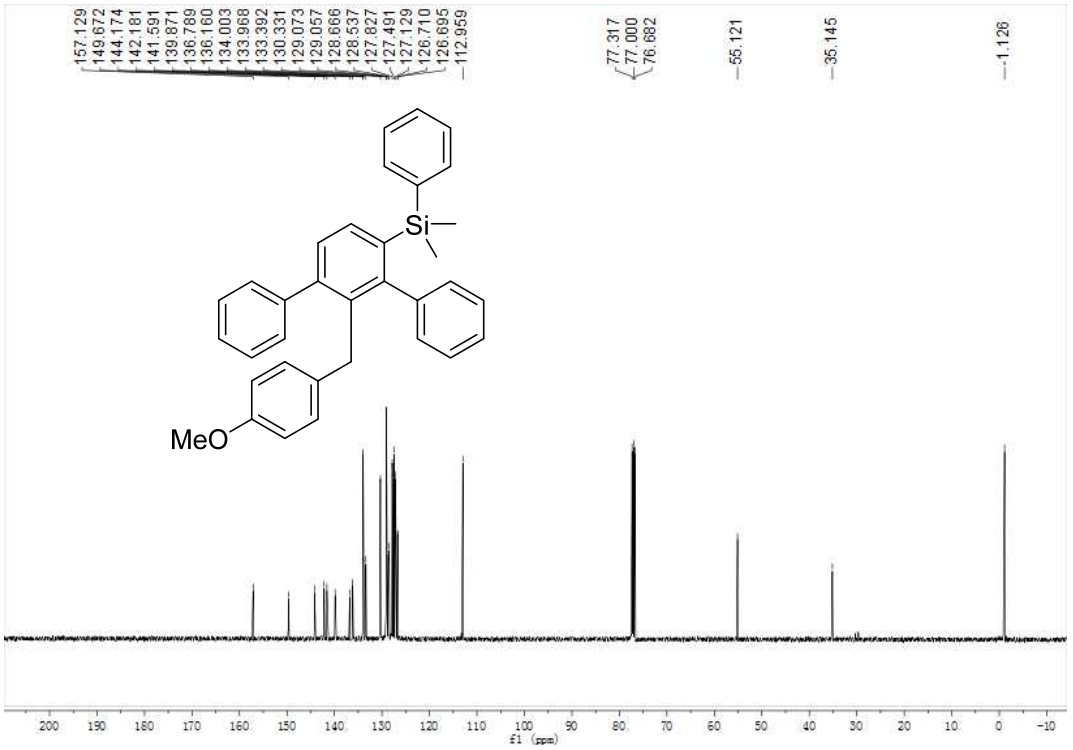


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-methoxybenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4ada):

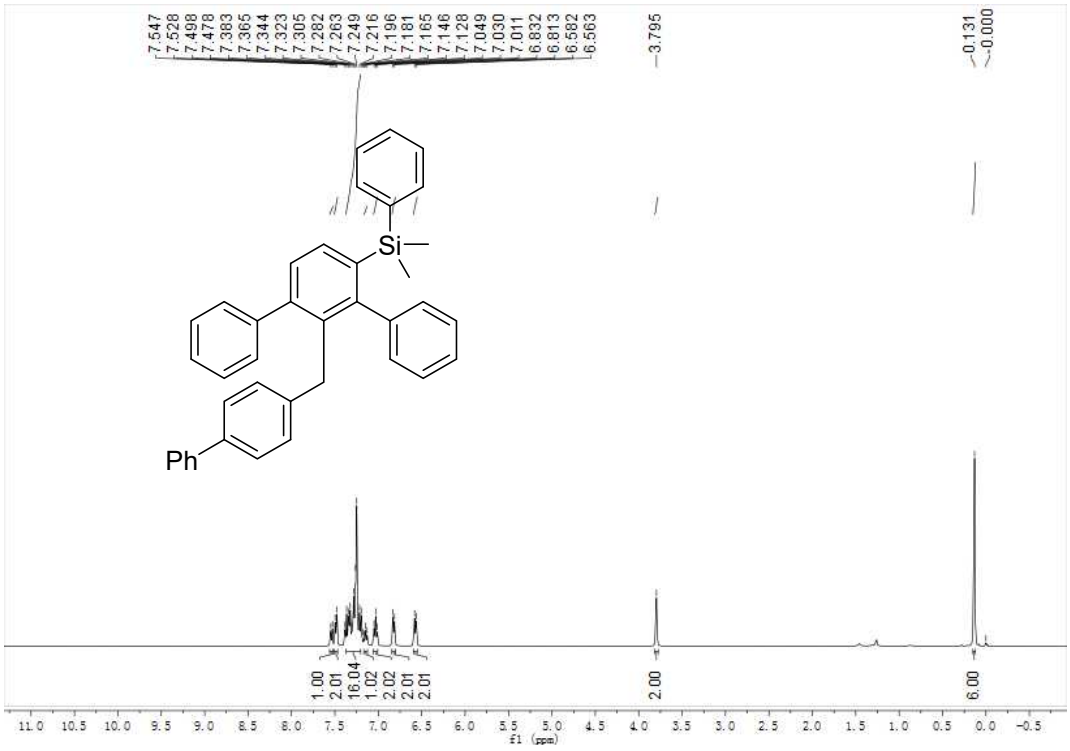


^{1}H NMR (400 MHz, $CDCl_3$)

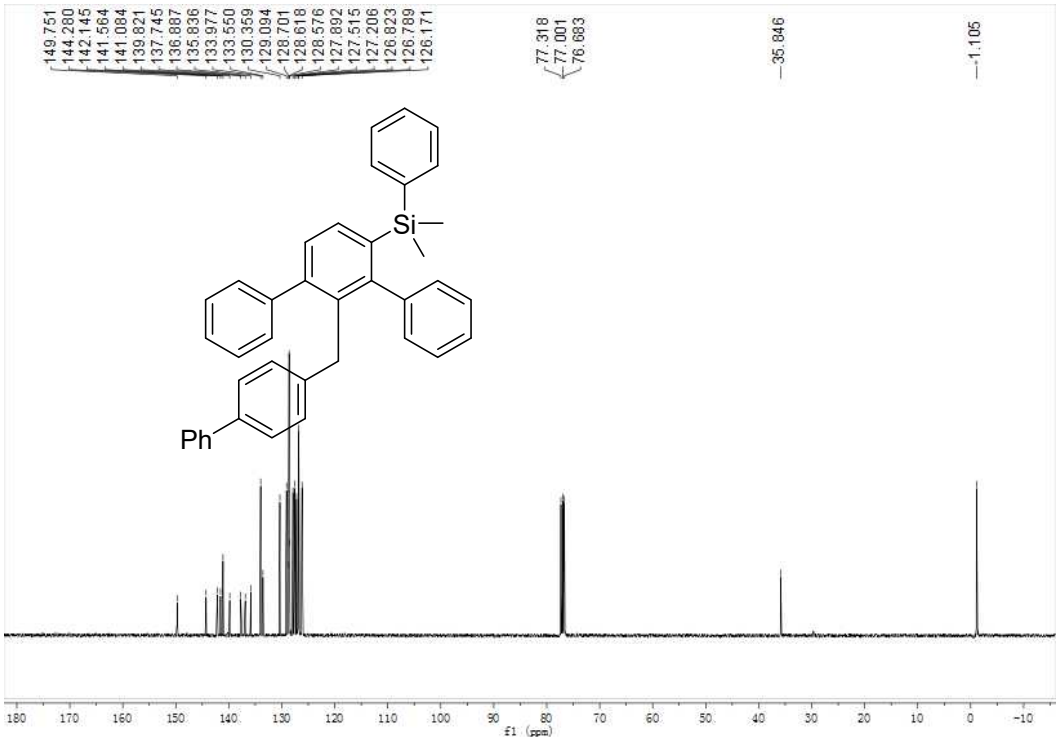


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-([1,1'-biphenyl]-4-ylmethyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aea):

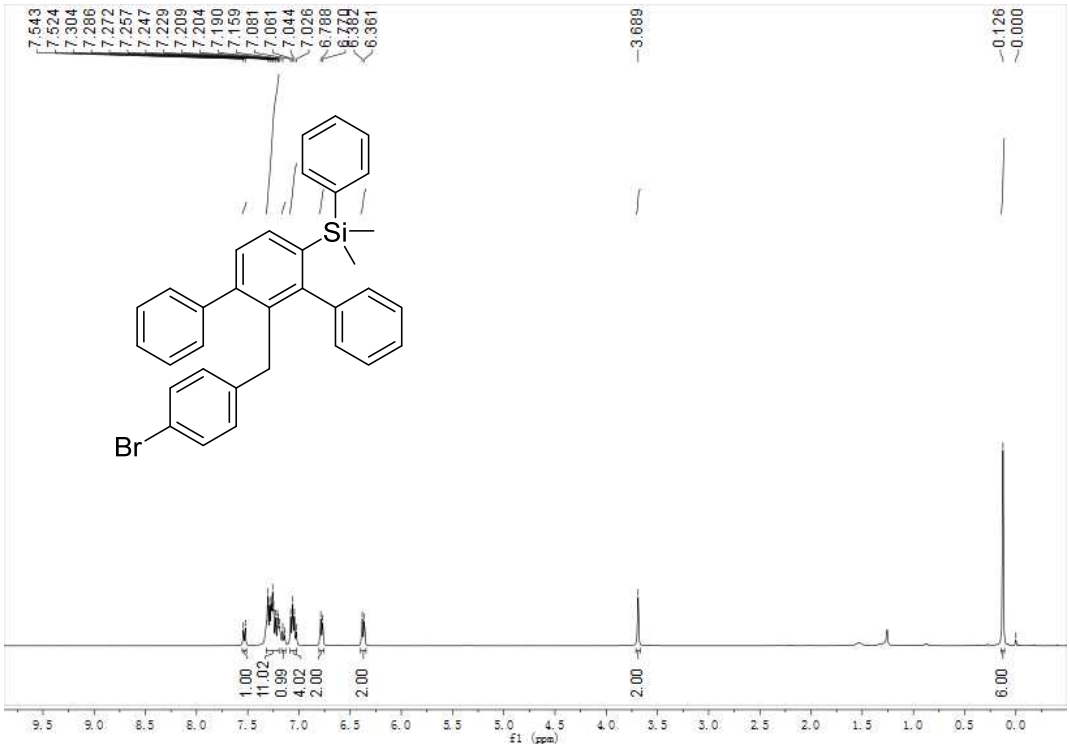


^{1}H NMR (400 MHz, $CDCl_3$)

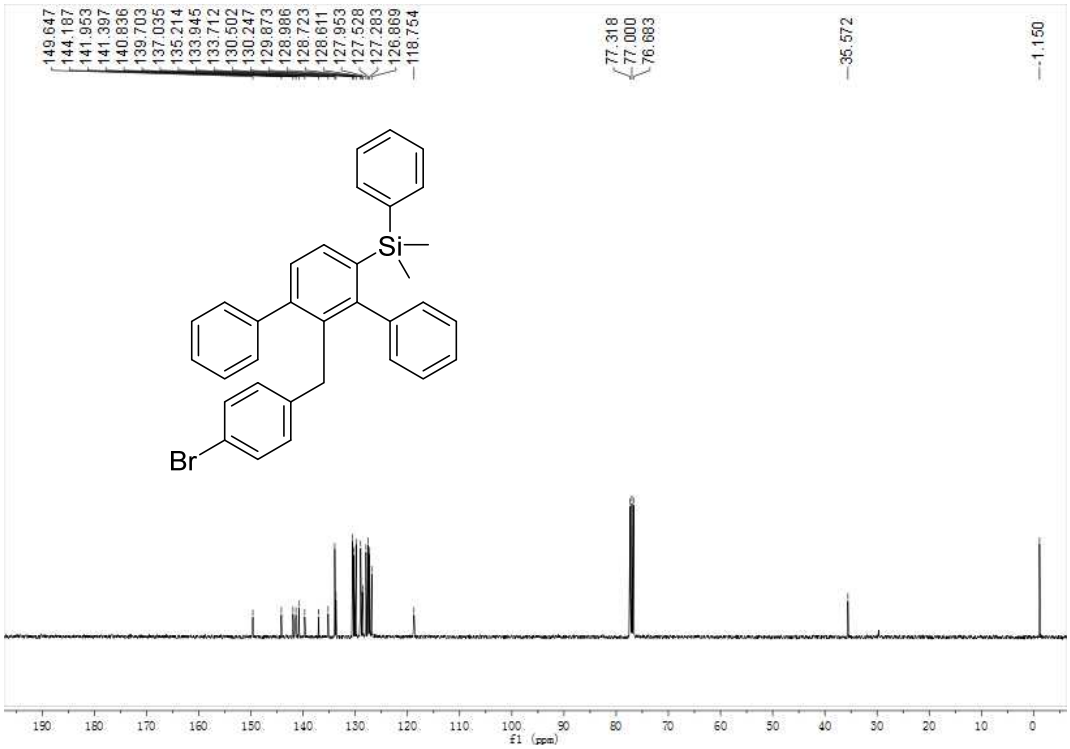


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-bromobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4afa):

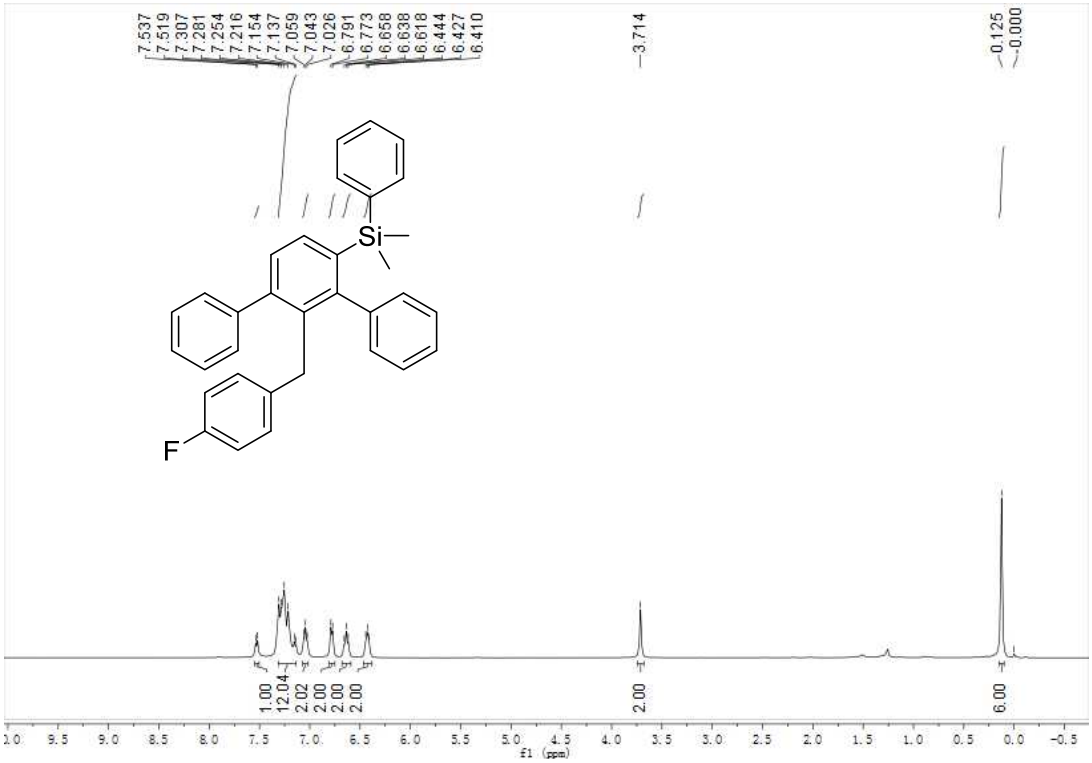


^{1}H NMR (400 MHz, $CDCl_3$)

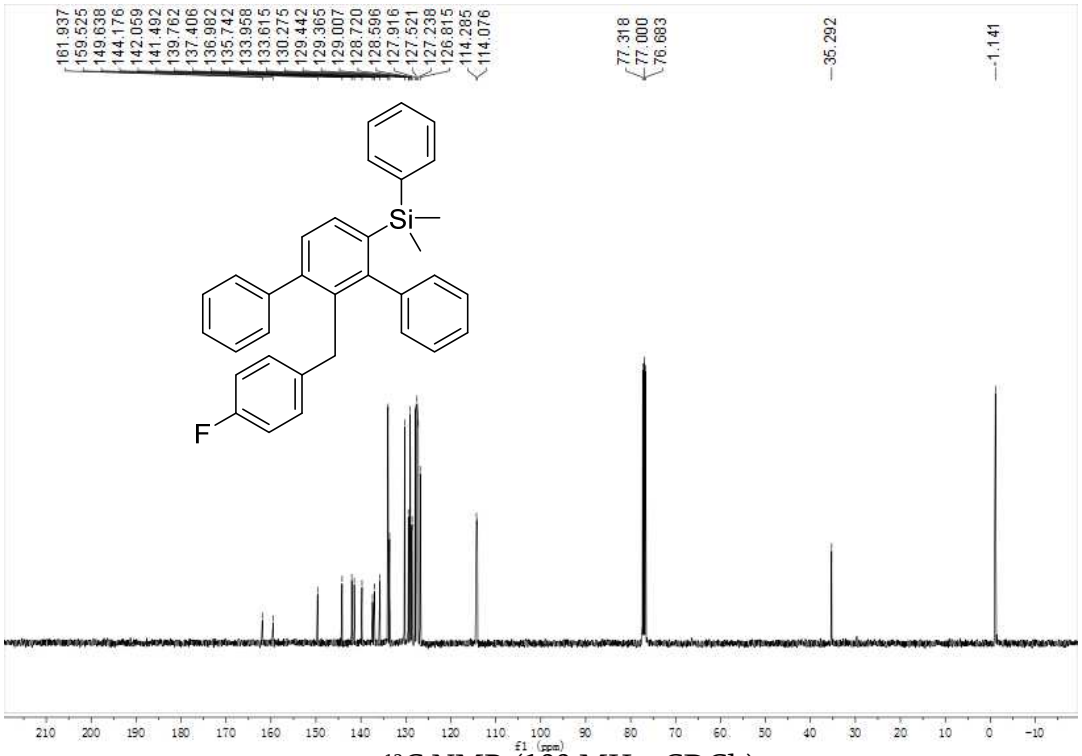


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-fluorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aga):

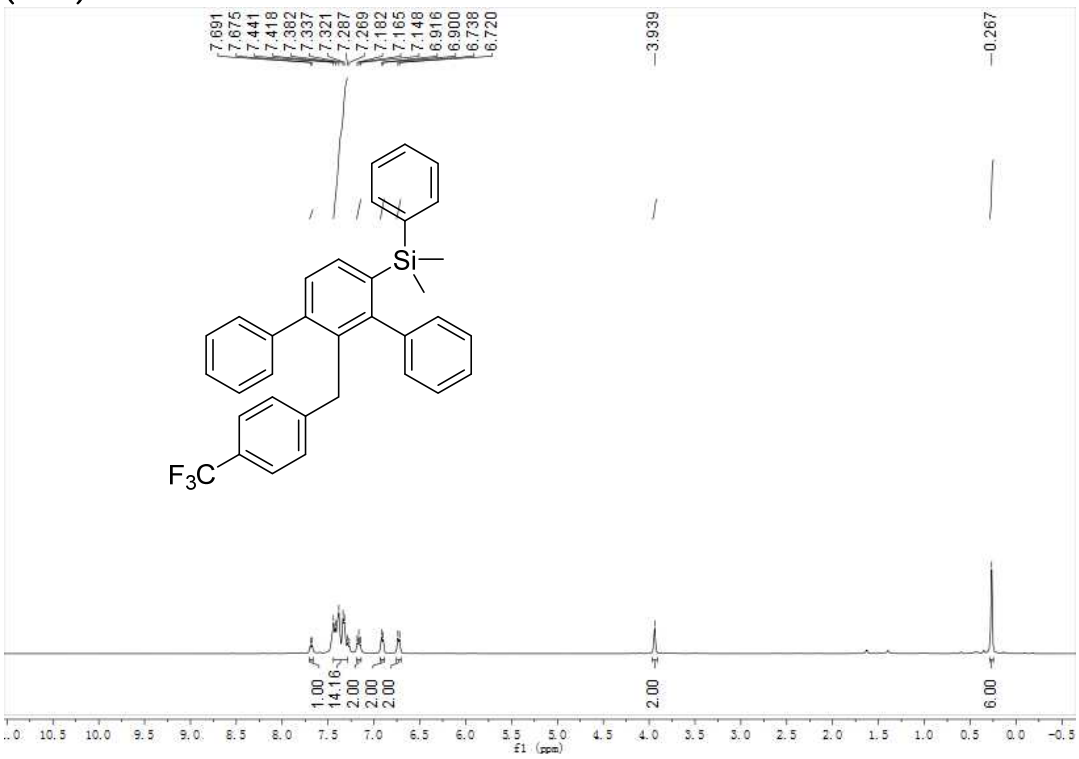


^{1}H NMR (400 MHz, $CDCl_3$)

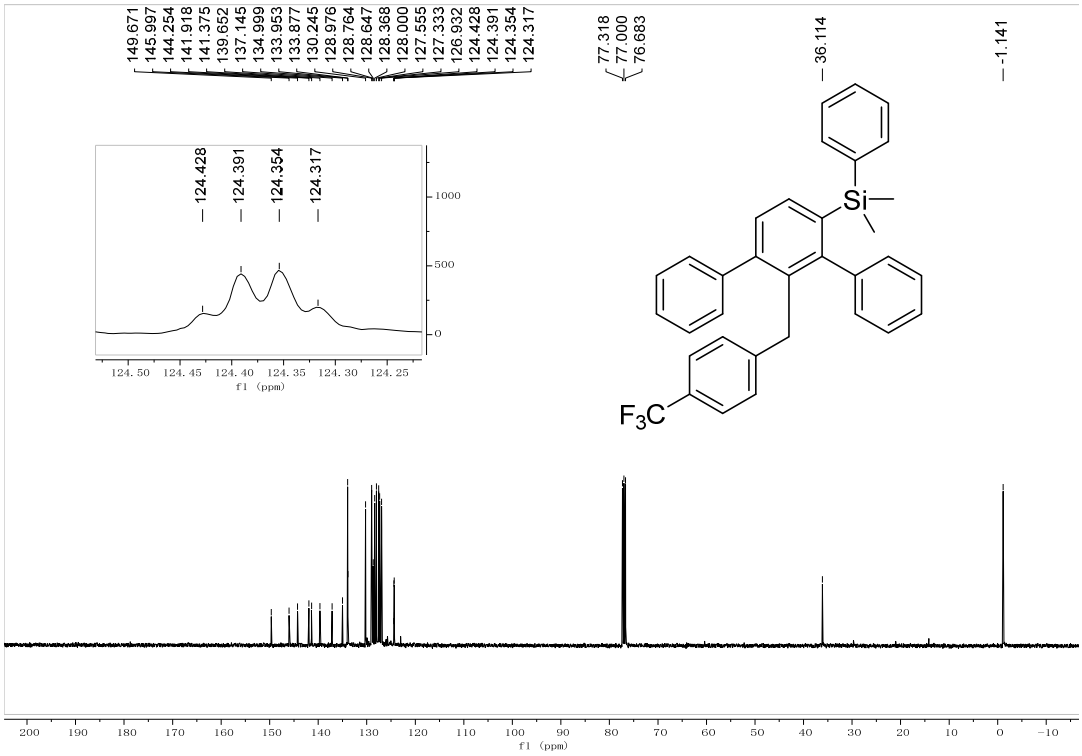


^{13}C NMR (100 MHz, $CDCl_3$)

dimethyl(phenyl)(2'-(4-(trifluoromethyl)benzyl)-[1,1':3',1''-terphenyl]-4'-yl)silane (4aha):

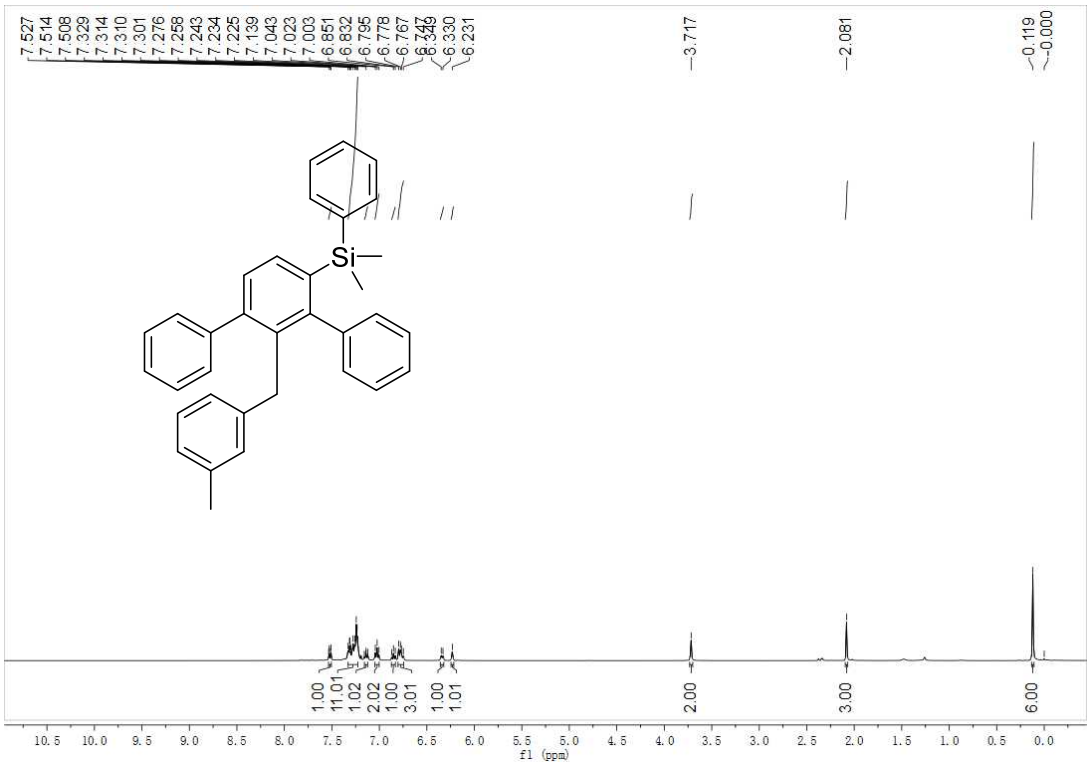


^{1}H NMR (400 MHz, $CDCl_3$)

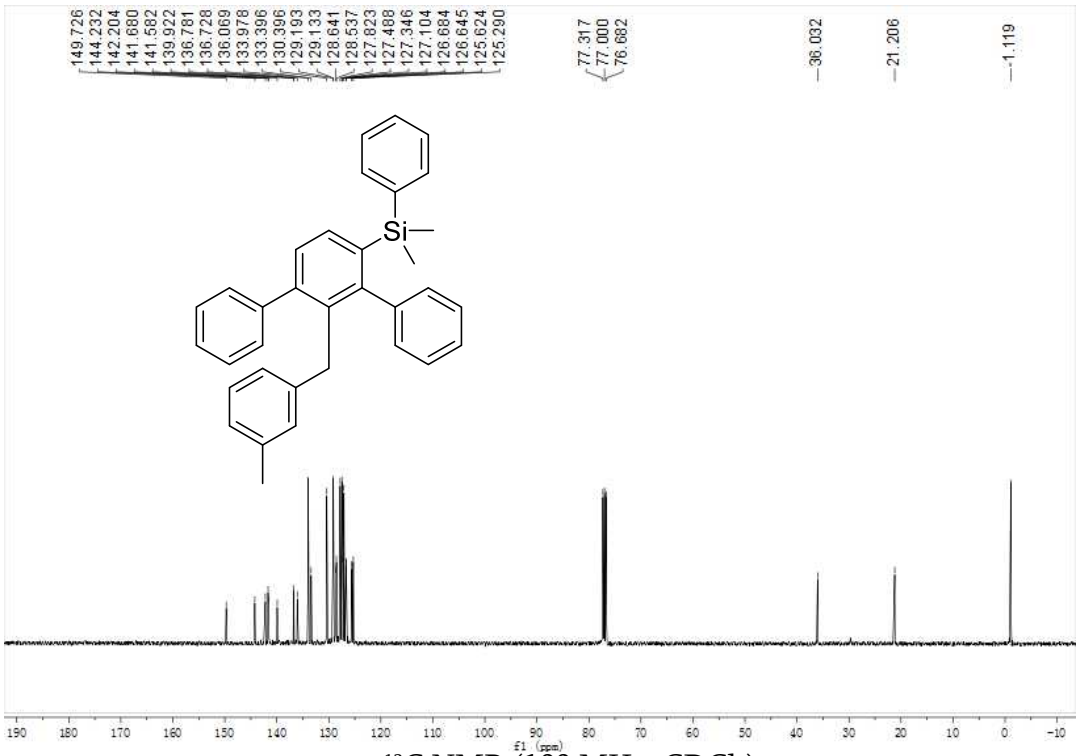


^{13}C NMR (100 MHz, $CDCl_3$)

dimethyl(2'-(3-methylbenzyl)-[1,1':3',1''-terphenyl]-4'-yl)(phenyl)silane (4aia):

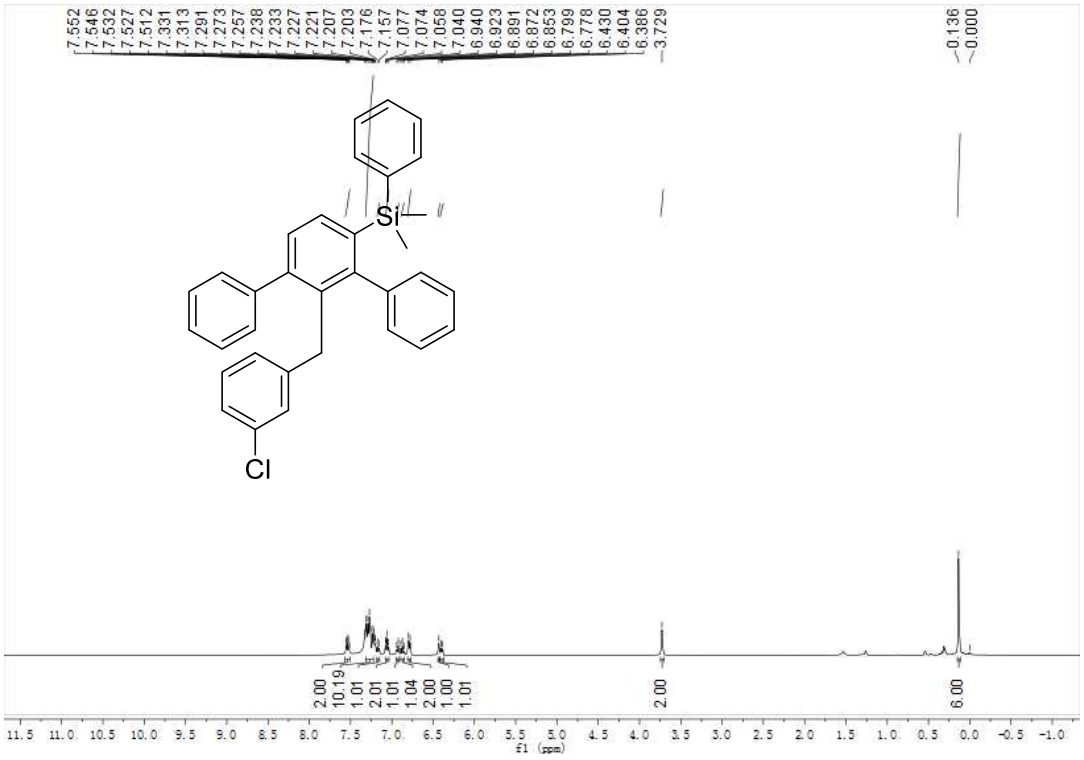


^{1}H NMR (400 MHz, $CDCl_3$)

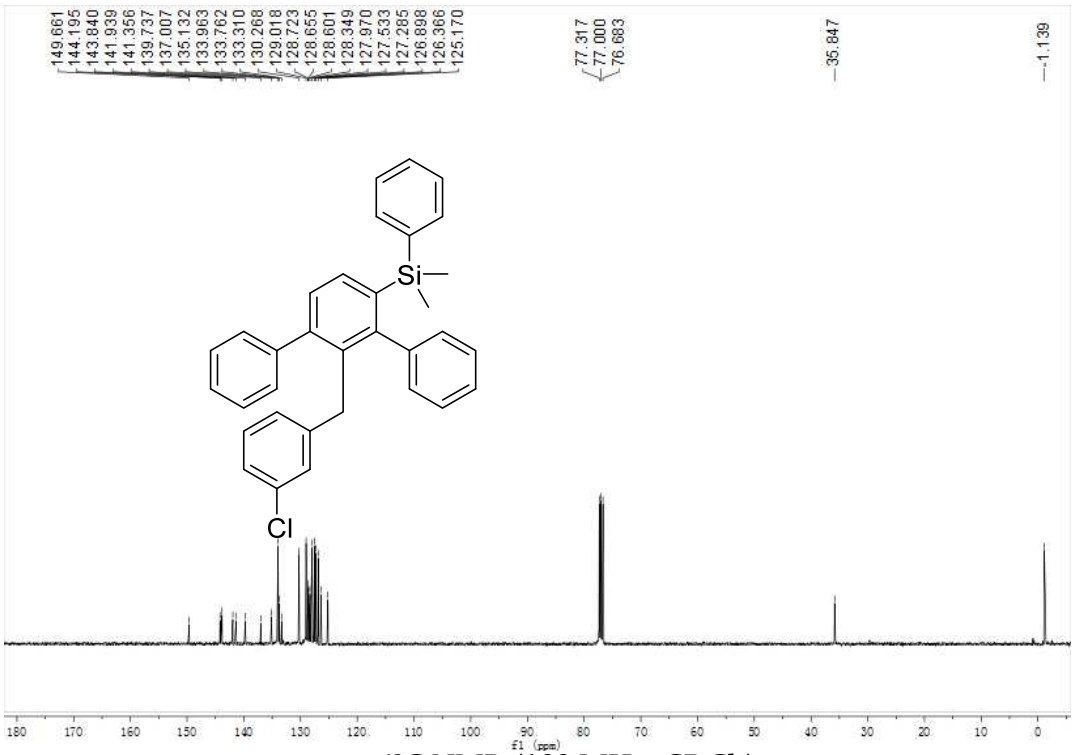


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(3-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aja):

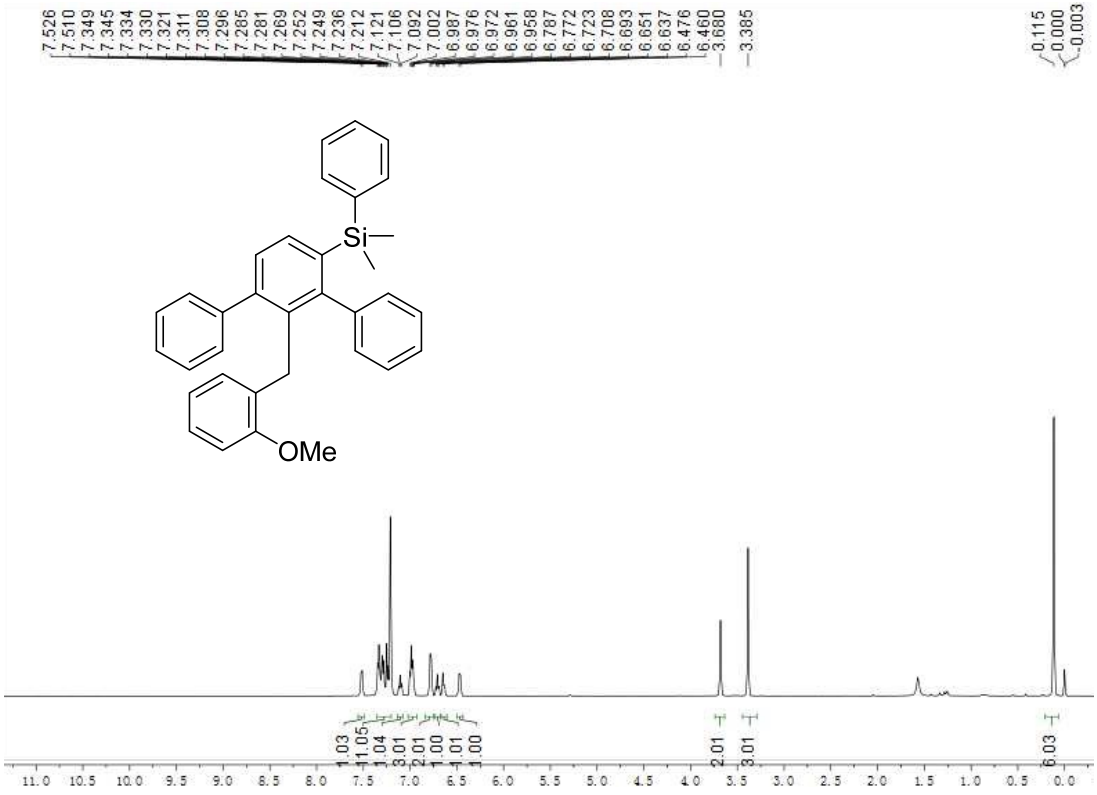


^{1}H NMR (400 MHz, $CDCl_3$)

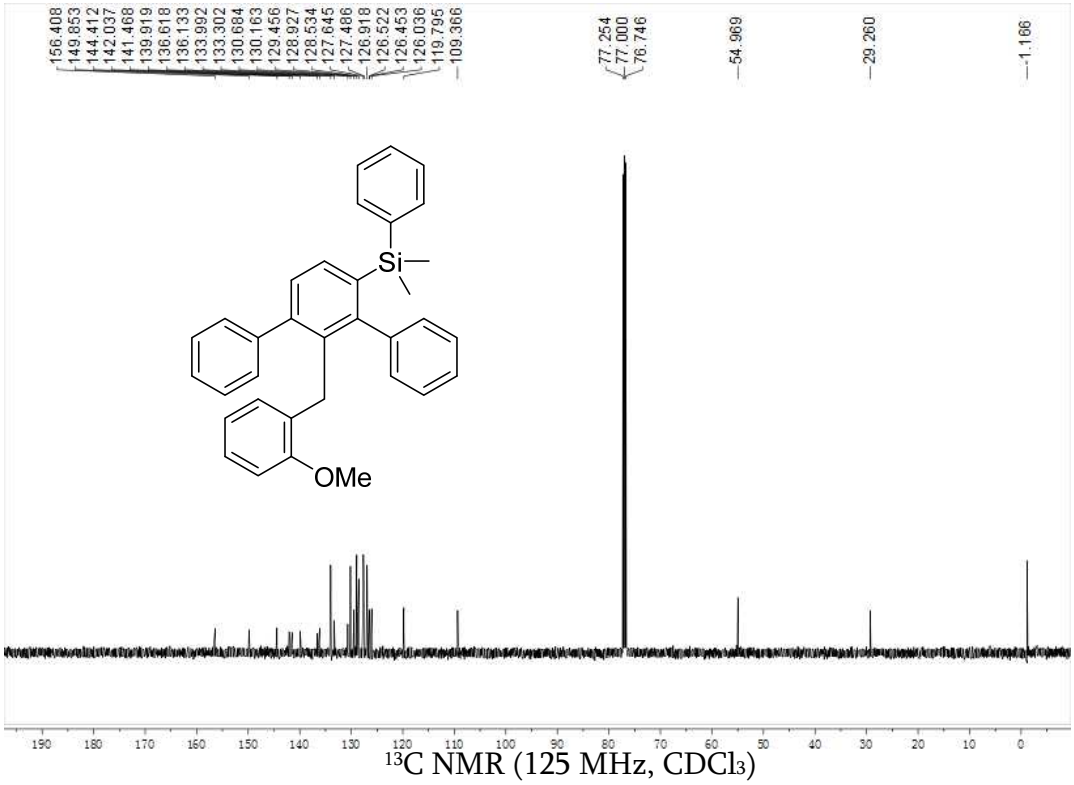


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(2-methoxybenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4aka):

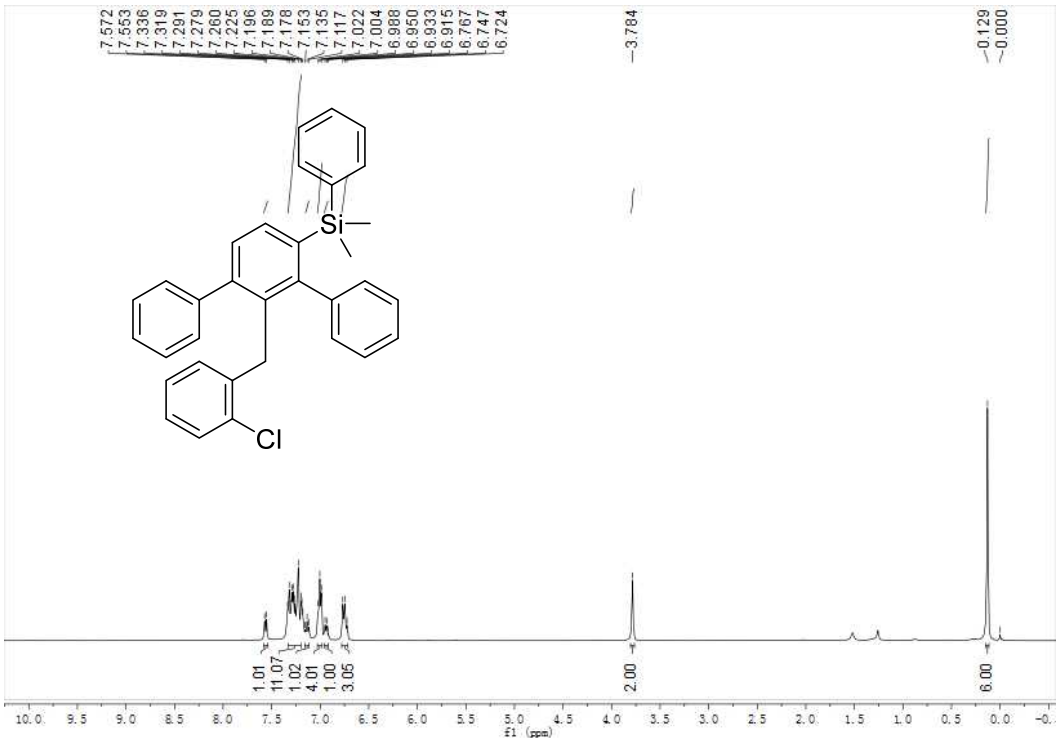


^{1}H NMR (500 MHz, $CDCl_3$)

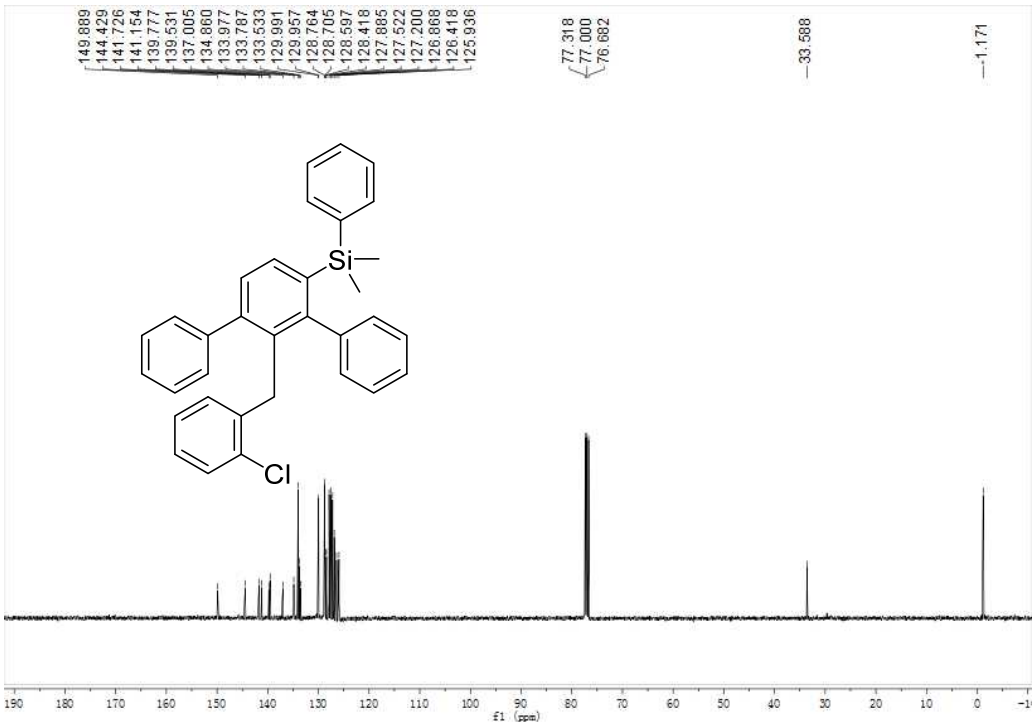


^{13}C NMR (125 MHz, $CDCl_3$)

(2'-(2-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4ala):

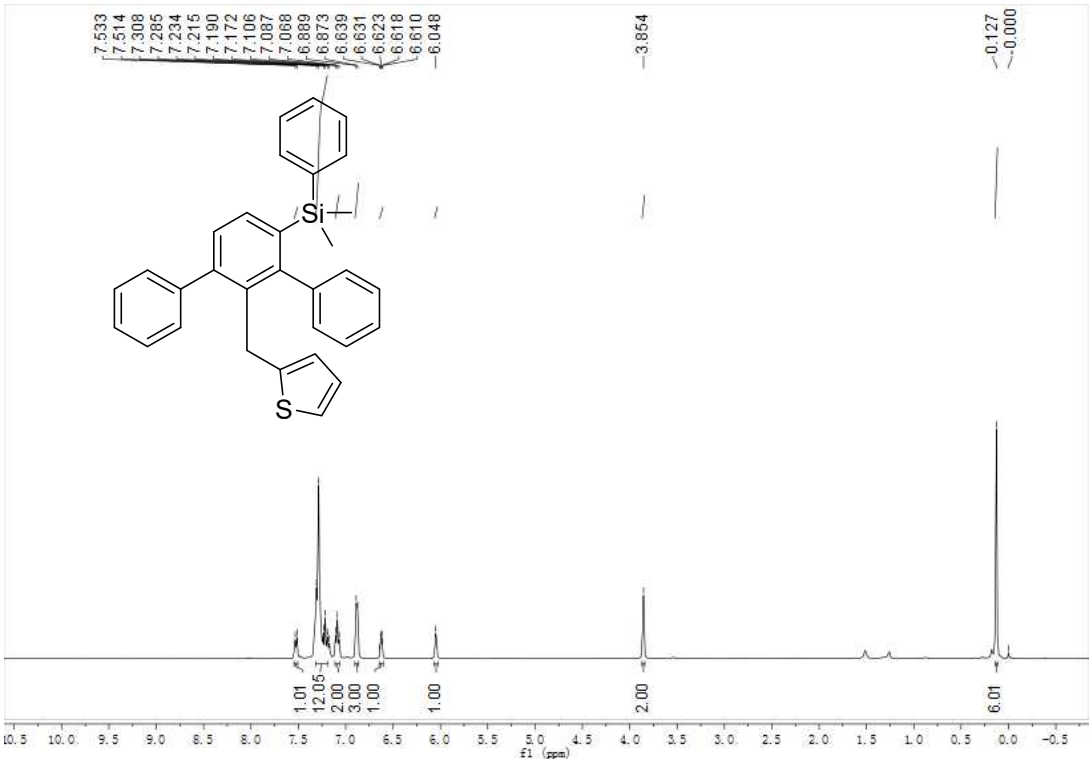


^{1}H NMR (400 MHz, $CDCl_3$)

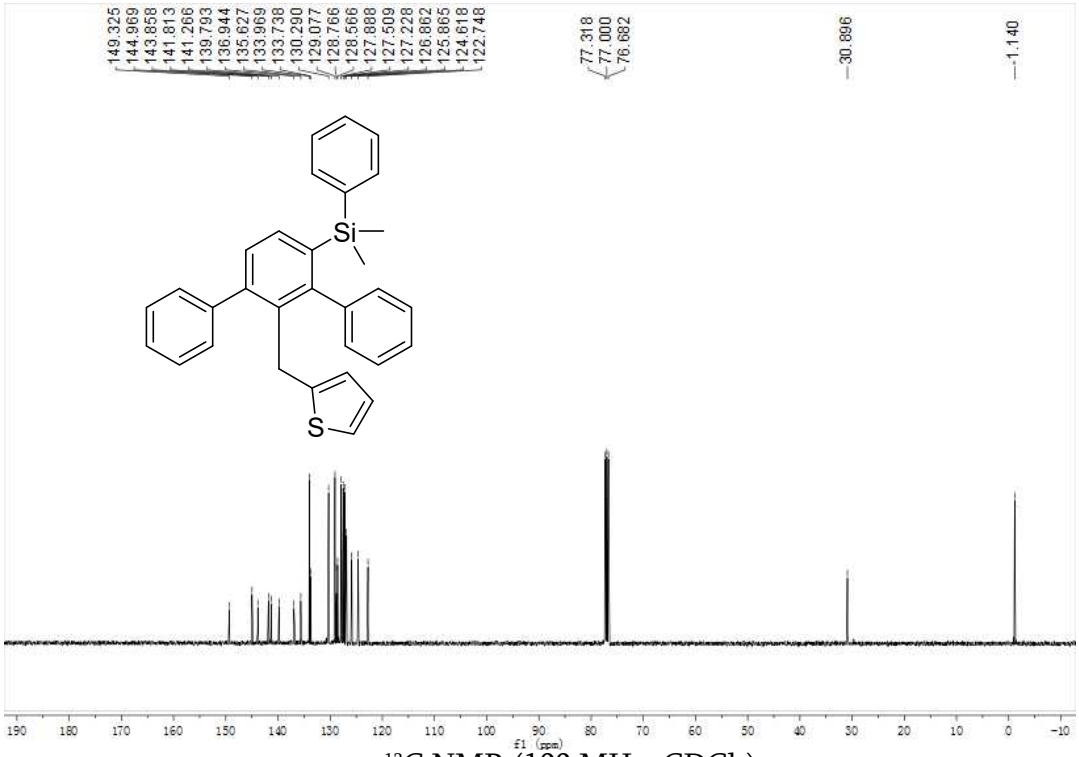


^{13}C NMR (100 MHz, $CDCl_3$)

dimethyl(phenyl)(2'-(thiophen-2-ylmethyl)-[1,1':3',1''-terphenyl]-4'-yl)silane (4ama):

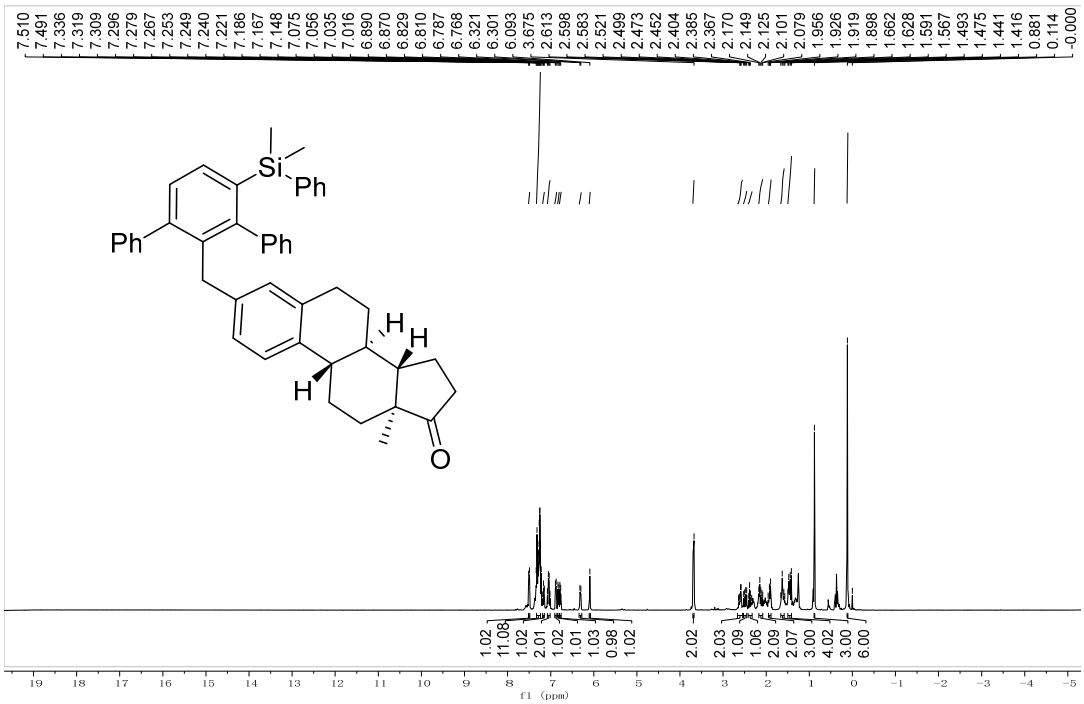


^{1}H NMR (400 MHz, $CDCl_3$)

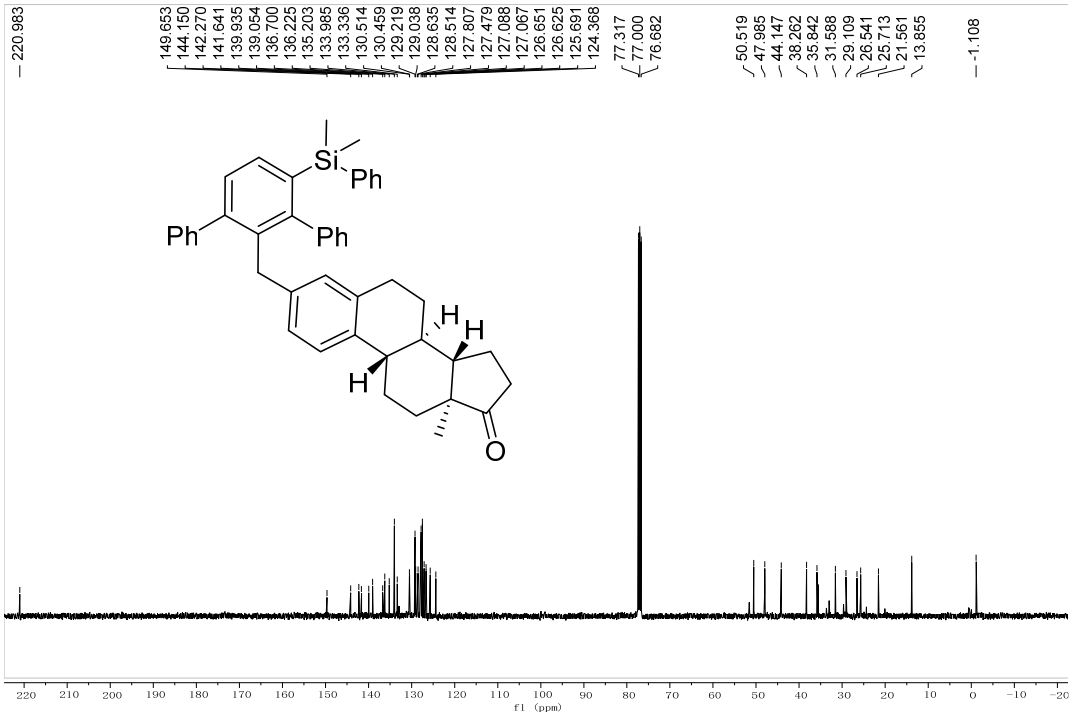


^{13}C NMR (100 MHz, $CDCl_3$)

(8R,9S,13S,14S)-3-((4'-(dimethyl(phenyl)silyl)-[1,1':3',1''-terphenyl]-2'-yl)methyl)-13-methyl-6,7,8,9,11,12,13,14,15,16-decahydro-17H-cyclopenta[a]phenanthren-17-one (4aoa):

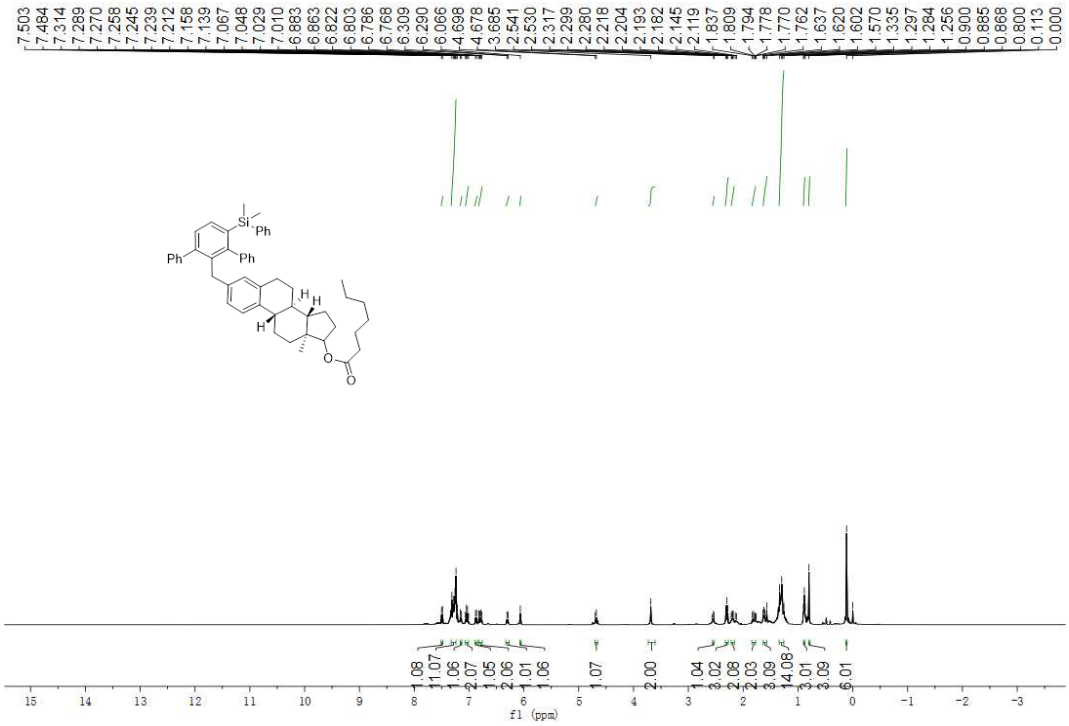


^{1}H NMR (400 MHz, $CDCl_3$)

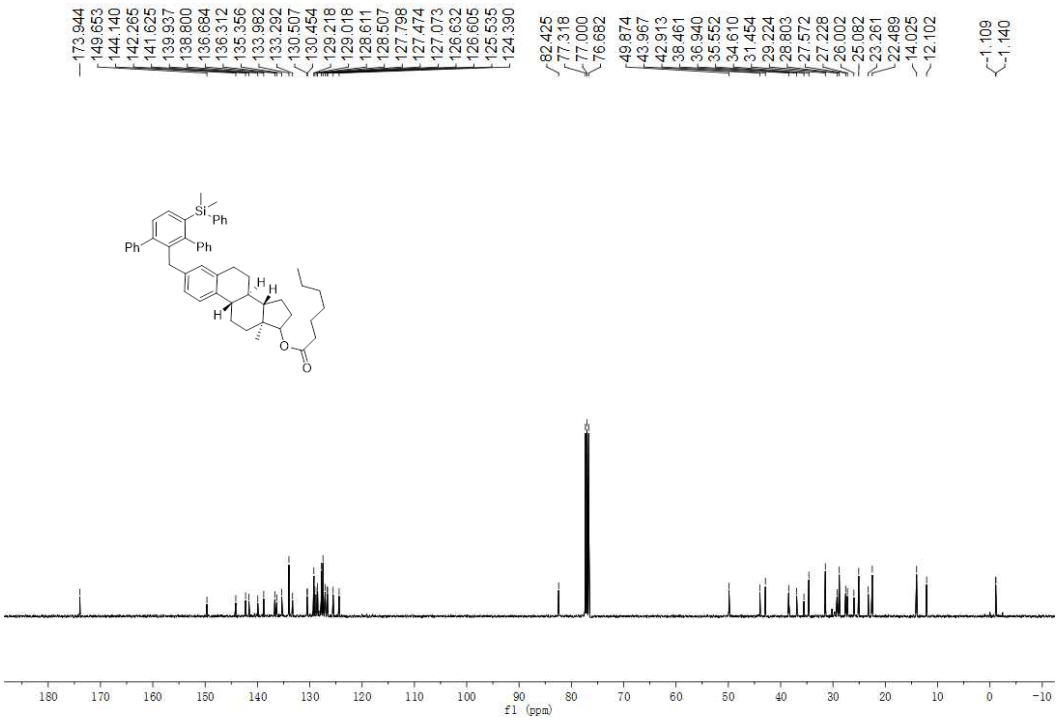


^{13}C NMR (100 MHz, $CDCl_3$)

(8R,9S,13S,14S)-3-((4'-(dimethyl(phenyl)silyl)-[1,1':3',1''-terphenyl]-2'-yl)methyl)-13-methyl-7,8,9,11,12,13,14,15,16,17-decahydro-6H-cyclopenta[a]phenanthren-17-yl heptanoate (4apa):

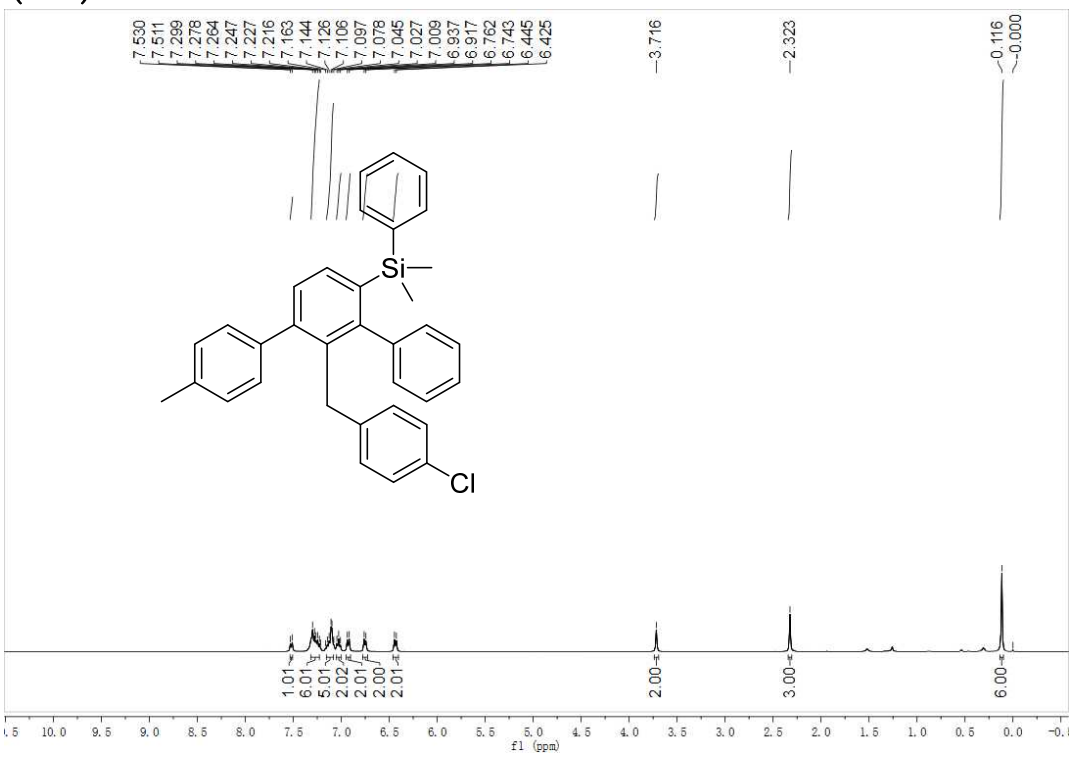


^{1}H NMR (400 MHz, $CDCl_3$)

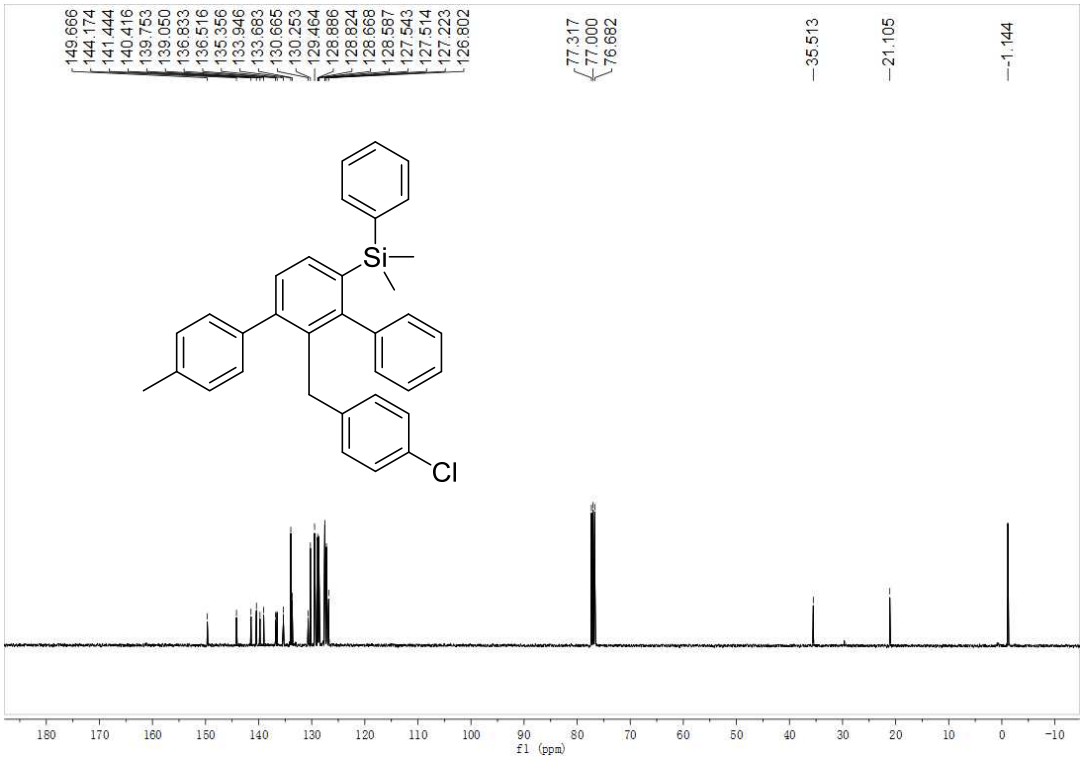


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-4-methyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4eaa):

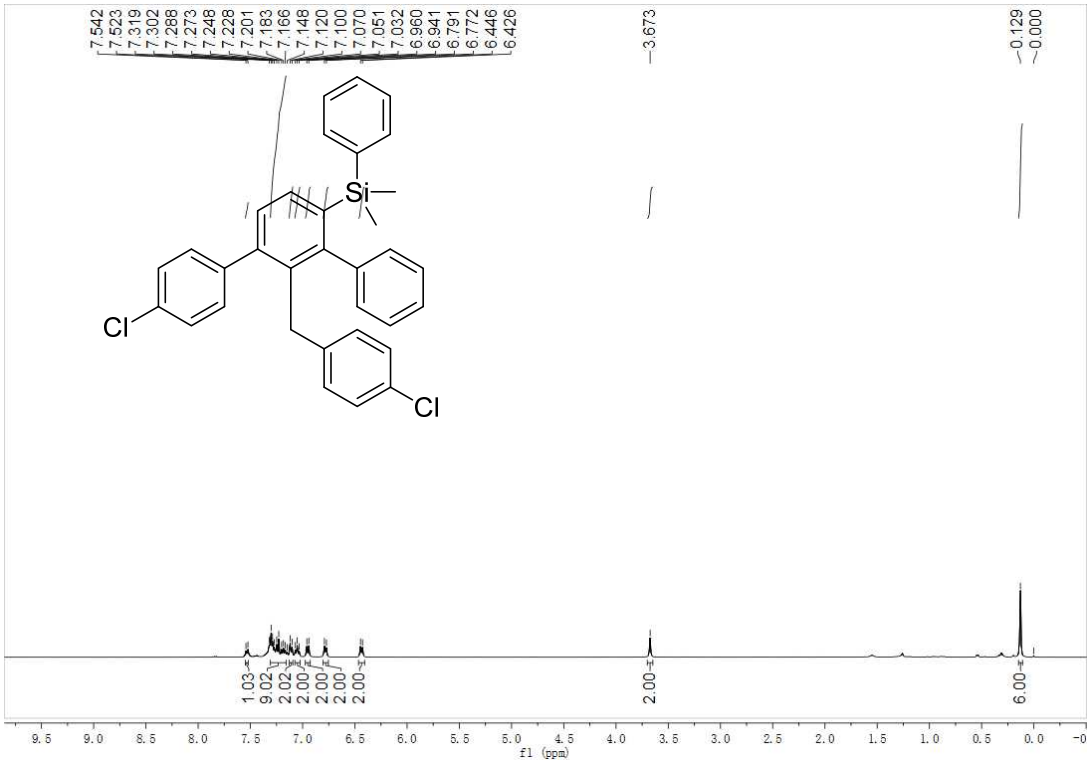


^{1}H NMR (400 MHz, $CDCl_3$)

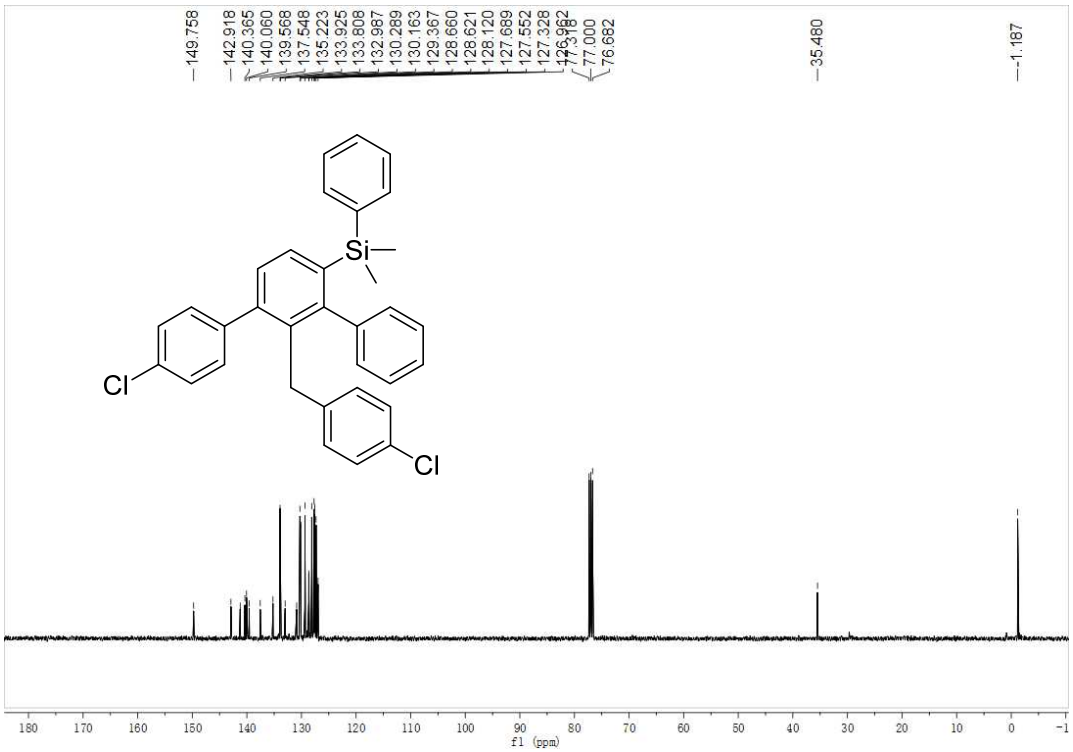


^{13}C NMR (100 MHz, $CDCl_3$)

(4-chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (5-(4faa):

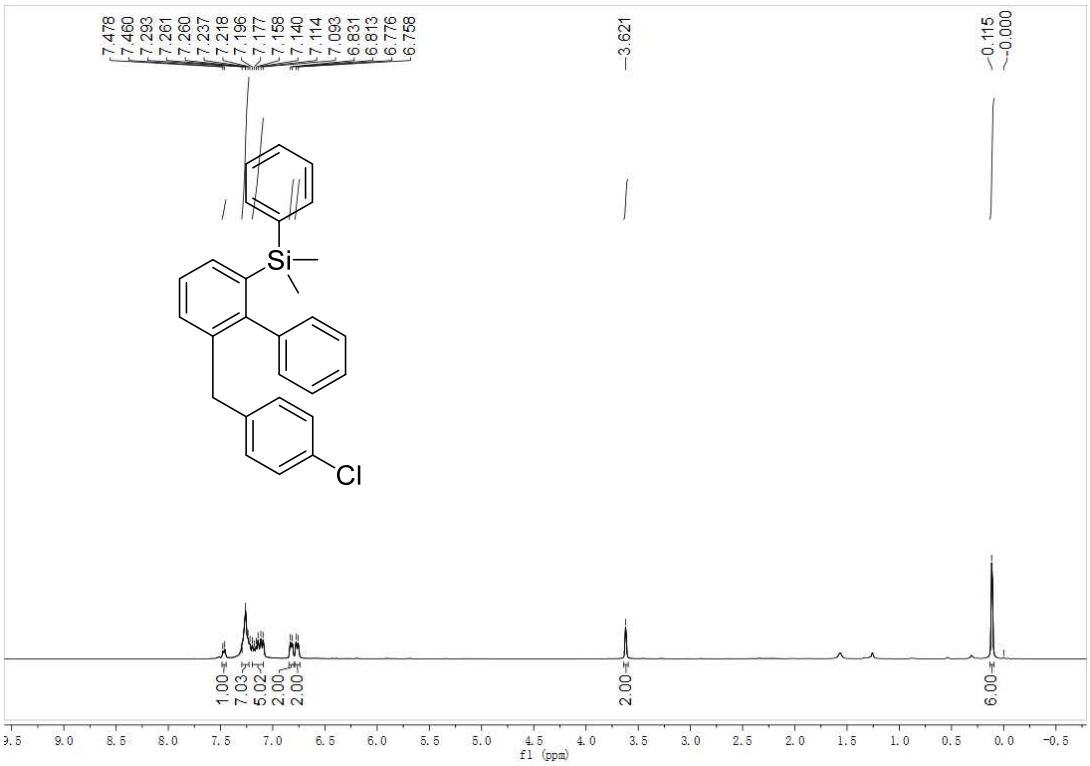


^{1}H NMR (400 MHz, $CDCl_3$)

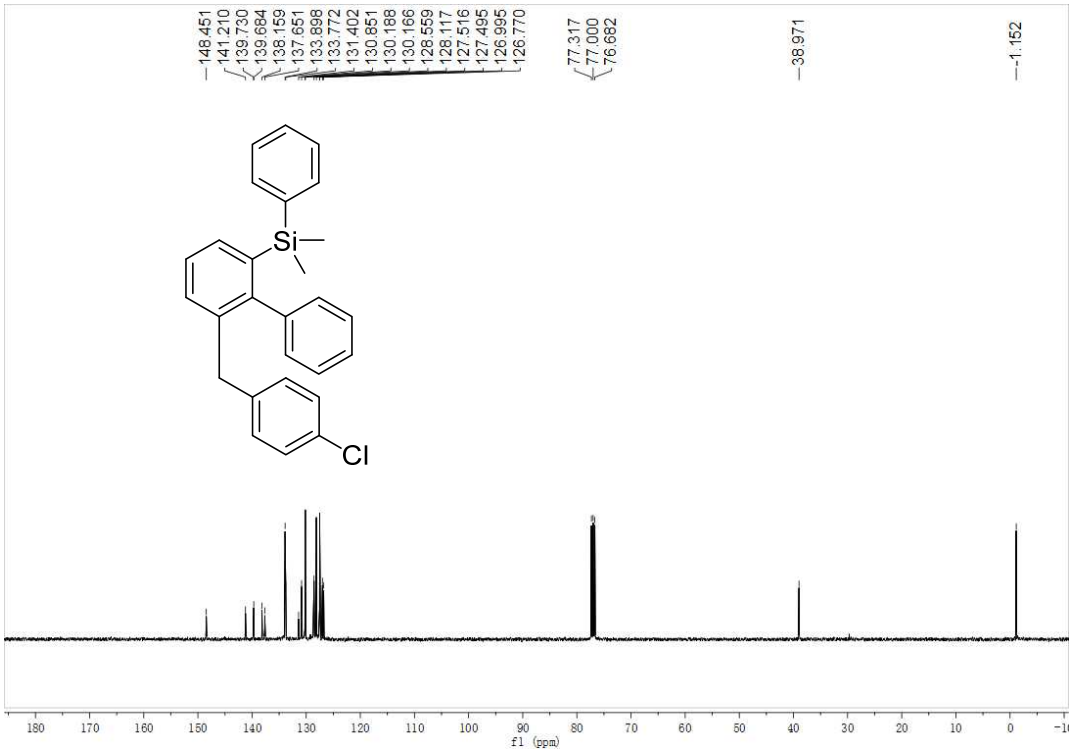


^{13}C NMR (100 MHz, $CDCl_3$)

(6-(4-chlorobenzyl)-[1,1'-biphenyl]-2-yl)dimethyl(phenyl)silane (4gaa):

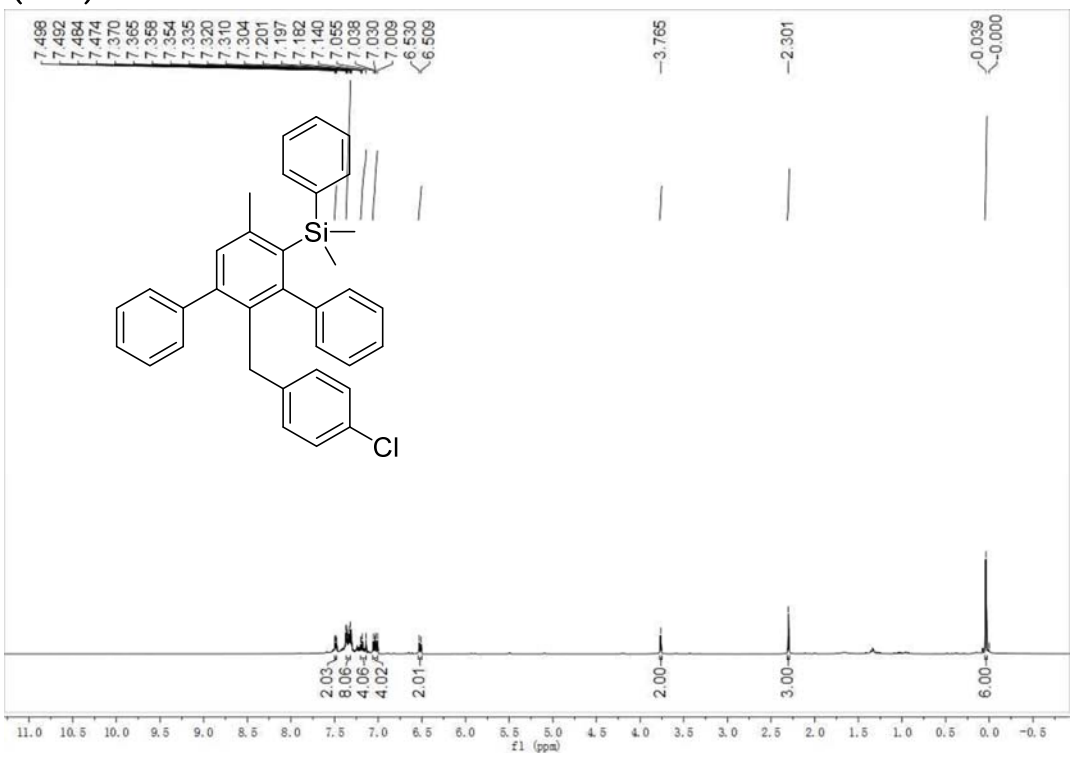


^{1}H NMR (400 MHz, $CDCl_3$)

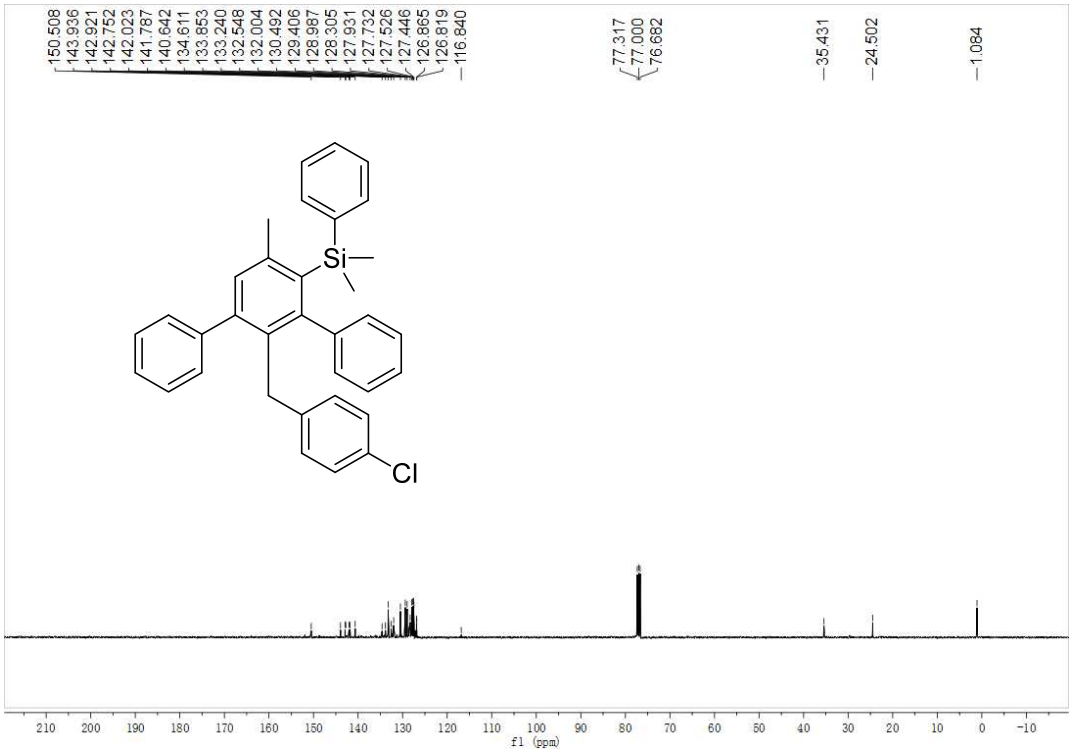


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-5'-methyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4haa):

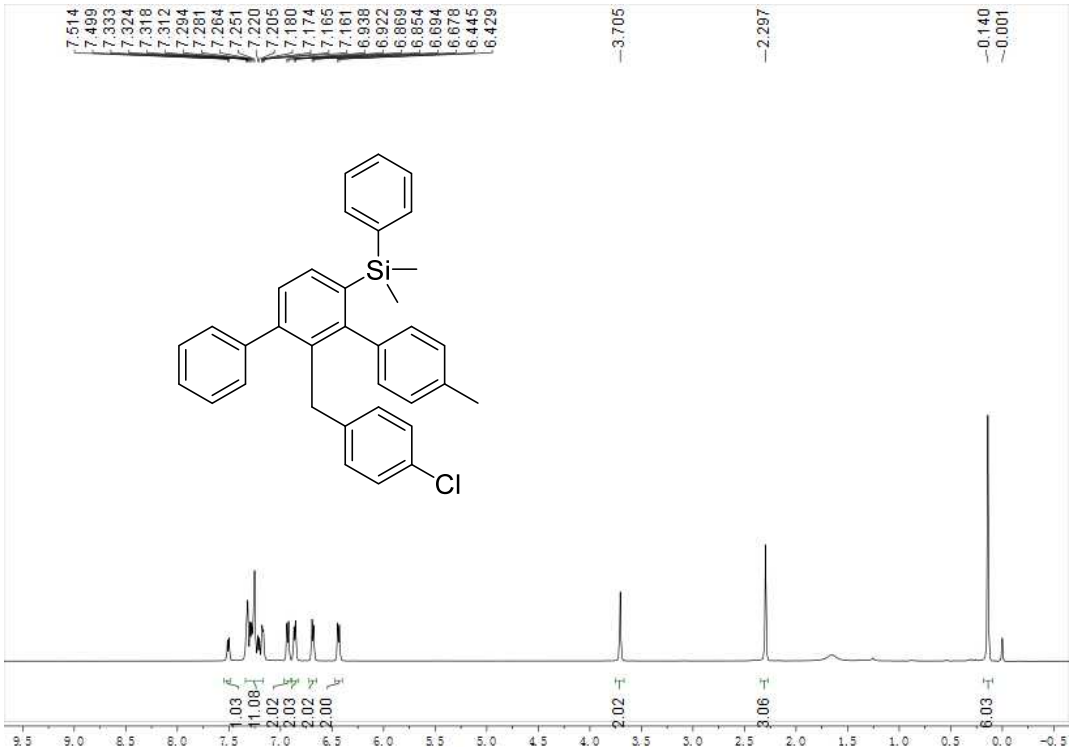


^{1}H NMR (400 MHz, $CDCl_3$)

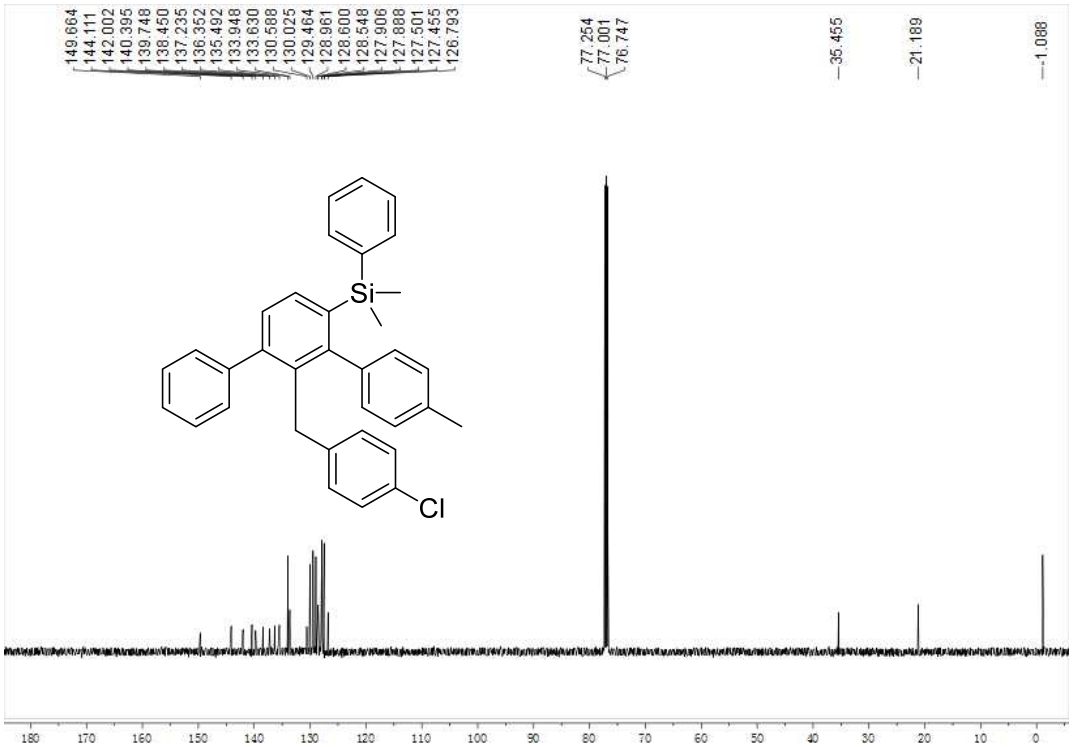


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-4''-methyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4iaa):

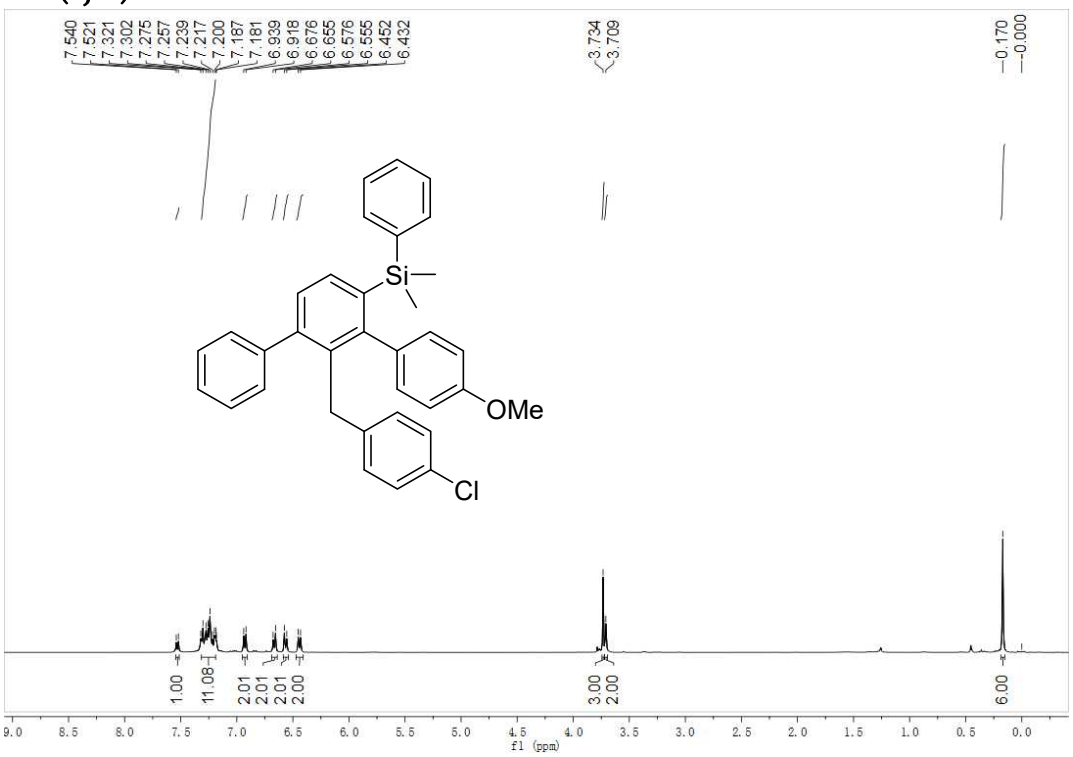


^{1}H NMR (500 MHz, $CDCl_3$)

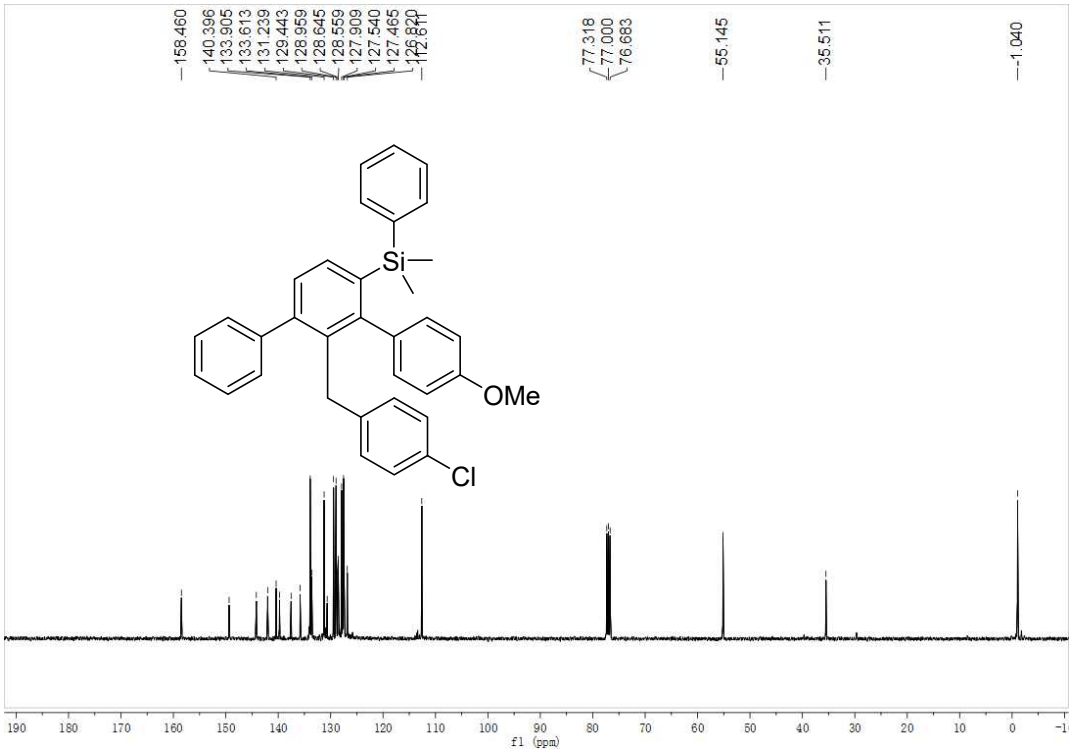


^{13}C NMR (125 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-4''-methoxy-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4jaa):

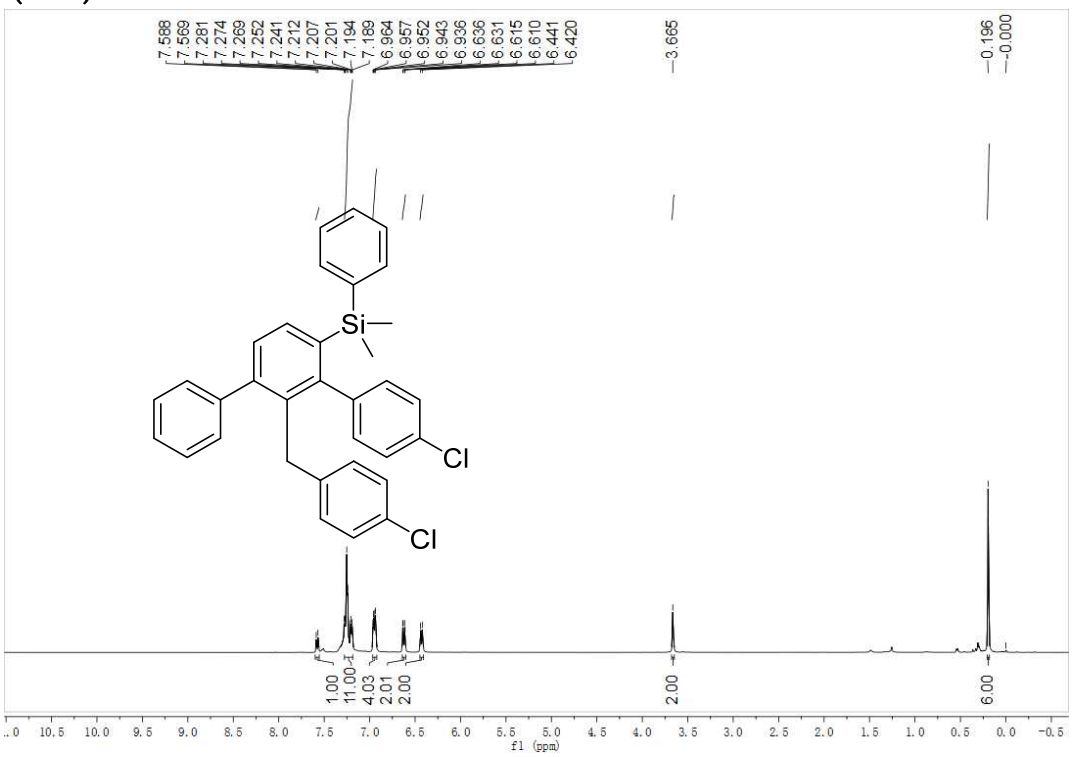


^{1}H NMR (400 MHz, $CDCl_3$)

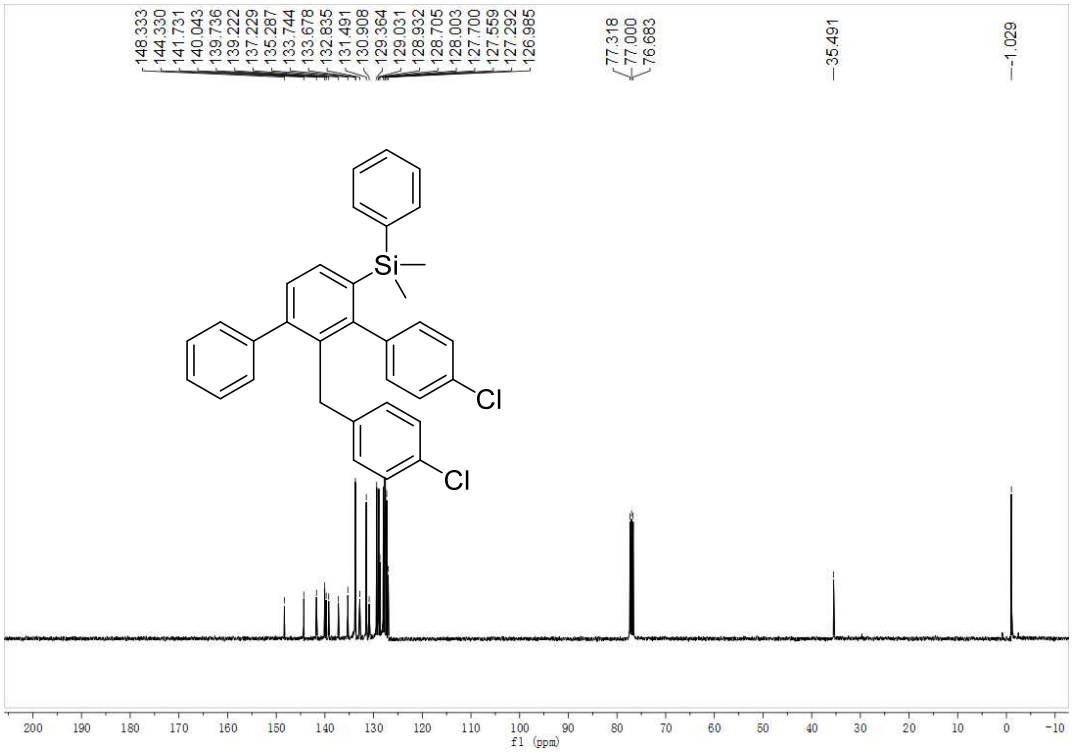


^{13}C NMR (100 MHz, $CDCl_3$)

(4''-chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4kaa):

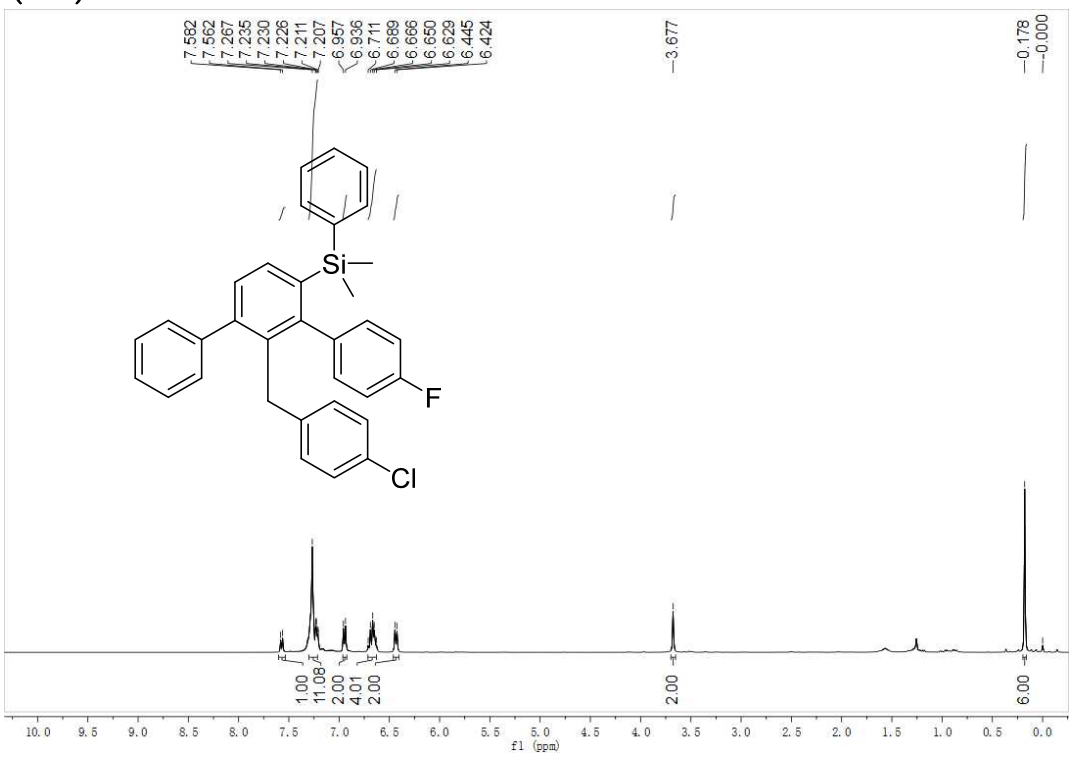


^{1}H NMR (400 MHz, $CDCl_3$)

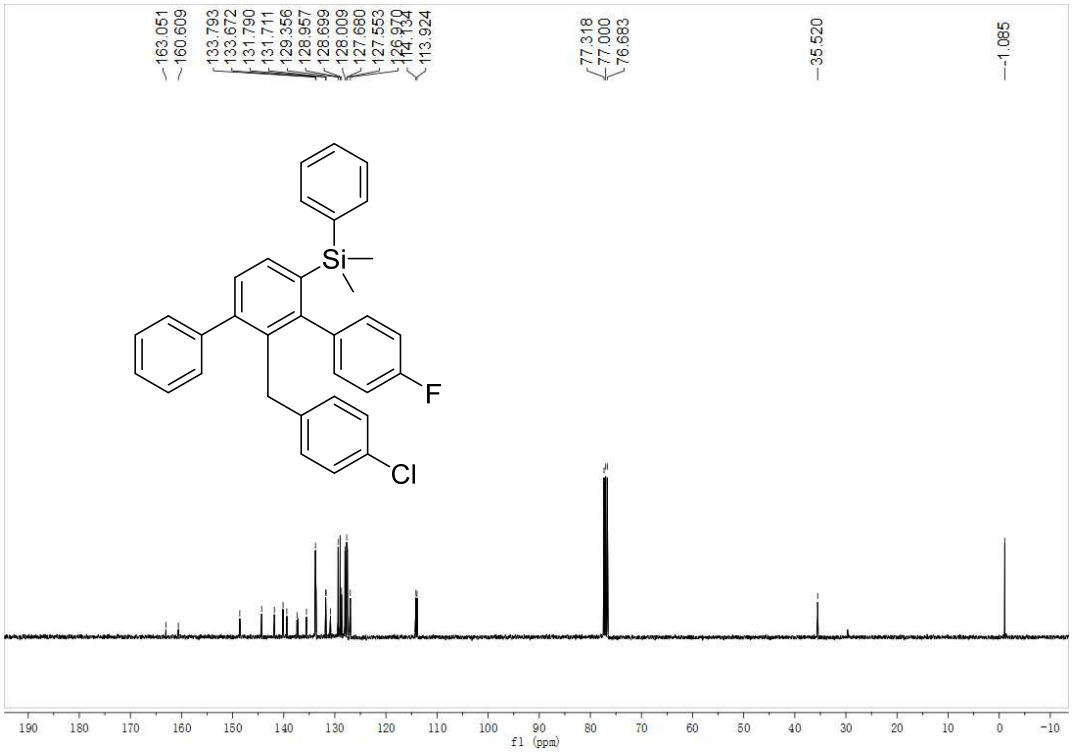


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-4''-fluoro-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4laa):

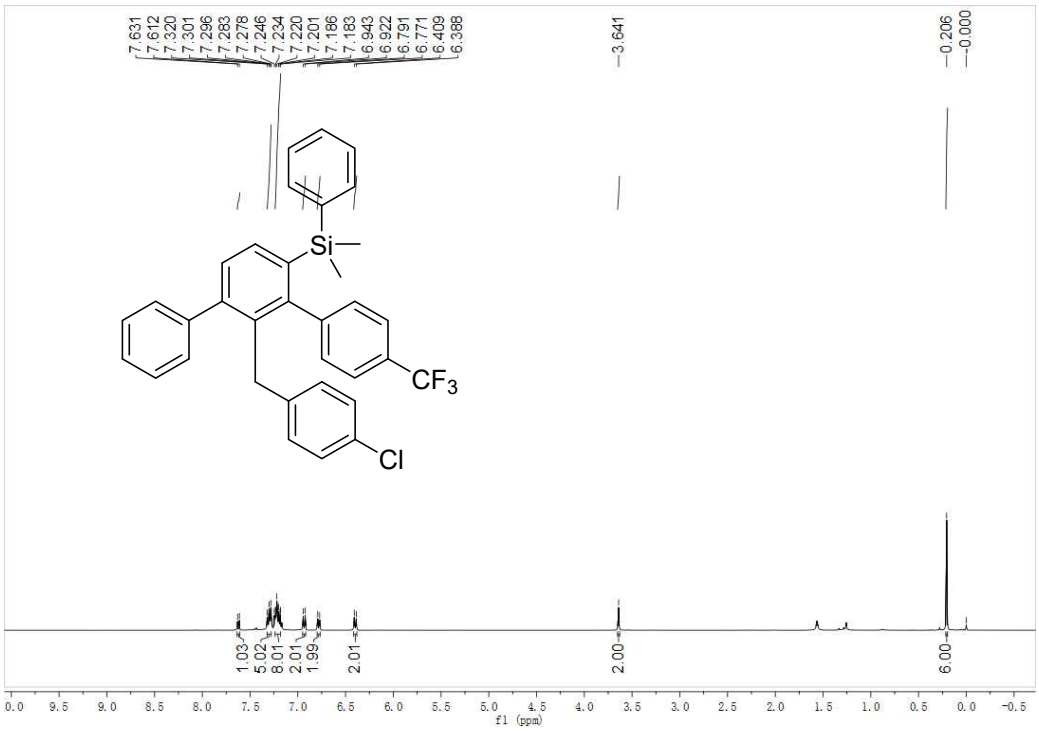


^{1}H NMR (400 MHz, $CDCl_3$)

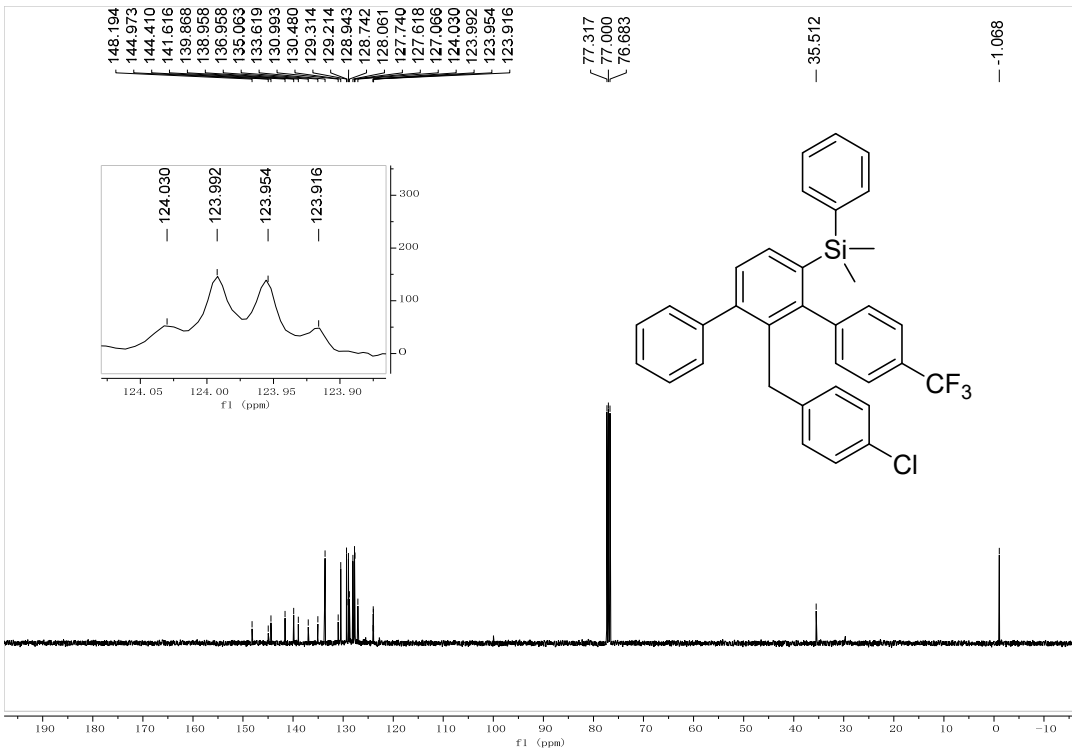


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-4''-(trifluoromethyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl-(phenyl)-silane (4maa):

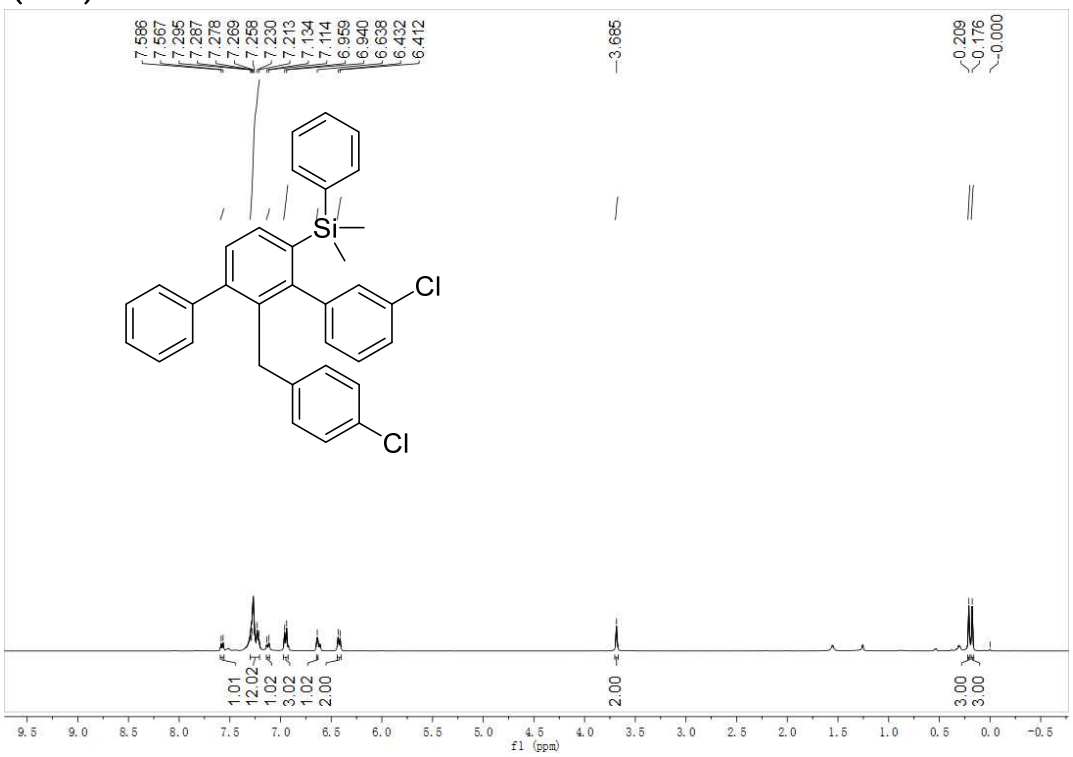


^{1}H NMR (400 MHz, $CDCl_3$)

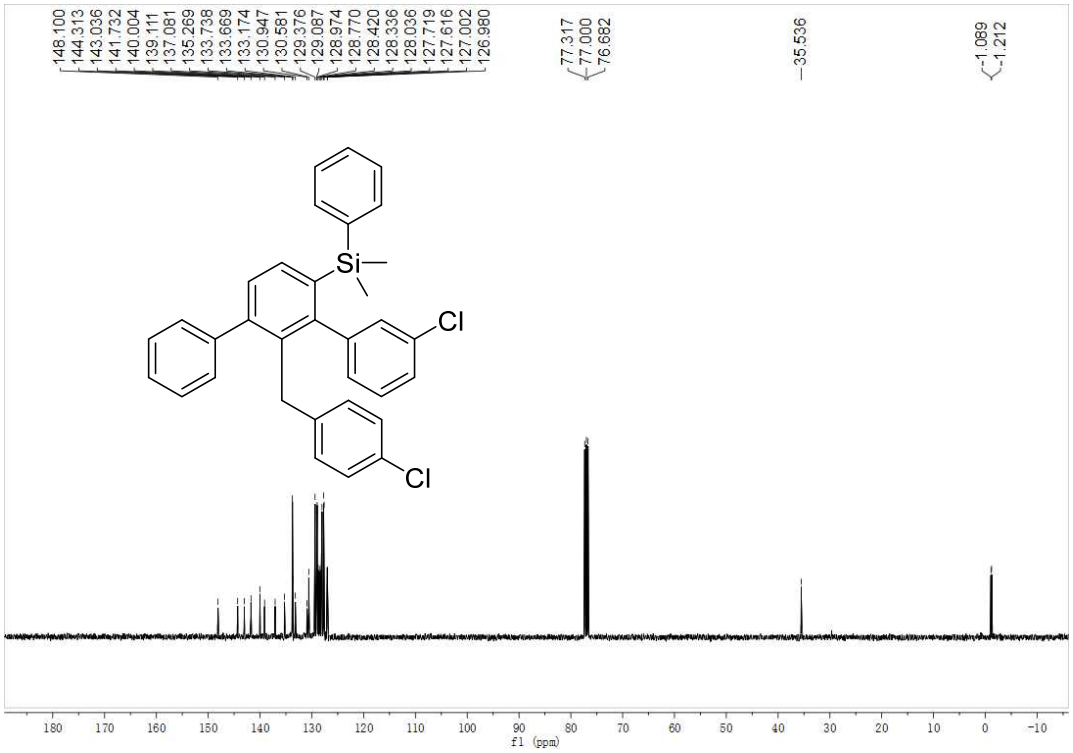


^{13}C NMR (100 MHz, $CDCl_3$)

(3''-chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4naa):

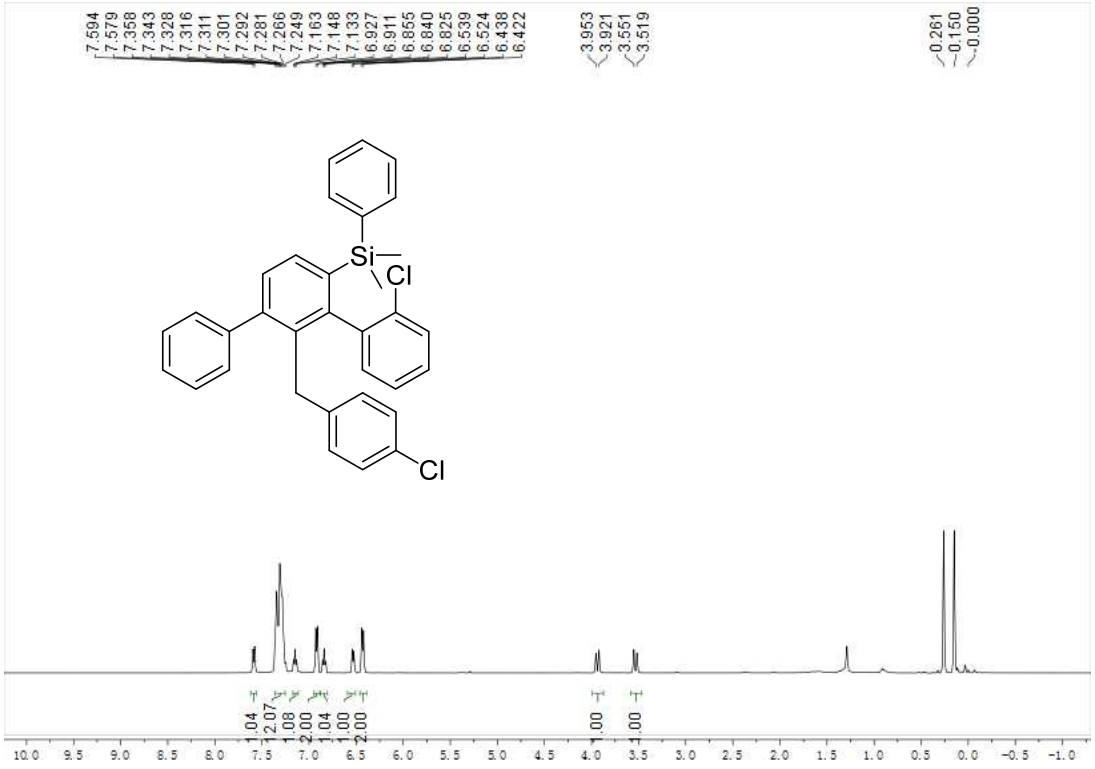


^{1}H NMR (400 MHz, $CDCl_3$)

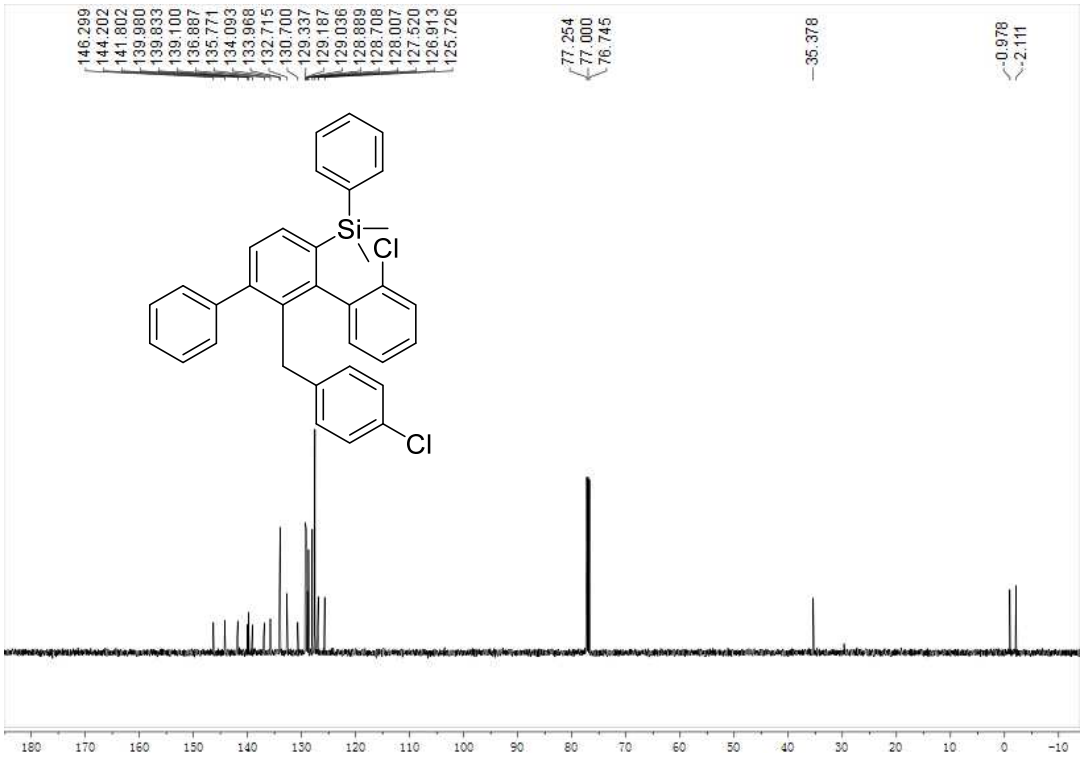


^{13}C NMR (100 MHz, $CDCl_3$)

(2''-chloro-2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4oaa):

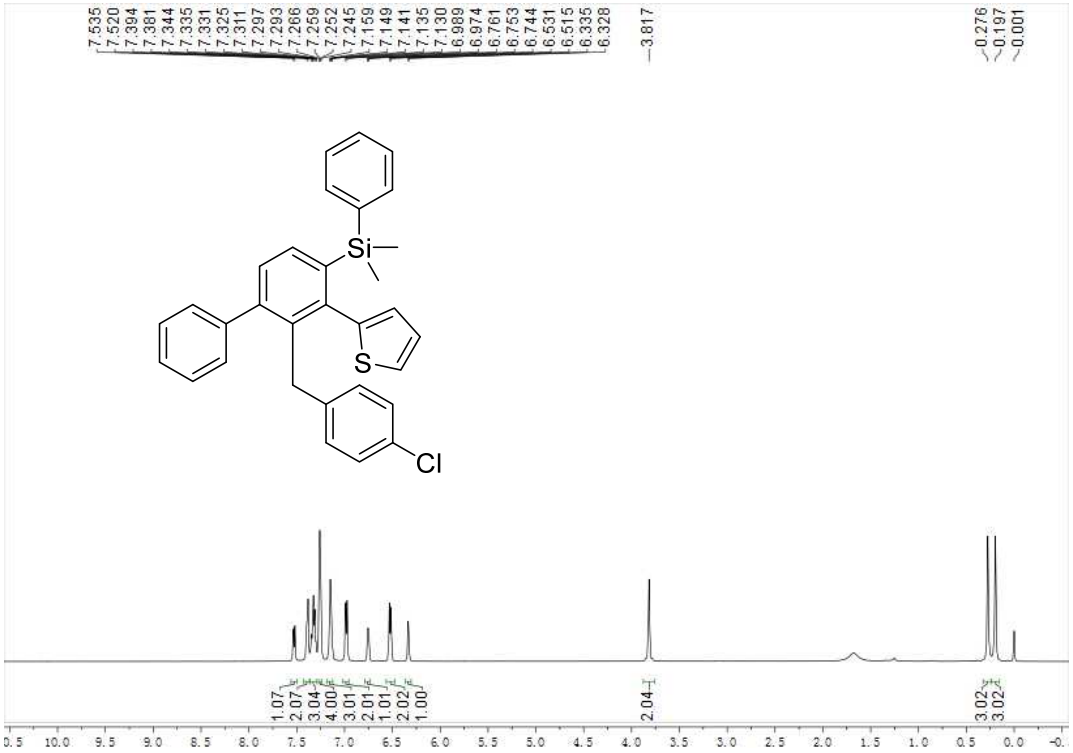


^{1}H NMR (500 MHz, $CDCl_3$)

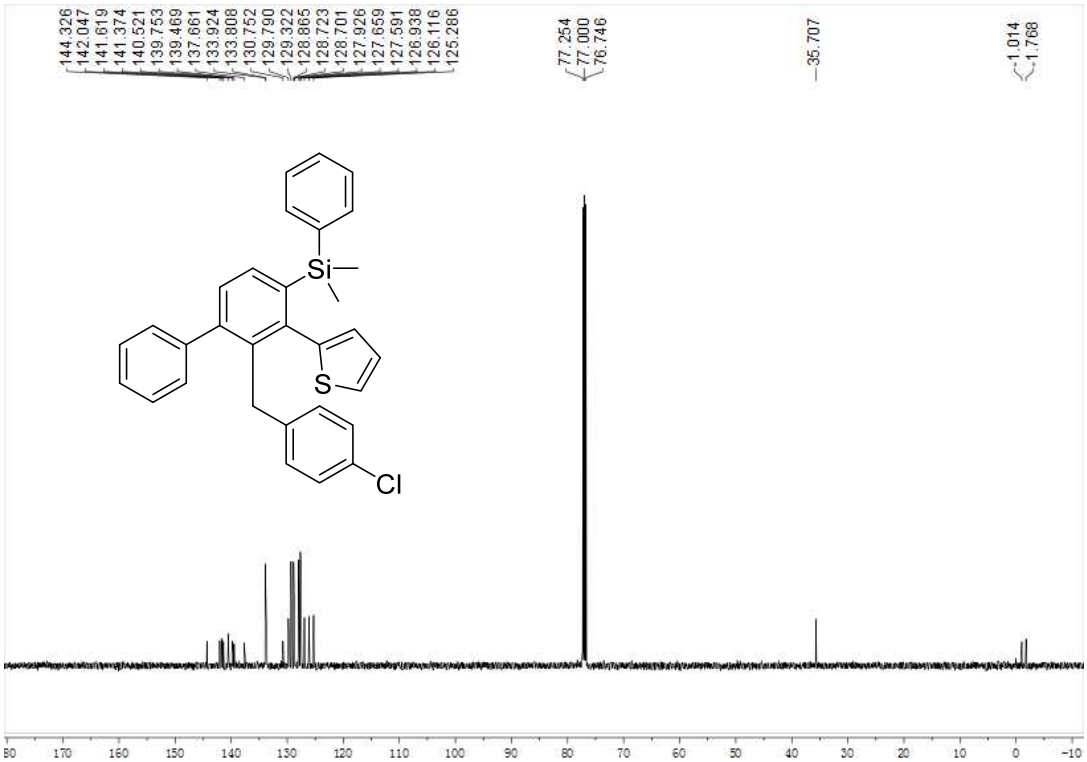


^{13}C NMR (125 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)trihexylsilane (4paa):

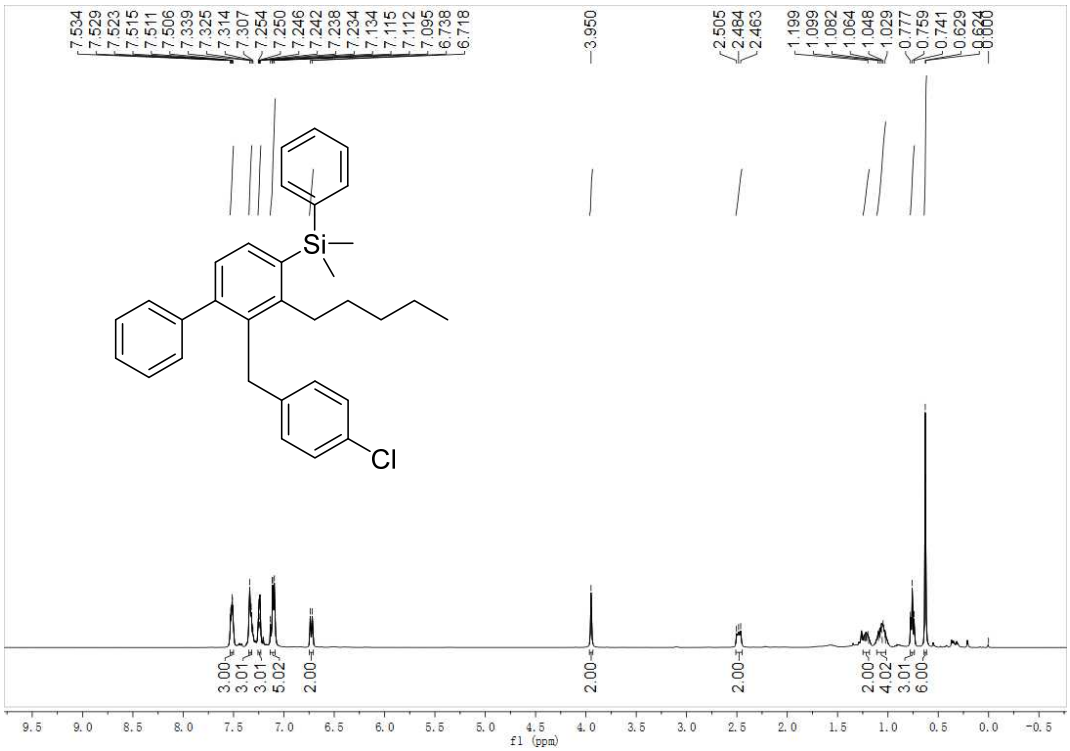


^{1}H NMR (500 MHz, $CDCl_3$)

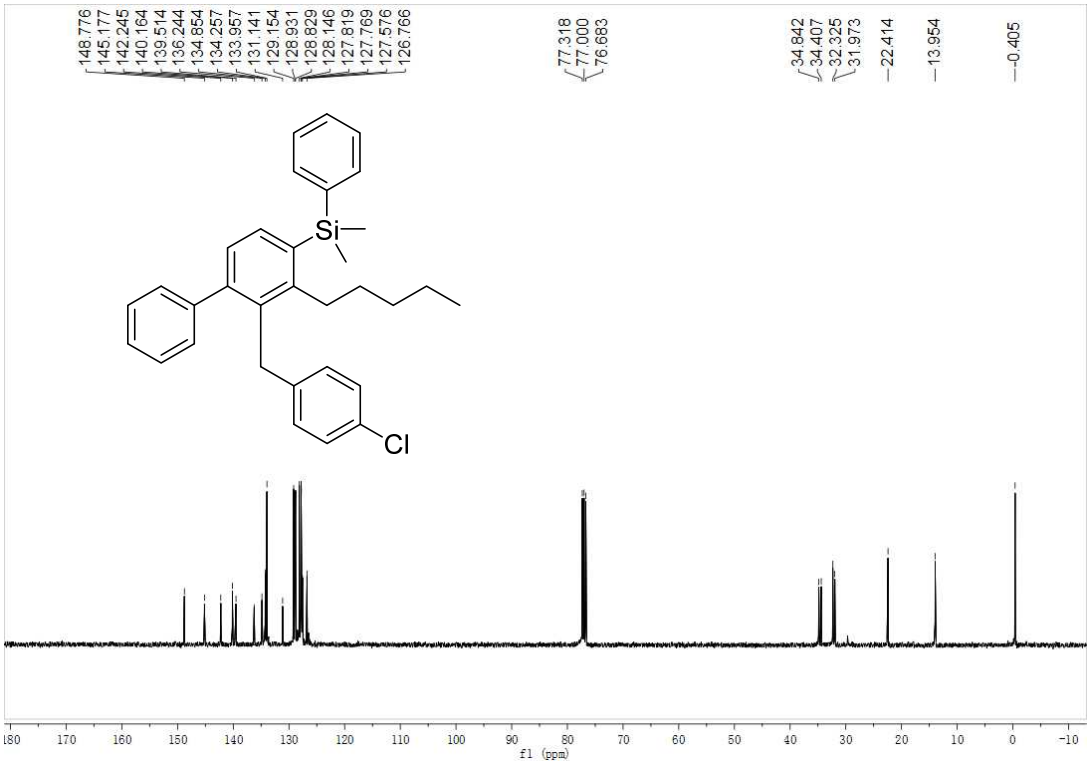


^{13}C NMR (125 MHz, $CDCl_3$)

(2-(4-chlorobenzyl)-3-pentyl-[1,1'-biphenyl]-4-yl)dimethyl(phenyl)silane (4qaa):

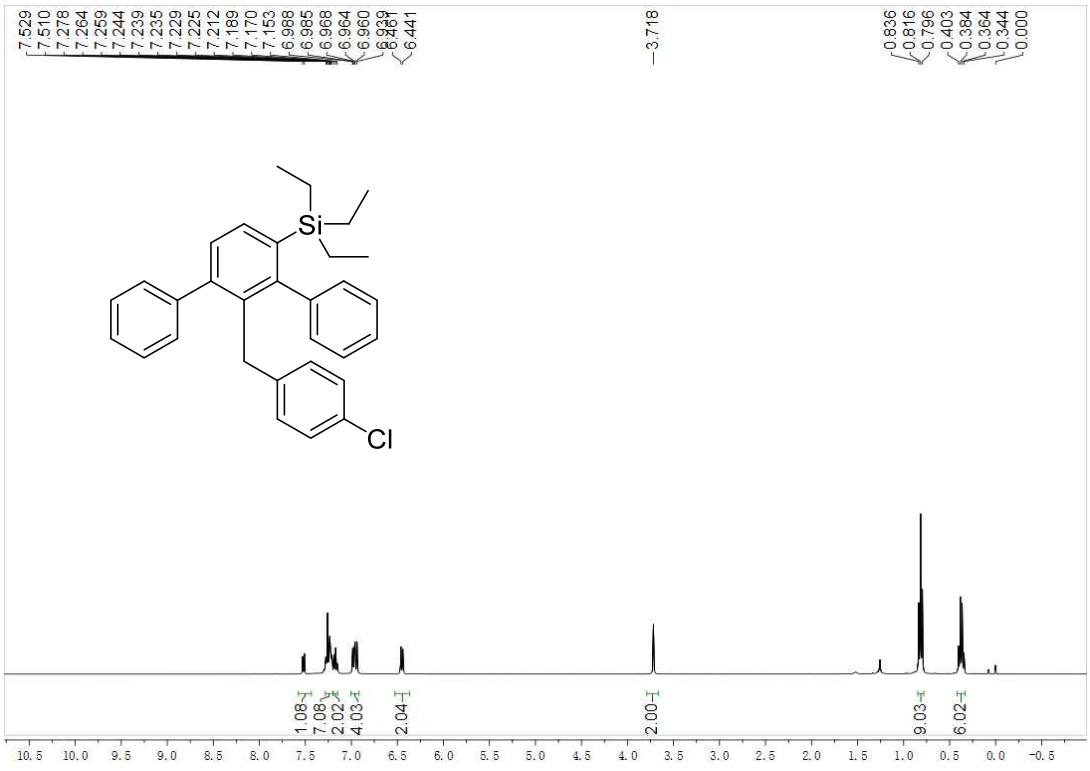


^{1}H NMR (400 MHz, $CDCl_3$)

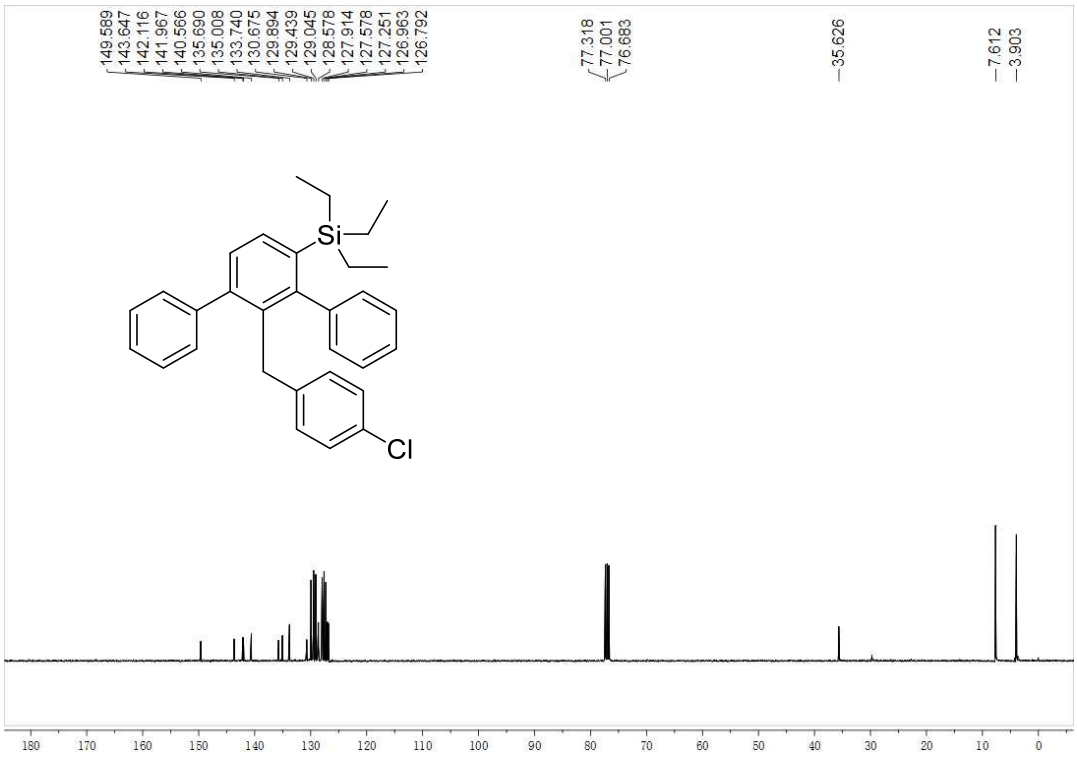


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)triethylsilane (4aab):

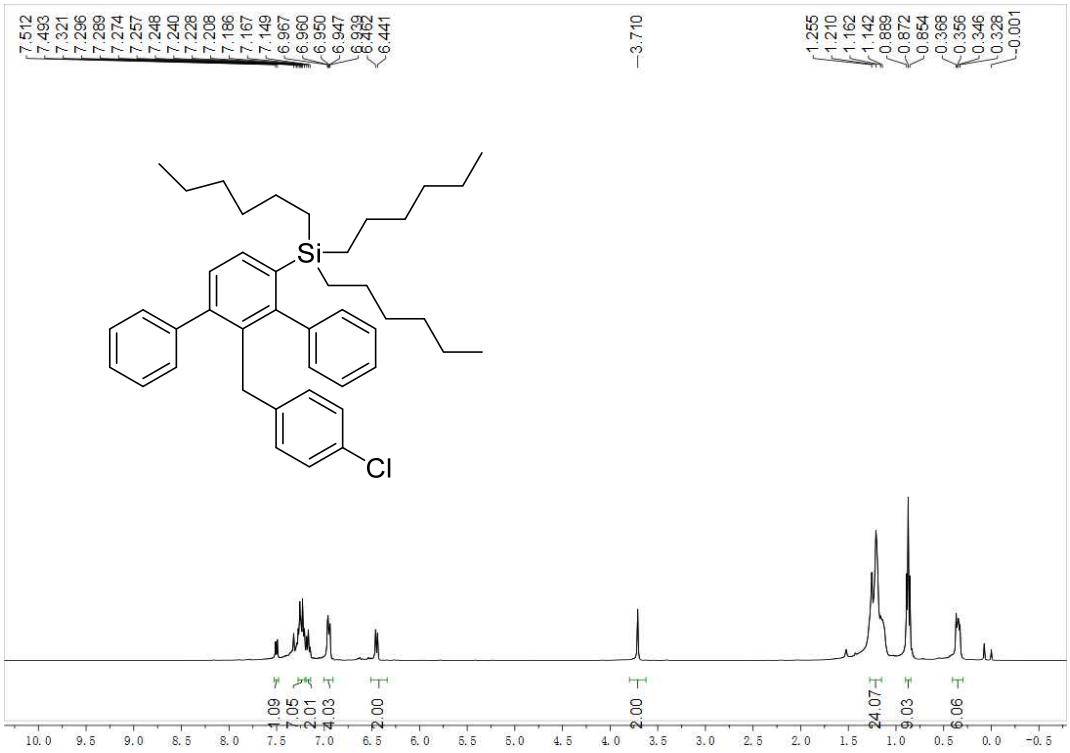


^{1}H NMR (400 MHz, $CDCl_3$)

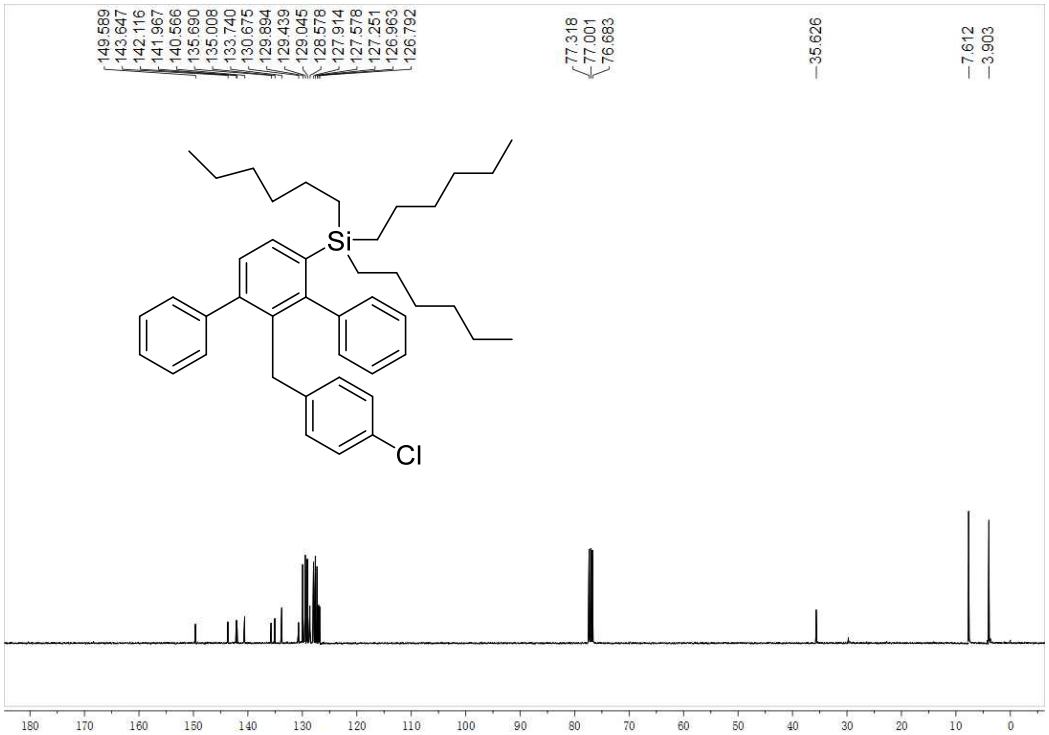


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-(4-chlorobenzyl)-[1,1':3',1''-terphenyl]-4'-yl)trihexylsilane (4aac):

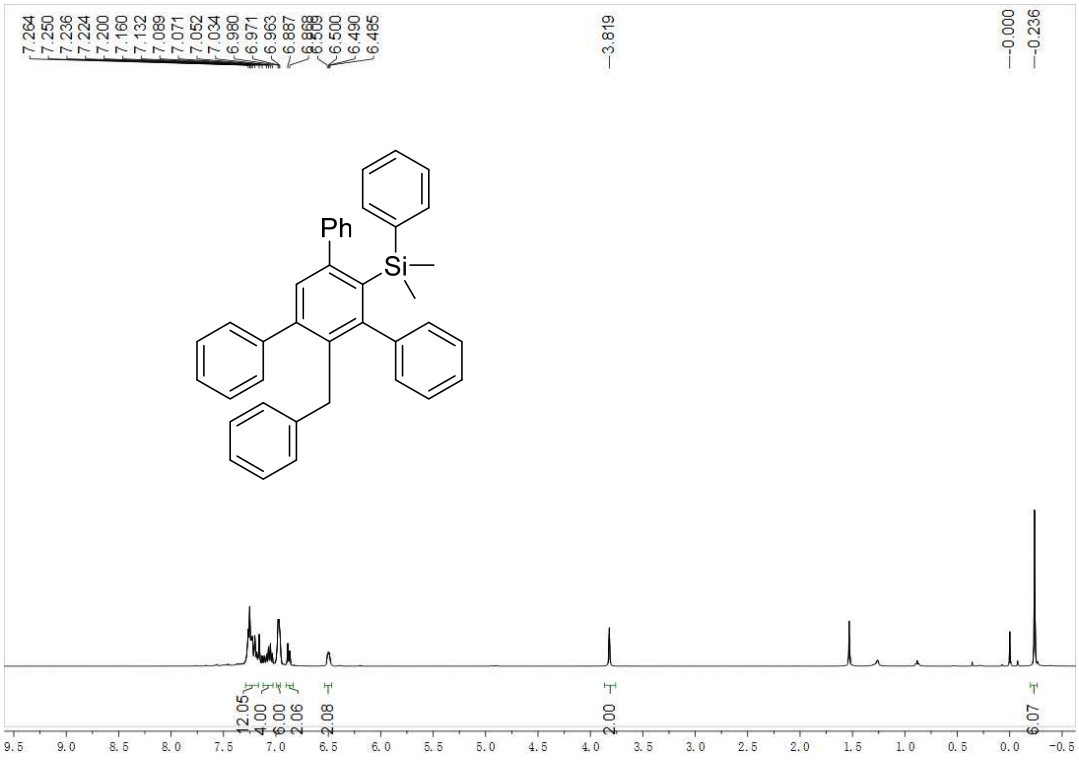


^{1}H NMR (400 MHz, $CDCl_3$)

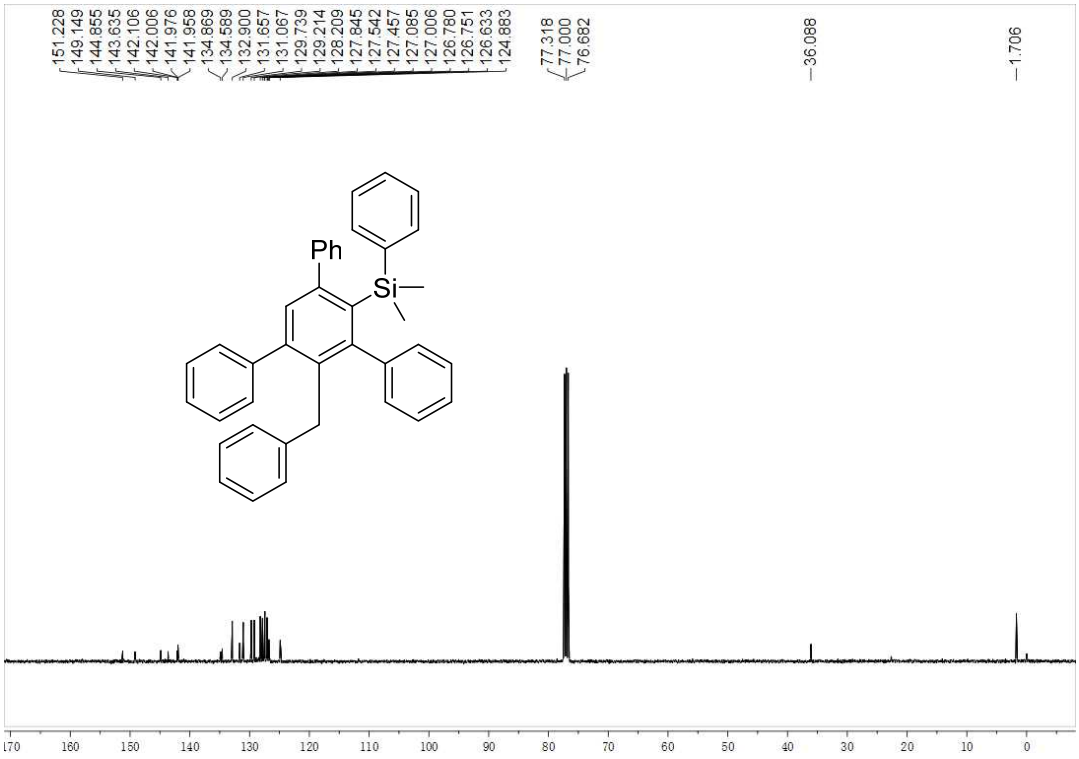


^{13}C NMR (100 MHz, $CDCl_3$)

(2'-benzyl-5'-phenyl-[1,1':3',1''-terphenyl]-4'-yl)dimethyl(phenyl)silane (4rba):

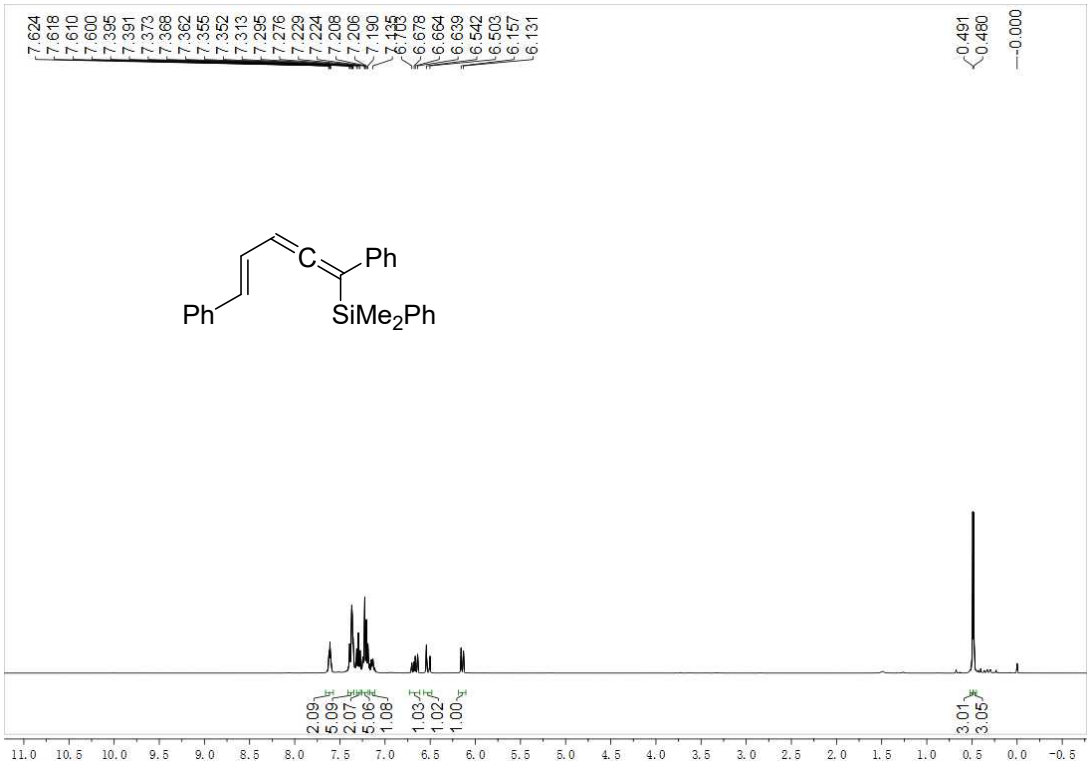


^{1}H NMR (400 MHz, $CDCl_3$)

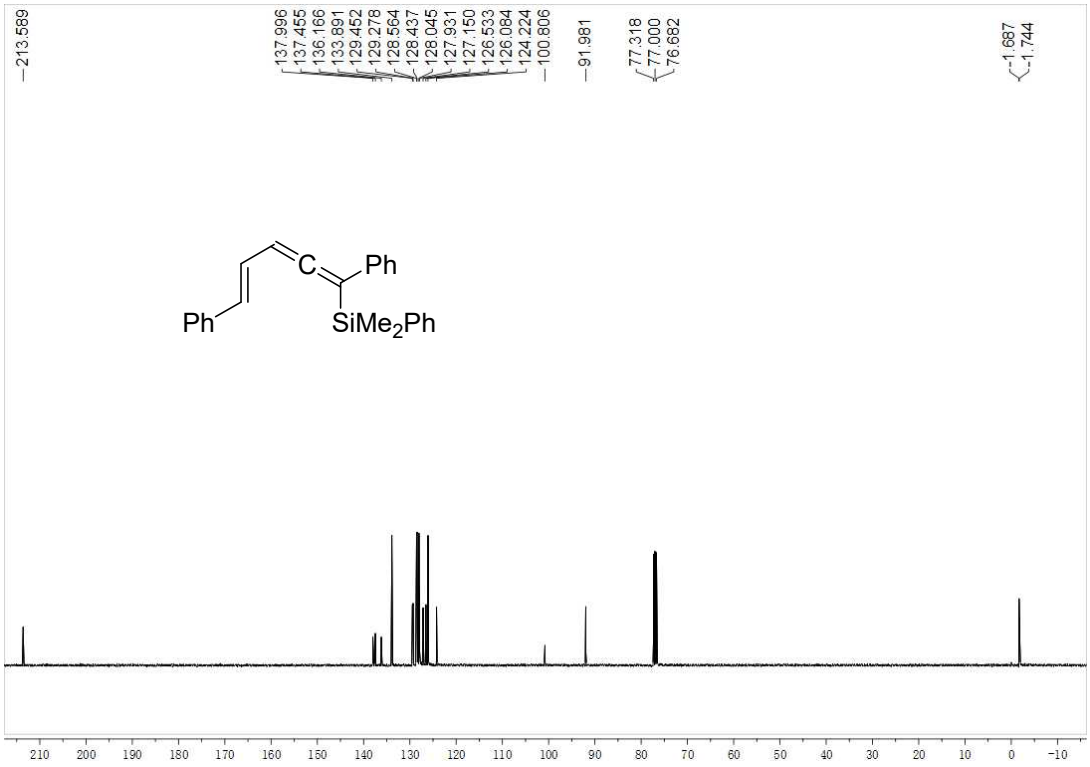


^{13}C NMR (100 MHz, $CDCl_3$)

(E)-(1,5-diphenylpenta-1,2,4-trien-1-yl)dimethyl(phenyl)silane (5):

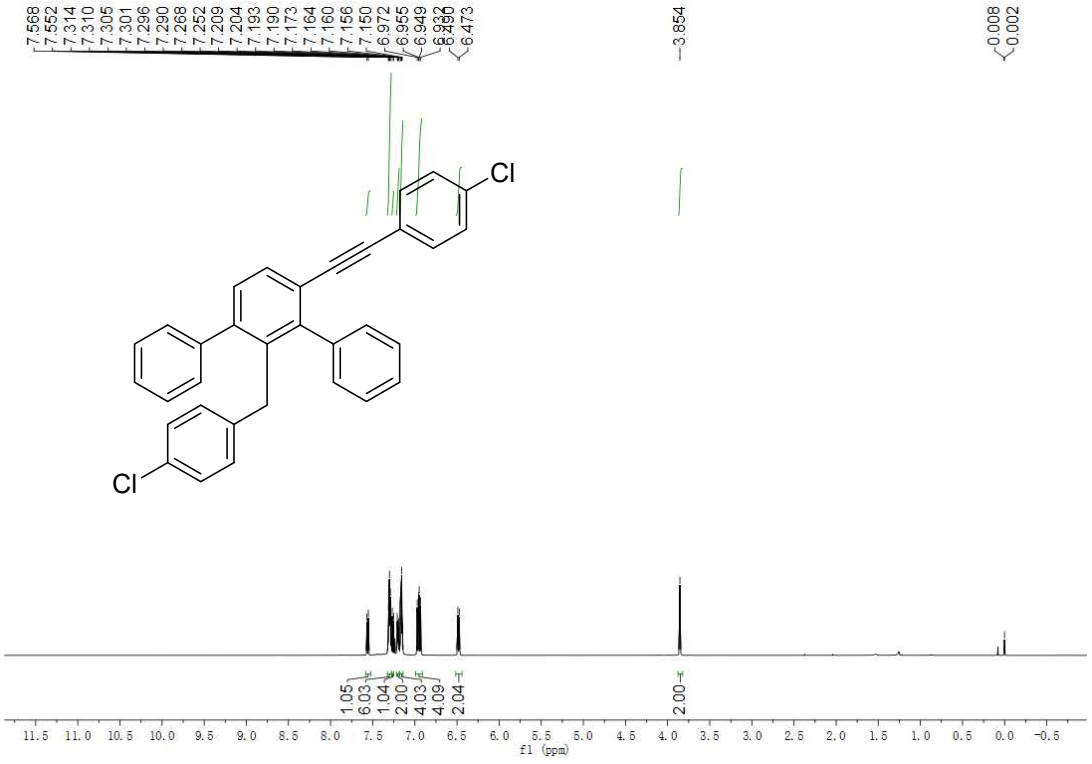


^{1}H NMR (400 MHz, $CDCl_3$)

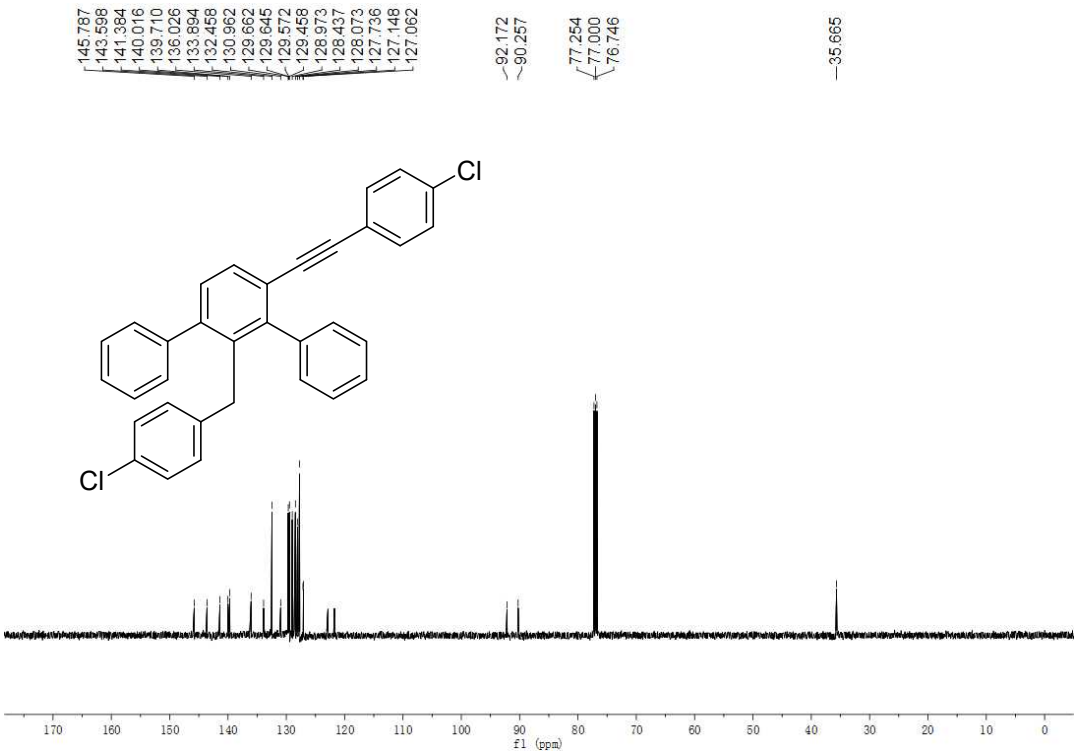


^{13}C NMR (100 MHz, $CDCl_3$)

2'-(4-chlorobenzyl)-4'-((4-chlorophenyl)ethynyl)-1,1':3',1''-terphenyl (7):

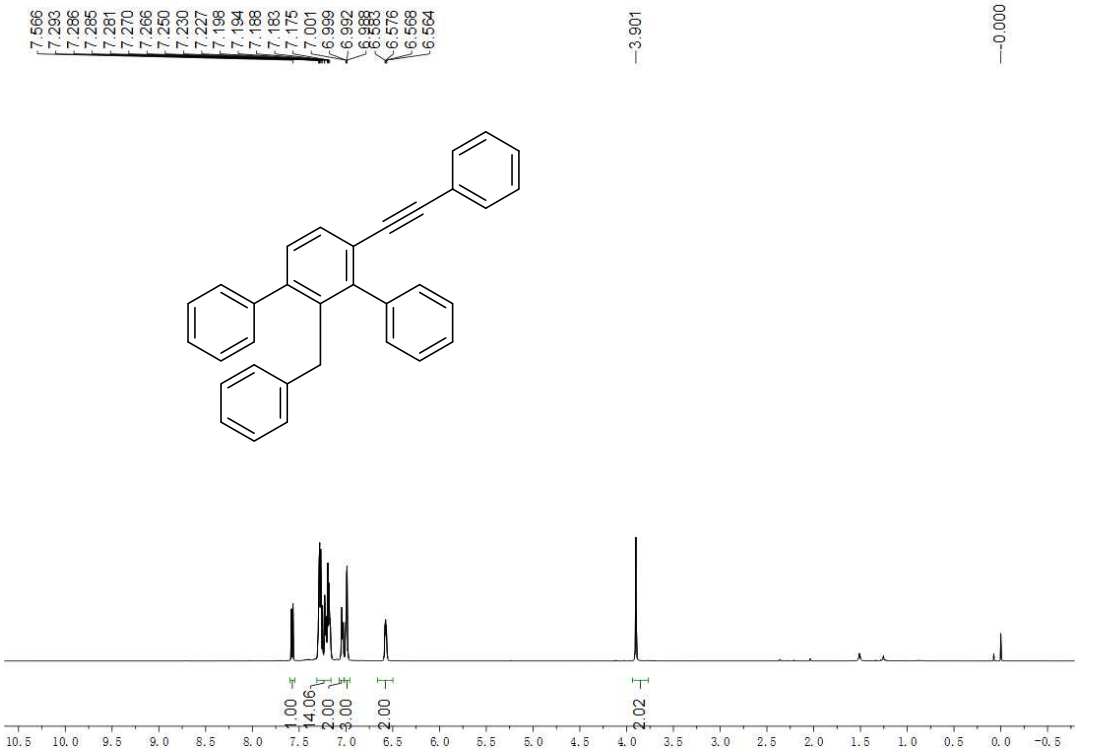


^{1}H NMR (500 MHz, $CDCl_3$)

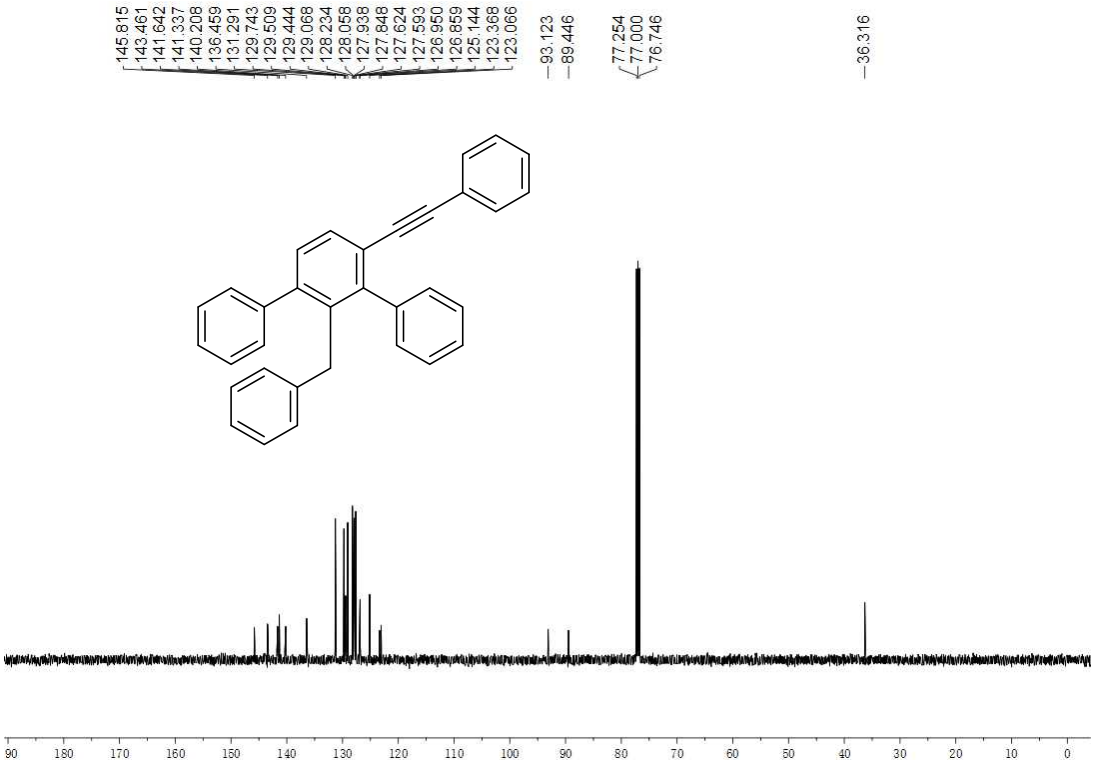


^{13}C NMR (125 MHz, $CDCl_3$)

2'-benzyl-4'-(phenylethynyl)-1,1':3',1''-terphenyl (8):



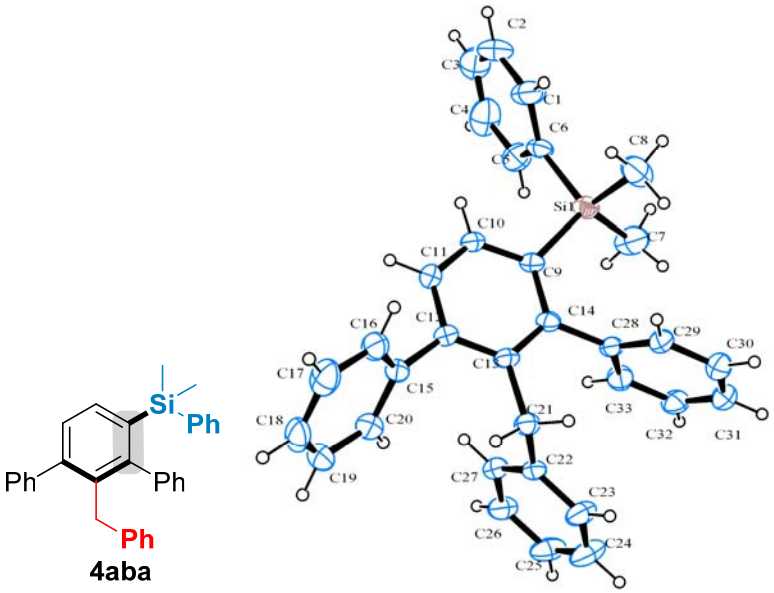
^{1}H NMR (500 MHz, $CDCl_3$)



^{13}C NMR (125 MHz, $CDCl_3$)

(D) The X-ray Single-Crystal Diffraction Analysis of 4aba

Method for crystal growth: In a vial (25 mL) the product **4aba** was dissolved in dichloromethane (0.2 mL), followed by addtion of petroleum ether (2 mL). Then, the big was covered with rubber cap (Don't seal it completely) and was set aside till the crystal formed. The crystal data for **4aba** were integrated using the program SAINT and corrected for absorption effects using the program SADABS.[2] The structures were solved by direct methods and refined on F2 by full-matrix least squares using SHELXTL -2014 software.



The thermal ellipsoid plot of 4aba with 30 % displacement ellipsoids

Table S2. Crystal data and structure refinement for A.

Identification code	A	
Empirical formula	C33 H30 Si	
Formula weight	454.66	
Temperature	293(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	$P2_1/c$	
Unit cell dimensions	a = 16.638(5) Å	α= 90°.

	b = 6.2177(17) Å	β= 104.068(5)°.
	c = 25.035(7) Å	γ = 90°.
Volume	2512.2(12) $Å^3$	
Z	4	
Density (calculated)	1.202 Mg/m^3	
Absorption coefficient	0.113 mm^{-1}	
F(000)	968	
Crystal size	0.150 x 0.060 x 0.050 mm^3	
Theta range for data collection	2.524 to 25.499°.	
Index ranges	-20<=h<=20, -7<=k<=7, -30<=l<=27	
Reflections collected	17551	
Independent reflections	4664 [R(int) = 0.1863]	
Completeness to theta = 25.242°	99.5 %	
Absorption correction	None	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	4664 / 0 / 309	
Goodness-of-fit on F^2	1.022	
Final R indices [I>2sigma(I)]	R1 = 0.1500, wR2 = 0.1972	
R indices (all data)	R1 = 0.2652, wR2 = 0.2417	
Extinction coefficient	n/a	
Largest diff. peak and hole	0.247 and -0.261 $e.Å^{-3}$	

Table S3. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters ($Å^2$x 10^3) for A. U(eq) is defined as one third of the trace of the orthogonalized U^{ij} tensor.

	x	y	z	U(eq)
Si(1)	3144(1)	5780(2)	-381(1)	50(1)
C(28)	3683(3)	7191(8)	893(2)	40(1)
C(29)	4355(3)	8436(8)	910(2)	48(1)
C(30)	5121(3)	7813(9)	1206(2)	58(2)
C(31)	5215(4)	5947(10)	1490(2)	61(2)
C(32)	4551(4)	4694(9)	1476(2)	60(2)
C(33)	3789(3)	5301(8)	1181(2)	51(1)
C(17)	416(4)	14721(10)	759(3)	75(2)
C(15)	1096(3)	11349(8)	798(2)	46(1)
C(16)	910(3)	13334(9)	572(2)	56(2)
C(19)	270(4)	12195(12)	1415(3)	72(2)
C(18)	95(4)	14141(13)	1187(3)	78(2)
C(12)	1606(3)	9871(8)	568(2)	43(1)
C(11)	1302(3)	9193(8)	33(2)	49(1)
C(10)	1753(3)	7911(8)	-219(2)	49(1)
C(8)	3830(4)	7742(9)	-594(3)	78(2)
C(6)	2412(3)	4737(9)	-1000(2)	49(1)
C(21)	2751(3)	9862(8)	1425(2)	46(1)
C(22)	2831(3)	8133(8)	1848(2)	43(1)
C(27)	2256(3)	6550(9)	1802(2)	52(2)
C(13)	2383(3)	9179(8)	843(2)	41(1)
C(14)	2842(3)	7865(7)	584(2)	39(1)
C(7)	3746(4)	3495(9)	-43(3)	83(2)
C(20)	766(3)	10795(10)	1229(2)	63(2)
C(3)	1335(5)	3022(19)	-1918(4)	106(3)
C(2)	1692(6)	4921(18)	-1948(3)	107(3)
C(1)	2231(4)	5773(12)	-1493(3)	84(2)
C(9)	2534(3)	7228(7)	40(2)	39(1)
C(26)	2334(4)	4957(9)	2188(3)	60(2)
C(25)	2999(5)	4935(10)	2621(3)	73(2)
C(24)	3582(4)	6498(11)	2672(3)	80(2)
C(23)	3494(4)	8075(9)	2287(2)	62(2)
C(5)	2026(4)	2804(10)	-993(3)	70(2)
C(4)	1491(5)	1968(12)	-1438(5)	98(3)

Table S4. Bond lengths [Å] and angles [°] for A.

Si(1)-C(7)	1.824(5)
Si(1)-C(8)	1.835(5)
Si(1)-C(6)	1.840(6)
Si(1)-C(9)	1.864(5)
C(28)-C(29)	1.351(6)
C(28)-C(33)	1.368(6)
C(28)-C(14)	1.485(6)
C(29)-C(30)	1.365(7)
C(29)-H(29)	0.9300
C(30)-C(31)	1.351(7)
C(30)-H(30)	0.9300
C(31)-C(32)	1.345(7)
C(31)-H(31)	0.9300
C(32)-C(33)	1.357(7)
C(32)-H(32)	0.9300
C(33)-H(33)	0.9300
C(17)-C(16)	1.350(7)
C(17)-C(18)	1.357(9)
C(17)-H(17)	0.9300
C(15)-C(16)	1.361(7)
C(15)-C(20)	1.369(7)
C(15)-C(12)	1.461(6)
C(16)-H(16)	0.9300
C(19)-C(18)	1.340(8)
C(19)-C(20)	1.357(7)
C(19)-H(19)	0.9300
C(18)-H(18)	0.9300
C(12)-C(11)	1.378(7)
C(12)-C(13)	1.378(6)
C(11)-C(10)	1.352(6)
C(11)-H(11)	0.9300
C(10)-C(9)	1.370(6)
C(10)-H(10)	0.9300
C(8)-H(8A)	0.9600

C(8)-H(8B)	0.9600
C(8)-H(8C)	0.9600
C(6)-C(1)	1.360(8)
C(6)-C(5)	1.365(7)
C(21)-C(22)	1.492(6)
C(21)-C(13)	1.498(6)
C(21)-H(21A)	0.9700
C(21)-H(21B)	0.9700
C(22)-C(23)	1.355(7)
C(22)-C(27)	1.357(7)
C(27)-C(26)	1.367(7)
C(27)-H(27)	0.9300
C(13)-C(14)	1.383(6)
C(14)-C(9)	1.390(6)
C(7)-H(7A)	0.9600
C(7)-H(7B)	0.9600
C(7)-H(7C)	0.9600
C(20)-H(20)	0.9300
C(3)-C(2)	1.332(10)
C(3)-C(4)	1.338(10)
C(3)-H(3)	0.9300
C(2)-C(1)	1.372(10)
C(2)-H(2)	0.9300
C(1)-H(1)	0.9300
C(26)-C(25)	1.349(7)
C(26)-H(26)	0.9300
C(25)-C(24)	1.357(8)
C(25)-H(25)	0.9300
C(24)-C(23)	1.358(7)
C(24)-H(24)	0.9300
C(23)-H(23)	0.9300
C(5)-C(4)	1.349(9)
C(5)-H(5)	0.9300
C(4)-H(4)	0.9300

C(7)-Si(1)-C(8)	110.0(3)

C(7)-Si(1)-C(6)	107.0(3)
C(8)-Si(1)-C(6)	108.7(3)
C(7)-Si(1)-C(9)	115.3(3)
C(8)-Si(1)-C(9)	107.8(2)
C(6)-Si(1)-C(9)	107.8(2)
C(29)-C(28)-C(33)	118.4(5)
C(29)-C(28)-C(14)	121.5(5)
C(33)-C(28)-C(14)	120.1(5)
C(28)-C(29)-C(30)	120.7(5)
C(28)-C(29)-H(29)	119.6
C(30)-C(29)-H(29)	119.6
C(31)-C(30)-C(29)	120.2(5)
C(31)-C(30)-H(30)	119.9
C(29)-C(30)-H(30)	119.9
C(32)-C(31)-C(30)	119.6(5)
C(32)-C(31)-H(31)	120.2
C(30)-C(31)-H(31)	120.2
C(31)-C(32)-C(33)	120.4(5)
C(31)-C(32)-H(32)	119.8
C(33)-C(32)-H(32)	119.8
C(32)-C(33)-C(28)	120.7(5)
C(32)-C(33)-H(33)	119.6
C(28)-C(33)-H(33)	119.6
C(16)-C(17)-C(18)	119.5(6)
C(16)-C(17)-H(17)	120.2
C(18)-C(17)-H(17)	120.2
C(16)-C(15)-C(20)	117.4(5)
C(16)-C(15)-C(12)	120.2(5)
C(20)-C(15)-C(12)	122.4(5)
C(17)-C(16)-C(15)	122.2(6)
C(17)-C(16)-H(16)	118.9
C(15)-C(16)-H(16)	118.9
C(18)-C(19)-C(20)	121.4(6)
C(18)-C(19)-H(19)	119.3
C(20)-C(19)-H(19)	119.3
C(19)-C(18)-C(17)	119.3(6)

C(19)-C(18)-H(18)	120.3
C(17)-C(18)-H(18)	120.3
C(11)-C(12)-C(13)	118.0(5)
C(11)-C(12)-C(15)	117.7(5)
C(13)-C(12)-C(15)	124.3(5)
C(10)-C(11)-C(12)	121.4(5)
C(10)-C(11)-H(11)	119.3
C(12)-C(11)-H(11)	119.3
C(11)-C(10)-C(9)	122.1(5)
C(11)-C(10)-H(10)	119.0
C(9)-C(10)-H(10)	119.0
Si(1)-C(8)-H(8A)	109.5
Si(1)-C(8)-H(8B)	109.5
H(8A)-C(8)-H(8B)	109.5
Si(1)-C(8)-H(8C)	109.5
H(8A)-C(8)-H(8C)	109.5
H(8B)-C(8)-H(8C)	109.5
C(1)-C(6)-C(5)	115.3(6)
C(1)-C(6)-Si(1)	123.6(5)
C(5)-C(6)-Si(1)	121.1(5)
C(22)-C(21)-C(13)	115.5(4)
C(22)-C(21)-H(21A)	108.4
C(13)-C(21)-H(21A)	108.4
C(22)-C(21)-H(21B)	108.4
C(13)-C(21)-H(21B)	108.4
H(21A)-C(21)-H(21B)	107.5
C(23)-C(22)-C(27)	117.9(5)
C(23)-C(22)-C(21)	120.6(5)
C(27)-C(22)-C(21)	121.5(5)
C(22)-C(27)-C(26)	121.4(5)
C(22)-C(27)-H(27)	119.3
C(26)-C(27)-H(27)	119.3
C(12)-C(13)-C(14)	120.5(5)
C(12)-C(13)-C(21)	120.7(4)
C(14)-C(13)-C(21)	118.9(4)
C(13)-C(14)-C(9)	120.9(4)

C(13)-C(14)-C(28)	118.6(5)
C(9)-C(14)-C(28)	120.4(4)
Si(1)-C(7)-H(7A)	109.5
Si(1)-C(7)-H(7B)	109.5
H(7A)-C(7)-H(7B)	109.5
Si(1)-C(7)-H(7C)	109.5
H(7A)-C(7)-H(7C)	109.5
H(7B)-C(7)-H(7C)	109.5
C(19)-C(20)-C(15)	120.2(6)
C(19)-C(20)-H(20)	119.9
C(15)-C(20)-H(20)	119.9
C(2)-C(3)-C(4)	119.5(9)
C(2)-C(3)-H(3)	120.3
C(4)-C(3)-H(3)	120.3
C(3)-C(2)-C(1)	120.5(8)
C(3)-C(2)-H(2)	119.8
C(1)-C(2)-H(2)	119.8
C(6)-C(1)-C(2)	121.7(7)
C(6)-C(1)-H(1)	119.1
C(2)-C(1)-H(1)	119.1
C(10)-C(9)-C(14)	117.2(4)
C(10)-C(9)-Si(1)	117.7(4)
C(14)-C(9)-Si(1)	124.7(4)
C(25)-C(26)-C(27)	119.6(6)
C(25)-C(26)-H(26)	120.2
C(27)-C(26)-H(26)	120.2
C(26)-C(25)-C(24)	119.8(6)
C(26)-C(25)-H(25)	120.1
C(24)-C(25)-H(25)	120.1
C(25)-C(24)-C(23)	119.9(6)
C(25)-C(24)-H(24)	120.0
C(23)-C(24)-H(24)	120.0
C(22)-C(23)-C(24)	121.4(6)
C(22)-C(23)-H(23)	119.3
C(24)-C(23)-H(23)	119.3
C(4)-C(5)-C(6)	123.2(7)

C(4)-C(5)-H(5)	118.4
C(6)-C(5)-H(5)	118.4
C(3)-C(4)-C(5)	119.9(8)
C(3)-C(4)-H(4)	120.1
C(5)-C(4)-H(4)	120.1

Symmetry transformations used to generate equivalent atoms:

Table S5. Anisotropic displacement parameters ($Å^2 x\ 10^3$) for A. The anisotropic displacement factor exponent takes the form: $-2\pi^2[\ h^2\ a^{*2}U^{11} + ...\ + 2\ h\ k\ a^*\ b^*\ U^{12}\ ]$

	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
Si(1)	58(1)	50(1)	43(1)	-2(1)	17(1)	6(1)
C(28)	44(3)	44(3)	30(3)	-1(3)	7(3)	3(3)
C(29)	46(3)	54(3)	41(4)	7(3)	6(3)	3(3)
C(30)	50(4)	69(4)	53(4)	-1(3)	8(3)	-7(3)
C(31)	51(4)	79(4)	50(4)	9(4)	5(3)	12(3)
C(32)	65(4)	67(4)	45(4)	17(3)	10(3)	16(4)
C(33)	55(4)	50(4)	50(4)	9(3)	13(3)	2(3)
C(17)	68(4)	65(4)	85(5)	-15(4)	3(4)	20(4)
C(15)	42(3)	58(4)	36(3)	-10(3)	9(3)	3(3)
C(16)	55(3)	58(4)	54(4)	-5(3)	10(3)	12(3)
C(19)	55(4)	108(5)	56(5)	-20(4)	19(3)	6(4)
C(18)	49(4)	96(6)	84(6)	-40(5)	7(4)	17(4)
C(12)	44(3)	51(3)	32(4)	1(3)	6(3)	1(3)
C(11)	39(3)	64(4)	43(4)	3(3)	7(3)	9(3)
C(10)	49(3)	65(4)	30(3)	0(3)	8(3)	10(3)
C(8)	79(4)	87(5)	78(5)	-22(4)	37(4)	-21(4)
C(6)	64(4)	52(4)	34(4)	-1(3)	20(3)	10(3)
C(21)	49(3)	49(3)	37(4)	-3(3)	9(3)	0(3)
C(22)	46(3)	54(3)	30(3)	-9(3)	8(3)	-3(3)
C(27)	49(3)	70(4)	36(4)	0(3)	7(3)	-3(3)
C(13)	49(3)	44(3)	28(3)	-4(3)	7(3)	-6(3)
C(14)	48(3)	39(3)	32(3)	6(3)	12(3)	2(2)
C(7)	105(5)	74(4)	65(5)	-6(3)	12(4)	38(4)
C(20)	59(4)	78(4)	51(4)	-7(3)	14(3)	9(3)
C(3)	84(6)	159(9)	72(7)	-63(7)	12(5)	13(6)
C(2)	110(7)	176(9)	39(5)	3(6)	24(5)	4(6)
C(1)	95(5)	108(5)	45(5)	2(4)	13(4)	-7(4)
C(9)	50(3)	38(3)	30(3)	3(2)	11(3)	1(2)
C(26)	72(4)	65(4)	43(4)	-2(3)	12(4)	-15(3)
C(25)	104(5)	72(4)	39(4)	12(3)	8(4)	-10(4)
C(24)	94(5)	87(5)	44(4)	13(4)	-11(4)	-19(4)
C(23)	67(4)	71(4)	40(4)	2(3)	-2(3)	-20(3)
C(5)	72(4)	66(4)	68(5)	-6(4)	7(4)	-4(4)
C(4)	81(5)	87(6)	118(8)	-40(6)	8(6)	-3(4)

Table S6. Hydrogen coordinates (x 10^4) and isotropic displacement parameters ($Å^2$x 10^3) for A.

	x	y	z	U(eq)
H(29)	4294	9732	719	57
H(30)	5579	8676	1211	70
H(31)	5736	5531	1695	74
H(32)	4615	3404	1670	72
H(33)	3334	4423	1174	62
H(17)	296	16063	595	90
H(16)	1131	13749	281	68
H(19)	48	11796	1707	87
H(18)	-244	15086	1320	94
H(11)	776	9626	-159	59
H(10)	1527	7479	-580	58
H(8A)	4114	7067	-840	118
H(8B)	4227	8260	-275	118
H(8C)	3507	8926	-777	118
H(21A)	3297	10455	1446	55
H(21B)	2412	11006	1517	55
H(27)	1799	6550	1502	63
H(7A)	3402	2601	122	124
H(7B)	4209	4005	236	124
H(7C)	3944	2675	-310	124
H(20)	883	9456	1395	75
H(3)	980	2433	-2229	128
H(2)	1576	5674	-2278	129
H(1)	2478	7094	-1523	100
H(26)	1931	3894	2151	72
H(25)	3058	3853	2884	88
H(24)	4042	6489	2970	96
H(23)	3898	9137	2325	74
H(5)	2137	2025	-667	84
H(4)	1232	662	-1411	117

Table S7. Torsion angles [°] for A.

C(33)-C(28)-C(29)-C(30)	0.5(7)
C(14)-C(28)-C(29)-C(30)	178.7(5)
C(28)-C(29)-C(30)-C(31)	-0.8(8)
C(29)-C(30)-C(31)-C(32)	0.8(8)
C(30)-C(31)-C(32)-C(33)	-0.4(9)
C(31)-C(32)-C(33)-C(28)	0.1(8)
C(29)-C(28)-C(33)-C(32)	-0.1(7)
C(14)-C(28)-C(33)-C(32)	-178.3(5)
C(18)-C(17)-C(16)-C(15)	0.5(9)
C(20)-C(15)-C(16)-C(17)	-0.5(8)
C(12)-C(15)-C(16)-C(17)	177.5(5)
C(20)-C(19)-C(18)-C(17)	0.4(10)
C(16)-C(17)-C(18)-C(19)	-0.4(9)
C(16)-C(15)-C(12)-C(11)	-62.7(7)
C(20)-C(15)-C(12)-C(11)	115.2(6)
C(16)-C(15)-C(12)-C(13)	114.7(6)
C(20)-C(15)-C(12)-C(13)	-67.4(7)
C(13)-C(12)-C(11)-C(10)	-0.9(7)
C(15)-C(12)-C(11)-C(10)	176.7(5)
C(12)-C(11)-C(10)-C(9)	-0.3(8)
C(7)-Si(1)-C(6)-C(1)	-139.3(5)
C(8)-Si(1)-C(6)-C(1)	-20.5(5)
C(9)-Si(1)-C(6)-C(1)	96.1(5)
C(7)-Si(1)-C(6)-C(5)	39.0(5)
C(8)-Si(1)-C(6)-C(5)	157.8(4)
C(9)-Si(1)-C(6)-C(5)	-85.6(5)
C(13)-C(21)-C(22)-C(23)	143.1(5)
C(13)-C(21)-C(22)-C(27)	-35.5(7)
C(23)-C(22)-C(27)-C(26)	0.8(7)
C(21)-C(22)-C(27)-C(26)	179.4(5)
C(11)-C(12)-C(13)-C(14)	0.8(7)
C(15)-C(12)-C(13)-C(14)	-176.6(4)
C(11)-C(12)-C(13)-C(21)	179.8(4)
C(15)-C(12)-C(13)-C(21)	2.4(7)
C(22)-C(21)-C(13)-C(12)	110.4(5)
C(22)-C(21)-C(13)-C(14)	-70.5(6)
C(12)-C(13)-C(14)-C(9)	0.4(7)

C(21)-C(13)-C(14)-C(9)	-178.6(4)
C(12)-C(13)-C(14)-C(28)	178.8(4)
C(21)-C(13)-C(14)-C(28)	-0.2(7)
C(29)-C(28)-C(14)-C(13)	-85.6(6)
C(33)-C(28)-C(14)-C(13)	92.6(6)
C(29)-C(28)-C(14)-C(9)	92.8(6)
C(33)-C(28)-C(14)-C(9)	-89.0(6)
C(18)-C(19)-C(20)-C(15)	-0.4(9)
C(16)-C(15)-C(20)-C(19)	0.5(8)
C(12)-C(15)-C(20)-C(19)	-177.5(5)
C(4)-C(3)-C(2)-C(1)	1.4(12)
C(5)-C(6)-C(1)-C(2)	0.4(9)
Si(1)-C(6)-C(1)-C(2)	178.8(5)
C(3)-C(2)-C(1)-C(6)	-0.7(12)
C(11)-C(10)-C(9)-C(14)	1.5(7)
C(11)-C(10)-C(9)-Si(1)	-171.9(4)
C(13)-C(14)-C(9)-C(10)	-1.6(7)
C(28)-C(14)-C(9)-C(10)	-180.0(4)
C(13)-C(14)-C(9)-Si(1)	171.3(4)
C(28)-C(14)-C(9)-Si(1)	-7.1(6)
C(7)-Si(1)-C(9)-C(10)	-140.0(4)
C(8)-Si(1)-C(9)-C(10)	96.7(4)
C(6)-Si(1)-C(9)-C(10)	-20.5(5)
C(7)-Si(1)-C(9)-C(14)	47.2(5)
C(8)-Si(1)-C(9)-C(14)	-76.2(5)
C(6)-Si(1)-C(9)-C(14)	166.6(4)
C(22)-C(27)-C(26)-C(25)	-0.7(8)
C(27)-C(26)-C(25)-C(24)	0.2(9)
C(26)-C(25)-C(24)-C(23)	0.0(10)
C(27)-C(22)-C(23)-C(24)	-0.5(8)
C(21)-C(22)-C(23)-C(24)	-179.1(5)
C(25)-C(24)-C(23)-C(22)	0.1(9)
C(1)-C(6)-C(5)-C(4)	-0.9(9)
Si(1)-C(6)-C(5)-C(4)	-179.4(5)
C(2)-C(3)-C(4)-C(5)	-2.0(12)
C(6)-C(5)-C(4)-C(3)	1.8(11)

Symmetry transformations used to generate equivalent atoms:

(E) Reference

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