Supporting Information

Visible-light-induced selective hydrolipocyclization and silylation of alkenes：Access to ring-fused quinazolin-4(3*H*)-ones and its silicon-substituted derivatives

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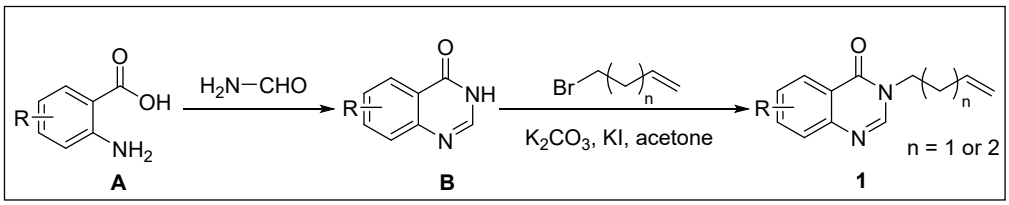
A. General Information

All purchased reagents and solvents were used without further purification unless otherwise noted. ^{1}H and ^{13}C NMR spectra were recorded using a Bruker DRX-500 spectrometer employing $CDCl_3$ as solvent. The chemical shifts are referenced to signals at 7.26 and 77.0 ppm, respectively. The data of HRMS was carried out on a high-resolution mass spectrometer (LCMS-IT-TOF). Melting points were determined with a Büchi Melting Point B-545 instrument. TLC was performed by using commercially prepared 100-400 mesh silica gel plates and visualization was effected at 254 nm. The blue light source (460-465 nm) was provided by Shanghai 3S Technology Co., LtdSSSTECH-AL2 parallel reactor (Figure S1)

Figure S1. Photoreactor used in this study.

B. Experimental Procedure[1-3]

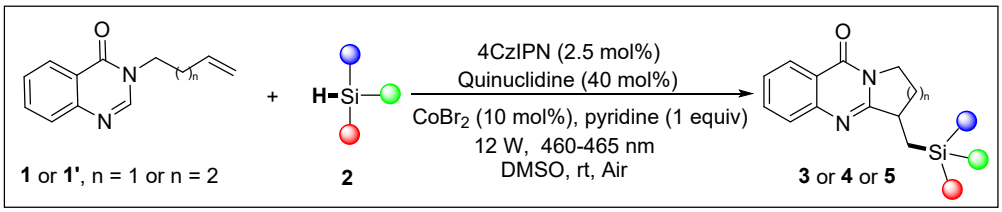
B1. General Procedure for the Synthesis of 1



The mixtures of anthranilic acid (**A**) (1 mmol) and an excess of formamide (10 mmol) in a round-bottom flask were heated at 120 °C with stirring for 3-5 h. The reaction was checked by TLC. After the starting materials completely disappeared, the resulting mixtures were cooled to room temperature and then poured into ice-cold water. The light or dark brown precipitates were formed. The precipitates were filtered, washed with water (3×20 mL) and dried to give quinazoline-4(3*H*)-one derivatives (**B**). These intermediates were used for the next step without further purification. To a solution of quinazoline-4(3*H*)-

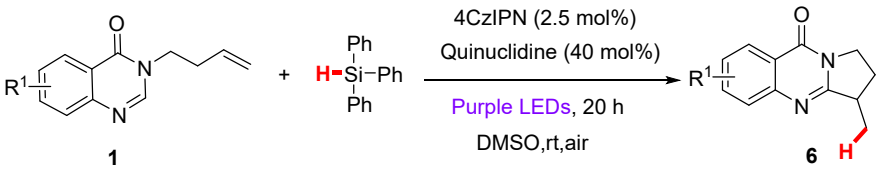
ones (**B**) (1 mmol) in acetone (10 mL) was added K_2CO_3 (207 mg, 1.5 mmol). The resulting mixture was heated at 60 °C with stirring for 30 min. KI (16.6 mg,0.1 mmol) was added and after stirring for further 15 min, brominated olefins (0.13 mL, 1.2 mmol) diluted with acetone (1 mL) was dropwise added into the mixture. The reaction mixture was further stirred at 60 °C for 3 h. After the reaction completed, the resulting mixture was cooled and poured into ice-cold water. The solids were formed, filtered and dried to give the corresponding crude products **1**, which is purified by column chromatography on silica gel with a mixture of petroleum ether and ethyl acetate.

B2. General Procedure for the Synthesis of 3, 4 or 5



To a 10 mL Schlenk tube equipped with a magnetic stir bar was added 4CzIPN (0.0025 mmol), $CoBr_2$ (0.01 mmol), and quinuclidine (0.04 mmol). Then dry dimethyl sulfoxide (2.0 mL) was added in Schlenk tube, after which the alkenes (0.1 mmol), silanes (0.5 mmol) and pyridine (0.1 mmol) were added respectively at room temperature, then placed in the irradiation apparatus equipped with a 12 W blue light-emitting diode (LED). The resulting mixture was stirred at 25 °C until the starting material was completely consumed as monitored by TLC. After the reaction was completed, the resulting mixture was extracted with ethyl acetate, dried over anhydrous $MgSO_4$, filtered and evaporated in vacuo. The desired products were obtained in 35-81% yields after being purified by column chromatography on silica gel with a mixture of petroleum ether and ethyl acetate.

B3. General Procedure for the Synthesis of 6



To a 10 mL Schlenk tube equipped with a magnetic stir bar was added 4CzIPN (0.0025 mmol), quinuclidine (0.04 mmol). Then dry dimethyl sulfoxide (2.0 mL) was added, after which the alkenes (0.1 mmol), triphenylsilane (0.3 mmol) were added respectively at room temperature, then placed in the irradiation apparatus equipped with a 12 W purple light-emitting diode (LED). The resulting mixture

was stirred at 25 °C until the starting material was completely consumed as monitored by TLC. After the reaction was completed, the resulting mixture was extracted with ethyl acetate, dried over anhydrous $MgSO_4$, filtered and evaporated in vacuo. The desired products were obtained in 47-64% yields after being purified by column chromatography on silica gel with a mixture of petroleum ether and ethyl acetate.

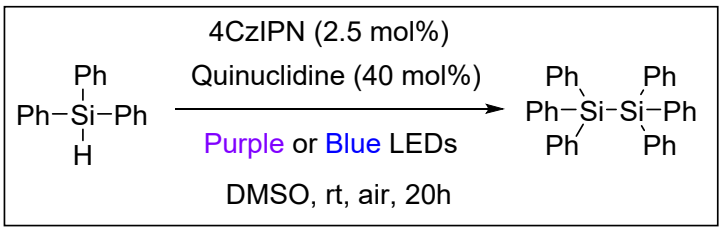
C. Gram Scale Reaction

To a 250 mL round-bottom flask equipped with a magnetic stir bar was added 4CzIPN (0.15 mmol), $CoBr_2$ (0.6 mmol), and quinuclidine (2.4 mmol). Then dry dimethyl sulfoxide (100 mL) was added, after which **1a** (6 mmol), **2a** (30 mmol) and pyridine (6 mmol) were added to the mixture at room temperature, respectively, then placed in the irradiation apparatus equipped with a 25 W blue light-emitting diode (LED). The resulting mixture was stirred at 25 °C until the starting material was completely consumed as monitored by TLC. After the reaction was completed, the resulting mixture was extracted with ethyl acetate, dried over anhydrous $MgSO_4$, filtered and evaporated in vacuo. The desired product **3a** was obtained in 60% yield after being purified by column chromatography on silica gel with a mixture of petroleum ether and ethyl acetate (volume ratio 10:1).

D. Light On-off Experiment

To a 10 mL Schlenk tube equipped with a magnetic stir bar was added 4CzIPN (0.0025 mmol), $CoBr_2$ (0.01 mmol), and quinuclidine (0.04 mmol). Then dry dimethyl sulfoxide (2.0 mL) was added, after which the **1a** (0.1 mmol), **2a** (0.5 mmol) and pyridine (0.1 mmol) were added respectively at room temperature, then placed in the irradiation apparatus equipped with a 25 W blue light-emitting diode (LED). The reaction mixture was stirred for 3, 7, 11, and 15 hours respectively. Meanwhile, the setting time span for 1 hours, and only stirred without light. The yield of the product **3a** was determined by GC and dodecane as internal standard.

E. Comparative Experiment for the Synthesis of Disilane



In order to find out why different products were obtained under different light source irradiation, a comparative experiment was conducted for the synthesis of disilane. The mixture of 0.5 mmol of triphenylsilane, 2.5 mol% of 4CzIPN and 40 mol% of quinuclidine was irradiated by different light source systems under standard conditions. After 1h, the disilane yield can reach 84 % under purple light, but only 34 % under blue light. The results disclosed that purple LEDs is more favorable for the synthesis of disilane, which provided important evidences for the selective silylation and hydroarylation process.

F. H_2 Detection Experiment

F1. H_2 Detection Experiment for the Synthesis of 3a

In order to demonstrate the release of H_2 during this procedure for the synthesis of **3a**, the model reaction of 3-(but-3-en-1-yl)quinazolin-4(3*H*)-one (**1a**) and 1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilane (**2a**) was monitored by a H_2 detector under standard conditions. Just as shown in Figure S2, as the reaction proceeded, the H_2 was observed clearly and the concentration increased gradually.

Figure S2. H_2 detection experiment by a H_2 detector for the synthesis of **3a** after 3 hours.

F2. H_2 Detection Experiment for the Synthesis of 6a

In order to demonstrate the release of H_2 during this photoreaction procedure for the synthesis of **6a**, the model reaction of 3-(but-3-en-1-yl)quinazolin-4(3*H*)-one (**1a**) and triphenylsilane was monitored by a H_2 detector under standard conditions. Just as shown in Figure S3, as the reaction proceeded, the H_2 was observed clearly and the concentration increased gradually.

Figure S3. H_2 detection experiment by a H_2 detector for the synthesis of **6a** after 3 hours.

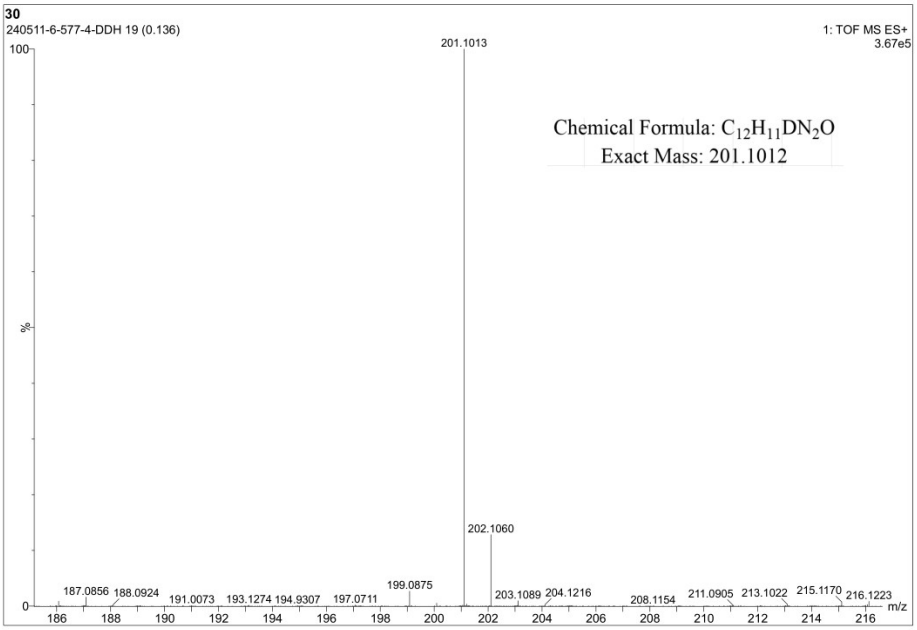
G. Labeling Experiment

G1. Typical Procedure for Preparation of Ph_3Si-D

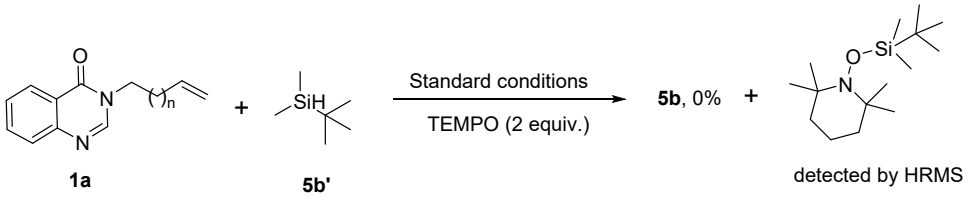
^{n}BuLi (2 equiv., 2 mmol) was added dropwise to a stirred solution of triphenylsilane (1 equiv., 1 mmol, 260 mg) in THF (5 mL) at -78 ℃. Then the mixture was warmed to room temperature and stirred for 3 h. Afterwards, 1 mL of D_2O was added dropwise. The mixture was quenched by diethyl ether (3×5 mL), The combined organic layers was washed with brine (5 mL), dried and filtered over anhydrous sodium sulfate. The solvent was removed under reduce pressure, and the residue was purified by column chromatography (peteroleum ether) to get Ph_3SiD (213 mg, yield 82%) as a white solid.

G2. Experimental Procedure for Labeling Experiment

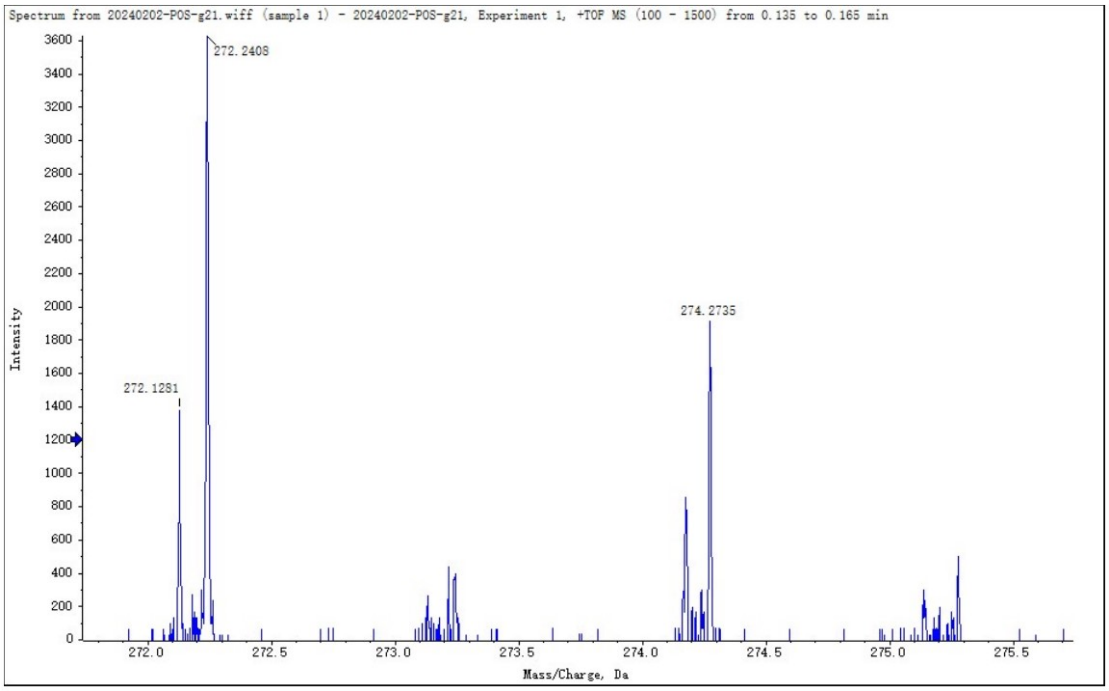
To a 10 mL Schlenk tube equipped with a magnetic stir bar was added 4CzIPN (0.0025 mmol), quinuclidine (0.04 mmol). Then dry dimethyl sulfoxide (2.0 mL) was added, after which the alkene (0.1 mmol) and Ph_3Si-D (0.3 mmol) were added respectively at room temperature, then placed in the irradiation apparatus equipped with a 12 W purple light-emitting diode (LED). The resulting mixture was stirred at 25 ^{o}C until the starting material was completely consumed as monitored by TLC. After the reaction was completed, the resulting mixture was extracted with ethyl acetate, dried over anhydrous $MgSO_4$, filtered and evaporated in vacuo. The desired deuterium-labeled product was obtained only in trace yield (detected by HRMS).



H. Trapping experiment of silicon free radicals



Under standard conditions, 2 equivalent of TEMPO was added to the system and no target product was obtained, fortunately the silicon radical was captured by HRMS as shown in the figure below.



I. Supplementary References

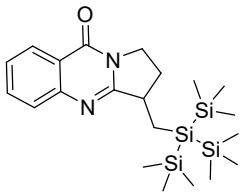
1. L. Liu, W. Zhang, C. Xu, J. He, Z. Xu, Z. Yang, F. Ling, W. Zhong. *Adv. Synth. Catal.* **2022**, *364*, 1319-1325.

2. B. Mu, L. Zhang, G. Lv, K. Chen, T. Wang, J. Chen, T. Huang, L. Guo, Z. Yang, Y. Wu. *J. Org. Chem.* **2022**, *87*, 10146-10157.

3. B. Sun, R. Shi, K. Zhang, X. Tang, X. Shi, J. Xu, J. Yang, C. Jin. *Chem. Commun.* **2021**, *57*, 6050-6053.

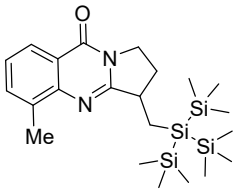
J. Characterization Data of Products

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3a)



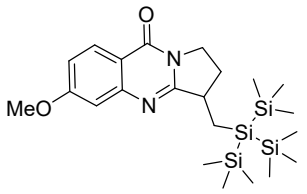
Yield 36.1 mg (81%, white solid); Melting point: 95.5-97.4 °C. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.28 (d, *J* = 7.9 Hz, 1H), 7.72 (d, *J* = 4.0 Hz, 2H), 7.43 (dt, *J* = 8.2, 4.1 Hz, 1H), 4.25 (ddd, *J* = 12.5, 8.4, 3.7 Hz, 1H), 4.08-3.94 (m, 1H), 3.23 (dtd, *J* = 11.5, 8.4, 3.1 Hz, 1H), 2.50 (dtd, *J* = 12.3, 7.6, 3.8 Hz, 1H), 1.92-1.78 (m, 2H), 1.09-0.98 (m, 1H), 0.24 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 162.7, 161.1, 149.5, 134.0, 127.2, 126.3, 126.1, 120.7, 44.3, 43.5, 29.5, 10.8, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{21}H_{39}N_2OSi_4$ 447.2134; Found 447.2139.

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-5-methyl-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3b)



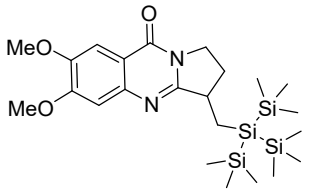
Yield 36.3 mg (79%, white solid); Melting point: 125.2-127.7 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.19-8.10 (m, 1H), 7.58 (d, *J* = 7.4 Hz, 1H), 7.33 (td, *J* = 7.6, 2.4 Hz, 1H), 4.31-4.22 (m, 1H), 4.02 (dtd, *J* = 14.9, 7.6, 2.4 Hz, 1H), 3.29-3.18 (m, 1H), 2.63 (d, *J* = 2.6 Hz, 3H), 2.56-2.48 (m, 1H), 1.93 (ddd, *J* = 14.7, 4.0, 1.9 Hz, 2H), 1.02 (ddd, *J* = 15.0, 10.6, 2.6 Hz, 1H), 0.45-0.20 (m, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 161.6, 161.5, 148.1, 135.7, 134.6, 125.5, 124.0, 120.5, 44.3, 43.4, 29.6, 17.4, 11.2, 1.2. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{41}N_2OSi_4$ 461.2290; Found 461.2299.

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6-methoxy-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3c)



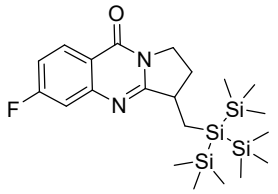
Yield 32.4 mg (68%, white solid); Melting point: 94.8-97.5 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.18 (dd, *J* = 8.9, 1.8 Hz, 1H), 7.12 (s, 1H), 7.02 (dt, *J* = 8.9, 2.2 Hz, 1H), 4.23 (td, *J* = 10.4, 8.6, 4.4 Hz, 1H), 4.00 (q, *J* = 6.3, 4.7 Hz, 1H), 3.94 (d, *J* = 1.8 Hz, 3H), 3.21 (q, *J* = 9.5 Hz, 1H), 2.50 (qd, *J* = 12.5, 10.3, 6.0 Hz, 1H), 1.89-1.81 (m, 2H), 1.07-0.98 (m, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 164.4, 163.5, 160.7, 151.9, 127.8, 116.2, 114.2, 107.9, 55.6, 44.2, 43.6, 29.4, 10.9, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{41}N_2O_2Si_4$ 477.2240; Found 477.2248.

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6,7-dimethoxy-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3d)



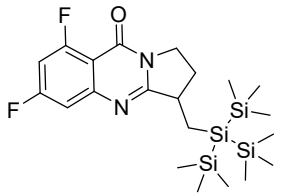
Yield 32.4 mg (64%, white solid); Melting point: 169.3-177.1 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.61 (s, 1H), 7.14 (s, 1H), 4.25 (ddd, *J* = 12.4, 8.5, 4.1 Hz, 1H), 4.02 (d, *J* = 8.4 Hz, 7H), 3.27-3.15 (m, 1H), 2.50 (dtd, *J* = 12.1, 7.6, 4.0 Hz, 1H), 1.85 (ddd, *J* = 12.4, 10.2, 5.8 Hz, 2H), 1.02 (dd, *J* = 14.6, 11.4 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 161.6, 160.5, 154.6, 148.5, 145.8, 113.9, 107.7, 105.3, 56.3, 56.2, 44.3, 43.5, 29.6, 10.9, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{23}H_{43}N_2O_3Si_4$ 507.2345; Found 507.2359.

6-fluoro-3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3e)



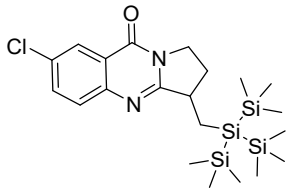
Yield 28.8 mg (62%, colorless liquid); ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.29 (dd, *J* = 8.7, 6.1 Hz, 1H), 7.37 (dd, *J* = 9.9, 2.5 Hz, 1H), 7.16 (td, *J* = 8.5, 2.4 Hz, 1H), 4.25 (ddd, *J* = 12.5, 8.5, 4.1 Hz, 1H), 4.00 (dt, *J* = 12.3, 7.8 Hz, 1H), 3.31-3.13 (m, 1H), 2.52 (dtd, *J* = 12.2, 7.8, 4.0 Hz, 1H), 1.92-1.77 (m, 2H), 1.02 (dd, *J* = 14.6, 11.0 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 166.3 (d, $J_{C\text{-}F}$ = 251.3 Hz), 164.15, 160.37, 151.8 (d, $J_{C\text{-}F}$ = 13.8 Hz), 128.9 (d, $J_{C\text{-}F}$ = 10.0 Hz), 117.4 (d, $J_{C\text{-}F}$ = 2.5 Hz), 114.8 (d, $J_{C\text{-}F}$ = 2.5 Hz), 112.5 (d, $J_{C\text{-}F}$ = 22.5 Hz), 44.34, 43.57, 29.49, 10.86, 1.33. ^{19}F NMR (471 MHz, Chloroform-*d*) δ -104.30, -104.31. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{21}H_{37}FN_2OSi_4$ 465.2040; Found 465.2044.

6,8-difluoro-3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3f)



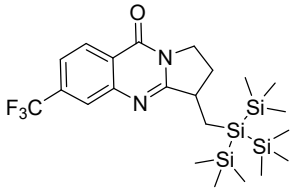
Yield 32.3 mg (67%, colorless liquid); ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.18 (dt, *J* = 9.7, 2.0 Hz, 1H), 6.84 (ddd, *J* = 11.0, 8.8, 2.5 Hz, 1H), 4.23 (ddd, *J* = 12.6, 8.6, 4.1 Hz, 1H), 3.97 (dt, *J* = 12.4, 7.9 Hz, 1H), 3.20 (dtd, *J* = 11.3, 8.3, 3.2 Hz, 1H), 2.51 (dtd, *J* = 12.3, 7.9, 4.1 Hz, 1H), 1.84 (ddd, *J* = 20.4, 16.5, 10.7 Hz, 2H), 1.00 (dd, *J* = 14.6, 10.9 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 166.5 (d, $J_{C\text{-}F}$ = 15.0 Hz), 164.92, 164.5 (d, $J_{C\text{-}F}$ = 13.8 Hz), 163.5 (d, $J_{C\text{-}F}$ = 15.0 Hz), 161.4 (d, $J_{C\text{-}F}$ = 15.0 Hz), 157.63, 153.3 (d, $J_{C\text{-}F}$ = 15.0 Hz), 109.1 (d, $J_{C\text{-}F}$ = 5.0 Hz), 108.9 (d, $J_{C\text{-}F}$ = 3.8 Hz), 107.5 (d, $J_{C\text{-}F}$ = 10.0 Hz), 102.5 (d, $J_{C\text{-}F}$ = 2.5 Hz), 102.4 (d, $J_{C\text{-}F}$ = 51.3 Hz), 44.39, 43.62, 29.21, 10.82, 1.31. ^{19}F NMR (471 MHz, Chloroform-*d*) δ -101.27, -101.29, -101.31, -101.33, -106.23, -106.25, -106.27. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{21}H_{37}F_2N_2OSi_4$ 483.1946; Found 483.1945.

7-chloro-3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3g)



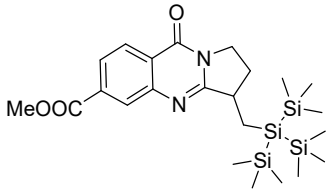
Yield 19.7 mg (41%, colorless liquid); ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.25 (s, 1H), 7.67 (s, 2H), 4.26 (ddd, *J* = 12.5, 8.6, 4.0 Hz, 1H), 4.00 (dt, *J* = 11.9, 7.8 Hz, 1H), 3.22 (dtd, *J* = 11.6, 8.5, 3.4 Hz, 1H), 2.52 (dtd, *J* = 12.1, 8.1, 4.0 Hz, 1H), 1.86 (ddd, *J* = 21.7, 11.5, 4.2 Hz, 2H), 1.03 (td, *J* = 12.4, 10.9, 3.0 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 163.1, 160.1, 148.1, 134.3, 131.8, 128.9, 125.7, 121.8, 44.4, 43.5, 29.5, 10.8, 1.3. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{21}H_{38}ClN_2OSi_4$ 481.1744; Found 481.1745.

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6-(trifluoromethyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3h)



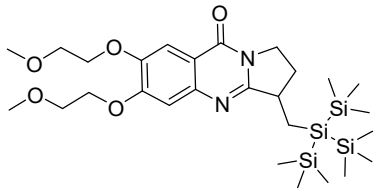
Yield 37 mg (72%, white solid); Melting point: 110.5-112.1 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.40 (d, *J* = 8.3 Hz, 1H), 8.07-7.96 (m, 1H), 7.64 (dd, *J* = 8.3, 1.8 Hz, 1H), 4.29 (ddd, *J* = 12.2, 8.3, 3.9 Hz, 1H), 4.03 (dt, *J* = 12.4, 7.9 Hz, 1H), 3.25 (dtd, *J* = 11.5, 8.3, 3.0 Hz, 1H), 2.55 (dtd, *J* = 12.1, 7.8, 4.0 Hz, 1H), 1.95-1.83 (m, 2H), 1.02 (dd, *J* = 14.6, 11.1 Hz, 1H), 0.26 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 164.25, 160.25, 149.57, 135.5 (q, J_{C-F} = 32.5 Hz), 127.44, 124.9 (q, J_{C-F} = 3.8 Hz), 123.6 (d, J_{C-F} = 271.3 Hz), 123.02, 122.0 (q, J_{C-F} = 3.8 Hz), 44.51, 43.59, 29.45, 10.93, 1.32. ^{19}F NMR (471 MHz, Chloroform-*d*) δ -63.07, -63.08, -63.10, -63.12. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{38}F_3N_2OSi_4$ 515.2008; Found 515.2009.

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-9-oxo-1,2,3,9-tetrahydropyrrolo[2,1-*b*]quinazolin-6-yl acetate (3i)



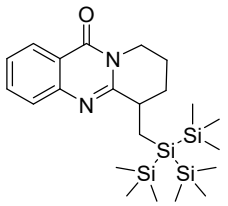
Yield 36.8 mg (73%, white solid); Melting point: 167.9-169.2 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.39 (d, *J* = 1.6 Hz, 1H), 8.32 (d, *J* = 8.3 Hz, 1H), 8.04 (dd, *J* = 8.3, 1.7 Hz, 1H), 4.26 (ddd, *J* = 12.4, 8.5, 4.0 Hz, 1H), 3.98 (s, 3H), 3.23 (dtd, *J* = 11.1, 7.8, 2.7 Hz, 1H), 2.53 (dtd, *J* = 12.0, 7.7, 4.0 Hz, 1H), 1.96-1.79 (m, 2H), 1.01 (dd, *J* = 14.6, 11.1 Hz, 1H), 0.39 (d, *J* = 17.6 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 166.3, 163.6, 160.5, 149.4, 135.0, 129.2, 126.6, 126.1, 123.7, 52.5, 44.4, 43.5, 29.5, 10.9, 1.3. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{23}H_{41}N_2O_3Si_4$ 505.2189; Found 505.2192.

3-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6,7-bis(2-methoxyethoxy)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (3j)



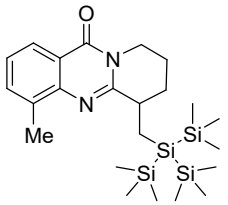
Yield 42.2 mg (71%, white solid); Melting point: 171.2-174.1 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.62 (s, 1H), 7.14 (s, 1H), 4.39-4.26 (m, 4H), 3.99 (dt, *J* = 12.4, 7.7 Hz, 1H), 3.92-3.76 (m, 4H), 3.50 (d, *J* = 2.9 Hz, 6H), 3.21 (d, *J* = 11.1 Hz, 1H), 2.49 (ddq, *J* = 12.5, 8.3, 5.0, 4.4 Hz, 1H), 1.84 (dt, *J* = 12.8, 3.7 Hz, 3H), 1.03 (dd, *J* = 14.6, 11.3 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 161.5, 160.4, 154.3, 148.0, 145.8, 114.0, 109.0, 107.2, 70.8, 70.6, 68.6, 68.4, 59.3, 59.3, 44.3, 43.4, 29.6, 10.9, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{27}H_{51}N_2O_5Si_4$ 595.2870; Found 595.2882.

6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4a)



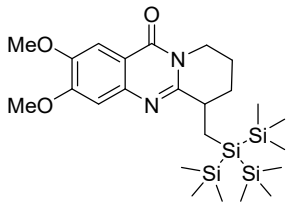
Yield 34 mg (74%, white solid); Melting point: 171.4-173.2 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.32-8.22 (m, 1H), 7.75-7.70 (m, 1H), 7.67 (d, *J* = 8.4 Hz, 1H), 7.47-7.40 (m, 1H), 4.40 (dt, *J* = 14.0, 5.7 Hz, 1H), 3.86 (ddd, *J* = 14.1, 8.0, 6.1 Hz, 1H), 2.99 (d, *J* = 10.4 Hz, 1H), 2.19 (dq, *J* = 13.1, 6.5 Hz, 1H), 2.07-1.97 (m, 2H), 1.83-1.57 (m, 2H), 1.09 (dd, *J* = 14.6, 9.0 Hz, 1H), 0.24 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 162.3, 159.1, 147.6, 133.9, 127.1, 126.6, 126.0, 120.2, 41.4, 40.0, 27.8, 20.2, 12.0, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{41}N_2OSi_4$ 461.2290; Found 461.2298.

6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-4-methyl-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4b)



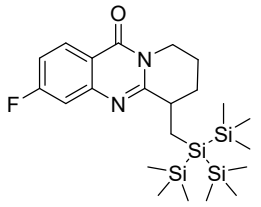
Yield 37.5 mg (79%, white solid); Melting point: 166.5-168.2 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.26-7.98 (m, 1H), 7.58 (d, *J* = 7.2 Hz, 1H), 7.32 (t, *J* = 7.6 Hz, 1H), 4.24 (dt, *J* = 14.1, 6.1 Hz, 1H), 3.97 (ddd, *J* = 13.7, 7.8, 5.4 Hz, 1H), 3.18-3.00 (m, 1H), 2.63 (s, 3H), 2.24-2.16 (m, 2H), 2.07 (dtd, *J* = 13.2, 7.7, 3.8 Hz, 1H), 2.02-1.94 (m, 1H), 1.67 (dtd, *J* = 13.3, 8.2, 5.4 Hz, 1H), 1.09 (dd, *J* = 14.6, 10.8 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 162.0, 159.8, 144.2, 135.2, 134.5, 126.2, 124.4, 119.6, 42.4, 39.3, 26.8, 19.9, 17.9, 13.9, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{23}H_{43}N_2OSi_4$ 475.2447; Found 475.2448.

6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-2,3-dimethoxy-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4c)



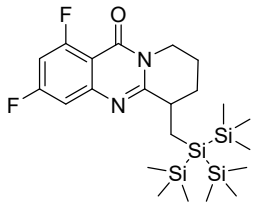
Yield 34.9 mg (67%, white solid); Melting point: 169.7-172.1 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.59 (s, 1H), 7.06 (s, 1H), 4.42 (dt, *J* = 14.0, 5.7 Hz, 1H), 4.02 (d, *J* = 9.0 Hz, 6H), 3.84 (dt, *J* = 14.1, 7.1 Hz, 1H), 2.96 (ddq, *J* = 13.1, 9.0, 4.2 Hz, 1H), 2.18 (dq, *J* = 13.1, 6.6 Hz, 1H), 1.99 (td, *J* = 8.4, 7.4, 3.6 Hz, 3H), 1.75-1.55 (m, 1H), 1.09 (dd, *J* = 14.5, 9.2 Hz, 1H), 0.23 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 161.5, 157.9, 154.8, 148.6, 143.8, 113.5, 107.4, 105.5, 56.3, 56.2, 41.3, 39.8, 27.9, 20.3, 11.9, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{24}H_{45}N_2O_3Si_4$ 521.2502; Found 521.2510.

3-fluoro-6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4d)



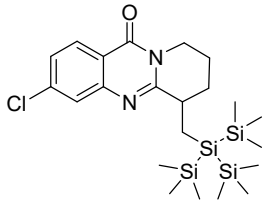
Yield 26.3 mg (55%, white solid); Melting point: 161.3-163.2 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.27 (dd, *J* = 8.8, 6.1 Hz, 1H), 7.36-7.29 (m, 1H), 7.14 (td, *J* = 8.6, 2.5 Hz, 1H), 4.36 (dt, *J* = 14.0, 5.6 Hz, 1H), 3.85 (ddd, *J* = 14.2, 8.1, 5.8 Hz, 1H), 2.98 (dh, *J* = 13.1, 3.7 Hz, 1H), 2.18 (dq, *J* = 13.2, 6.6 Hz, 1H), 2.01 (ddt, *J* = 14.5, 7.8, 4.9 Hz, 3H), 1.66 (dq, *J* = 14.3, 7.2 Hz, 1H), 1.07 (dd, *J* = 14.5, 9.2 Hz, 1H), 0.24 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 167.3, 165.3, 161.1 (d, J_{C-F} = 127.5 Hz), 149.7 (d, J_{C-F} = 13.8 Hz), 129.3 (d, J_{C-F} = 11.3 Hz), 116.9 (d, J_{C-F} = 2.5 Hz), 114.9 (d, J_{C-F} = 22.5 Hz), 112.1 (d, J_{C-F} = 22.5 Hz), 41.6, 40.1, 27.7, 20.1, 12.2, 1.4. ^{19}F NMR (471 MHz, Chloroform-*d*) δ -104.39. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{40}FN_2OSi_4$ 479.2202; Found 479.2204.

1,3-difluoro-6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4e)



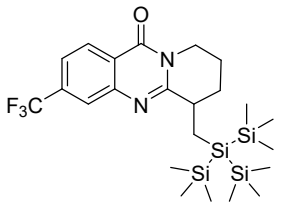
Yield 30.4 mg (63%, white solid); Melting point: 178.8-180.5 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.23 (d, *J* = 9.3 Hz, 1H), 6.83 (ddd, *J* = 11.2, 9.0, 2.4 Hz, 1H), 4.27 (dt, *J* = 14.2, 5.6 Hz, 1H), 3.82 (ddd, *J* = 14.0, 8.0, 5.7 Hz, 1H), 3.06 (d, *J* = 9.5 Hz, 1H), 2.14 (dq, *J* = 13.3, 7.0, 6.5 Hz, 1H), 2.05-1.92 (m, 3H), 1.70 (dq, *J* = 13.3, 6.5 Hz, 1H), 1.09 (dd, *J* = 14.5, 9.9 Hz, 1H), 0.23 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 166.7 (d, J_{C-F} = 15.0 Hz), 164.7 (d, J_{C-F} = 13.8 Hz), 163.3 (d, J_{C-F} = 15.0 Hz), 162.4, 161.2 (d, J_{C-F} = 13.8 Hz), 158.1, 149.2, 107.7 (d, J_{C-F} = 21.3 Hz), 106.6 (d, J_{C-F} = 6.3 Hz), 102.8 (t, J_{C-F} = 26.3 Hz), 41.9, 39.4, 26.9, 19.6, 13.1, 1.4. ^{19}F NMR (471 MHz, Chloroform-*d*) δ -100.09, -106.12, -106.24, -106.28, -106.35, -106.36. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{39}F_2N_2OSi_4$ 497.2108; Found 497.2104.

3-chloro-6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4f)



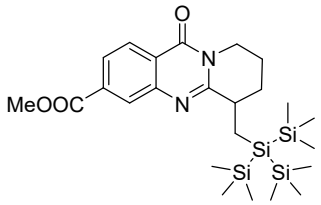
Yield 24.2 mg (49%, white solid); Melting point: 170.2-172.8 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.19 (d, *J* = 8.6 Hz, 1H), 7.77-7.60 (m, 1H), 7.38 (dd, *J* = 8.5, 2.0 Hz, 1H), 4.35 (dt, *J* = 14.1, 5.8 Hz, 1H), 3.86 (ddd, *J* = 14.1, 8.2, 5.8 Hz, 1H), 3.05-2.92 (m, 1H), 2.18 (dq, *J* = 13.1, 6.5 Hz, 1H), 2.01 (ddtd, *J* = 14.1, 11.4, 8.1, 4.0 Hz, 3H), 1.67 (dq, *J* = 13.9, 7.1 Hz, 1H), 1.07 (dd, *J* = 14.6, 9.5 Hz, 1H), 0.24 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 161.6, 160.7, 140.1, 128.1, 128.1, 126.7, 126.4, 118.5, 41.7, 40.0, 27.5, 20.0, 12.4, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{22}H_{40}ClN_2OSi_4$ 495.1901; Found 495.1909.

6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-3-(trifluoromethyl)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4g)



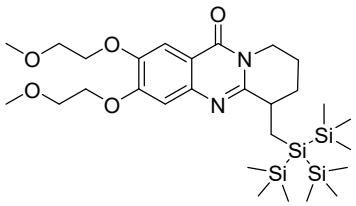
Yield 33.8 mg (64%, colorless liquid); ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.38 (d, *J* = 8.3 Hz, 1H), 7.93 (s, 1H), 7.63 (dd, *J* = 8.4, 1.8 Hz, 1H), 4.38 (dt, *J* = 14.1, 5.8 Hz, 1H), 3.88 (ddd, *J* = 14.1, 8.2, 6.0 Hz, 1H), 3.00 (tdd, *J* = 9.2, 6.1, 3.5 Hz, 1H), 2.21 (dq, *J* = 13.2, 6.6 Hz, 1H), 2.02 (ddt, *J* = 12.5, 8.5, 4.9 Hz, 3H), 1.74-1.62 (m, 1H), 1.08 (dd, *J* = 14.6, 9.6 Hz, 1H), 0.25 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 161.5, 160.8, 147.5, 135.5 (d, $J_{C\text{-}F}$ = 32.5 Hz), 127.8, 124.7 (q, $J_{C\text{-}F}$ = 2.5 Hz), 122.5, 122.3, 121.9 (q, $J_{C\text{-}F}$ = 2.5 Hz), 41.8, 40.1, 27.5, 20.0, 12.3, 1.4. ^{19}F NMR (471 MHz, $CDCl_3$) δ -63.13. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{23}H_{40}F_3N_2OSi_4$ 529.2170; Found 529.2170.

methyl 6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-11-oxo-6,8,9,11-tetrahydro-7*H*-pyrido[2,1-*b*]quinazoline-3-carboxylate (4h)



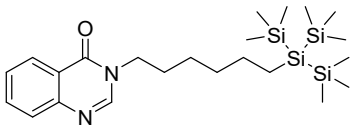
Yield 39.4 mg (76%, white solid); Melting point: 155.6-157.3 °C. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.44-8.14 (m, 2H), 8.00 (dd, *J* = 8.3, 1.6 Hz, 1H), 4.34 (dt, *J* = 14.1, 5.8 Hz, 1H), 3.97 (s, 3H), 3.85 (ddd, *J* = 14.0, 8.1, 5.8 Hz, 1H), 2.96 (tdd, *J* = 9.7, 6.1, 3.5 Hz, 1H), 2.17 (dq, *J* = 13.4, 6.6 Hz, 2H), 2.05-1.96 (m, 2H), 1.73-1.57 (m, 1H), 1.06 (dd, *J* = 14.6, 9.6 Hz, 1H), 0.21 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 166.4, 161.8, 160.0, 147.4, 135.0, 129.1, 126.9, 125.9, 123.0, 52.5, 41.8, 40.1, 27.5, 20.0, 12.2, 1.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{24}H_{43}N_2O_3Si_4$ 519.2351; Found 519.2347.

6-((1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)methyl)-2,3-bis(2-methoxyethoxy)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (4i)



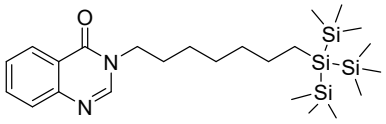
Yield 40.1 mg (67%, white solid); Melting point: 123.6-125.4 °C. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.60 (s, 1H), 7.05 (s, 1H), 4.40 (dt, *J* = 14.0, 5.7 Hz, 1H), 4.28 (dt, *J* = 9.6, 4.7 Hz, 4H), 3.86 (dt, *J* = 12.0, 4.8 Hz, 4H), 3.50 (d, *J* = 5.0 Hz, 6H), 2.94 (s, 1H), 2.16 (dq, *J* = 13.1, 6.5 Hz, 1H), 1.99 (p, *J* = 6.5, 5.8 Hz, 3H), 1.88 (s, 1H), 1.63 (s, 1H), 1.09 (dd, *J* = 14.5, 9.0 Hz, 1H), 0.23 (s, 27H). ^{13}C NMR (125 MHz, DMSO-d_6) δ 156.7, 153.0, 149.7, 143.4, 139.2, 108.8, 104.0, 102.6, 66.0, 65.8, 63.8, 63.6, 54.6, 54.5, 36.5, 35.0, 23.1, 15.5, 7.1, -3.4. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{28}H_{53}N_2O_5Si_4$ 609.3032; Found 609.3037.

3-(6-(1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)hexyl)quinazolin-4(3*H*)-one (1'j-A)



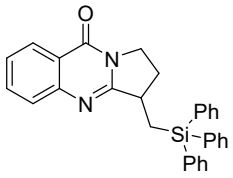
Yield 29.0 mg (61%, white solid); Melting point: 123.6-125.4 °C. 1H NMR (500 MHz, Chloroform-d) δ 8.34 (dd, J = 8.0, 1.6 Hz, 1H), 8.05 (s, 1H), 7.77 (ddd, J = 8.5, 6.8, 1.5 Hz, 1H), 7.74-7.70 (m, 1H), 7.55-7.49 (m, 1H), 4.01 (t, J = 7.4 Hz, 2H), 1.80 (p, J = 6.9 Hz, 2H), 1.40 (d, J = 4.3 Hz, 6H), 0.77 (dd, J = 11.1, 4.9 Hz, 2H), 0.16 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-d) δ 161.0, 148.1, 146.6, 134.1, 127.4, 127.2, 126.7, 122.2, 47.1, 33.8, 29.5, 29.1, 26.3, 7.6, 1.2. HRMS (ESI-TOF) m/z: [M+H]+ Calcd for C23H45N2OSi4 477.2603; Found 477.2608.

3-(7-(1,1,1,3,3,3-hexamethyl-2-(trimethylsilyl)trisilan-2-yl)heptyl)quinazolin-4(3*H*)-one (1'k-A)



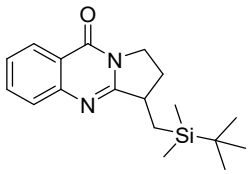
Yield 27.4 mg (56%, colorless liquid); ^{1}H NMR (500 MHz, Chloroform-d) δ 8.37-8.31 (m, 1H), 8.05 (s, 1H), 7.77 (td, J = 7.6, 7.0, 1.6 Hz, 1H), 7.75-7.70 (m, 1H), 7.56-7.50 (m, 1H), 4.02 (t, J = 7.4 Hz, 2H), 1.81 (q, J = 6.9 Hz, 2H), 1.44-1.31 (m, 8H), 0.81-0.68 (m, 2H), 0.16 (s, 27H). ^{13}C NMR (125 MHz, Chloroform-d) δ 161.1, 148.1, 146.6, 134.1, 127.4, 127.2, 126.7, 122.2, 47.1, 34.1, 29.4, 29.1, 28.8, 26.7, 7.5, 1.2. HRMS (ESI-TOF) m/z: [M+H]+ Calcd for C24H47N2OSi4 491.2760; Found 491.2768.

3-((triphenylsilyl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (5a)



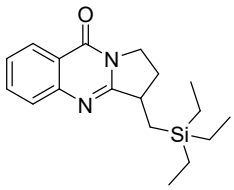
Yield 16 mg (35%, colorless liquid); ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.37-8.17 (m, 1H), 7.74 (td, *J* = 7.6, 6.9, 1.6 Hz, 1H), 7.71-7.60 (m, 7H), 7.49-7.36 (m, 10H), 4.15 (ddt, *J* = 8.9, 7.1, 3.0 Hz, 1H), 3.79 (ddd, *J* = 12.3, 9.2, 7.3 Hz, 1H), 3.53-3.34 (m, 1H), 2.58 (dd, *J* = 15.1, 3.1 Hz, 1H), 1.77-1.59 (m, 2H), 1.36-1.19 (m, 1H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 162.8, 161.0, 149.4, 135.7, 134.4, 134.0, 129.8, 128.1, 127.1, 126.4, 126.1, 120.7, 44.5, 40.4, 29.0, 16.0. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{30}H_{27}N_2OSi$ 459.1893; Found 459.1888.

3-((tert-butyldimethylsilyl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (5b)



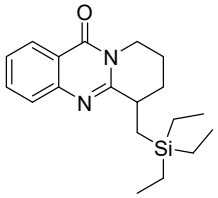
Yield 15.1 mg (48%, white solid); Melting point: 86.2-89.3 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.30 (d, *J* = 7.9 Hz, 1H), 7.73 (d, *J* = 6.7 Hz, 2H), 7.46 (tt, *J* = 7.7, 1.9 Hz, 1H), 4.37-4.24 (m, 1H), 3.98 (dt, *J* = 13.2, 8.4 Hz, 1H), 3.37-3.19 (m, 1H), 2.62-2.43 (m, 1H), 1.90-1.78 (m, 1H), 1.64 (dt, *J* = 14.7, 2.3 Hz, 1H), 0.96 (d, *J* = 1.8 Hz, 9H), 0.86-0.73 (m, 1H), 0.26-0.04 (m, 6H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 163.3, 161.1, 149.4, 134.1, 127.0, 126.4, 126.1, 120.6, 44.5, 40.7, 29.2, 26.5, 16.7, 15.3, -4.6, -5.8. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{18}H_{27}N_2OSi$ 315.1893; Found 315.1894.

3-((triethylsilyl)methyl)-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (5c)



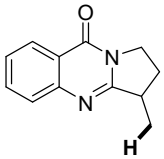
Yield 21.4 mg (68%, white solid); Melting point: 145.6-148.3 °C.^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.30 (d, *J* = 8.0 Hz, 1H), 7.77-7.68 (m, 2H), 7.45 (ddd, *J* = 8.1, 6.0, 2.2 Hz, 1H), 4.30 (ddd, *J* = 12.1, 8.6, 3.2 Hz, 1H), 4.01-3.92 (m, 1H), 3.26 (ddt, *J* = 11.5, 8.3, 4.3 Hz, 1H), 2.51 (dtd, *J* = 11.3, 7.7, 3.2 Hz, 1H), 1.85 (dq, *J* = 12.6, 9.0 Hz, 1H), 1.59 (dd, *J* = 14.8, 3.6 Hz, 1H), 1.01 (t, *J* = 8.0 Hz, 9H), 0.83 (dd, *J* = 14.9, 11.5 Hz, 1H), 0.66 (qd, *J* = 7.9, 2.6 Hz, 6H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 163.3, 161.1, 149.5, 134.0, 127.0, 126.4, 126.1, 120.6, 44.5, 40.5, 29.3, 14.5, 7.5, 3.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{18}H_{27}N_2OSi$ 315.1893; Found 315.1887.

6-((triethylsilyl)methyl)-6,7,8,9-tetrahydro-11*H*-pyrido[2,1-*b*]quinazolin-11-one (5d)



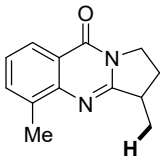
Yield 21.3 mg (65%, colorless liquid);^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.28 (d, *J* = 8.0 Hz, 1H), 7.73 (t, *J* = 7.5 Hz, 1H), 7.68 (s, 1H), 7.44 (t, *J* = 7.5 Hz, 1H), 4.32 (dt, *J* = 14.0, 5.9 Hz, 1H), 3.96 (ddd, *J* = 14.0, 8.2, 5.5 Hz, 1H), 3.08 (s, 1H), 2.16 (dq, *J* = 13.1, 6.5 Hz, 1H), 2.02 (ddp, *J* = 26.3, 12.9, 6.5, 6.1 Hz, 2H), 1.68 (dq, *J* = 14.6, 7.5 Hz, 1H), 1.56 (dd, *J* = 14.9, 5.1 Hz, 1H), 1.28 (s, 1H), 1.00 (t, *J* = 7.9 Hz, 9H), 0.64 (tp, *J* = 14.6, 7.2 Hz, 6H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 163.3, 161.1, 149.5, 134.0, 127.0, 126.4, 126.1, 120.6, 44.5, 40.5, 29.7, 29.2, 14.5, 7.5, 3.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calcd for $C_{19}H_{29}N_2OSi$ 329.2049; Found 329.2044.

3-methyl-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (6a)



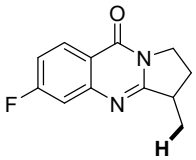
Yield 12.8 mg (64%, white solid); Melting point: 87-89 °C.^{1}H NMR (500 MHz, Chloroform-d) δ 8.33 (dt, J = 22.9, 6.0 Hz, 1H), 7.74 (tt, J = 14.0, 8.1 Hz, 2H), 7.47 (dq, J = 14.2, 7.3 Hz, 1H), 4.40-4.22 (m, 1H), 4.04 (tt, J = 15.5, 6.0 Hz, 1H), 3.35 (dh, J = 15.1, 7.8 Hz, 1H), 2.63-2.37 (m, 1H), 2.02-1.82 (m, 1H), 1.69-1.38 (m, 3H). ^{13}C NMR (125 MHz, Chloroform-d) δ 162.4, 161.0, 149.3, 134.1, 127.0, 126.4, 126.2, 120.7, 44.6, 38.8, 28.6, 17.2.

3,5-dimethyl-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (6b)



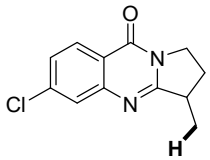
Yield 13.1 mg (61%, white solid); Melting point: 46-49 °C. ^{1}H NMR (500 MHz, Chloroform-d) δ 8.15 (d, J = 8.0 Hz, 1H), 7.58 (d, J = 7.3 Hz, 1H), 7.33 (td, J = 7.7, 2.2 Hz, 1H), 4.28 (ddt, J = 12.2, 8.8, 2.9 Hz, 1H), 4.01 (ddd, J = 12.3, 9.2, 7.0 Hz, 1H), 3.35 (h, J = 7.4 Hz, 1H), 2.64 (s, 3H), 2.50 (tdd, J = 12.2, 6.7, 3.3 Hz, 1H), 1.95-1.80 (m, 1H), 1.50 (dd, J = 7.0, 2.3 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-d) δ 161.4, 161.0, 147.9, 135.5, 134.7, 125.6, 124.0, 120.6, 44.5, 38.8, 28.7, 17.5, 17.3.

6-fluoro-3-methyl-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (6c)



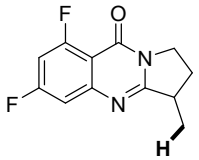
Yield 11.8 mg (54%, white solid); Melting point: 95-97 °C. ^{1}H NMR (500 MHz, Chloroform-d) δ 8.29 (dd, J = 8.9, 6.2 Hz, 1H), 7.34 (dd, J = 9.9, 2.5 Hz, 1H), 7.16 (td, J = 8.5, 2.5 Hz, 1H), 4.28 (ddd, J = 12.4, 8.7, 3.7 Hz, 1H), 4.01 (dt, J = 11.9, 8.0 Hz, 1H), 3.33 (h, J = 7.7 Hz, 1H), 2.51 (dtd, J = 12.3, 8.0, 3.7 Hz, 1H), 1.90 (dq, J = 12.6, 8.7 Hz, 1H), 1.49 (d, J = 7.0 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-d) δ 166.4 (d, JC-F = 251.3 Hz), 163.76, 160.30, 151.6 (d, JC-F = 13.8 Hz), 128.9 (d, JC-F = 10.0 Hz), 117.4 (d, JC-F = 2.5 Hz), 114.9 (d, JC-F = 23.8 Hz), 112.4 (d, JC-F = 22.5 Hz), 44.62, 38.91, 28.58, 17.10. 19F NMR (471 MHz, Chloroform-d) δ -104.11 (t, J = 8.2 Hz).

6-chloro-3-methyl-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (6d)



Yield 12.4mg (53%, white solid); Melting point: 89-91 °C.^{1}H NMR (500 MHz, Chloroform-d) δ 8.41 (d, J = 8.4 Hz, 1H), 8.02 (s, 1H), 7.66 (d, J = 8.3 Hz, 1H), 4.32 (ddd, J = 12.3, 8.7, 3.5 Hz, 1H), 4.04 (dt, J = 12.6, 8.2 Hz, 1H), 3.38 (h, J = 7.6 Hz, 1H), 2.55 (dtd, J = 12.1, 7.9, 3.5 Hz, 1H), 1.93 (dtd, J = 12.5, 10.0, 9.6, 7.5 Hz, 1H), 1.52 (dd, J = 7.1, 2.0 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-d) δ163.9, 160.1, 149.2, 135.8, 127.5, 124.6, 123.0, 122.2, 44.9, 38.9, 28.6, 17.0.

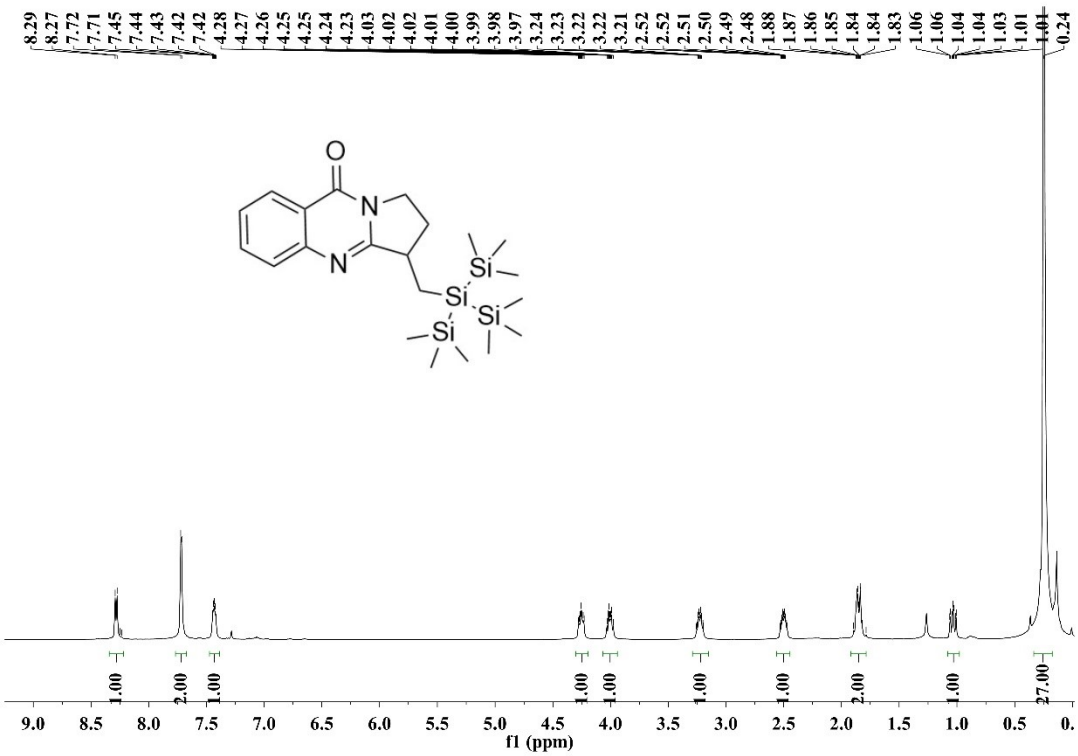
6,8-difluoro-3-methyl-2,3-dihydropyrrolo[2,1-*b*]quinazolin-9(1*H*)-one (6e)



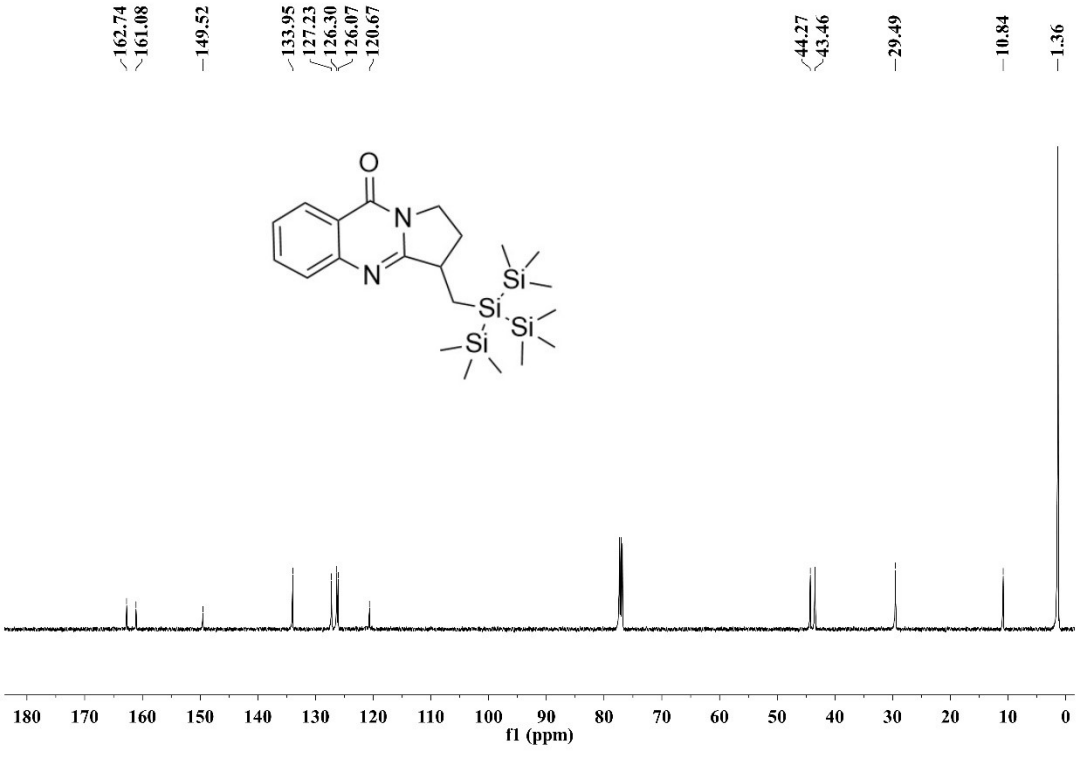
Yield 11.1 mg (47%, white solid); Melting point: 139-141 °C. ^{1}H NMR (500 MHz, Chloroform-d) δ 7.14 (d, J = 9.6 Hz, 1H), 6.95-6.69 (m, 1H), 4.24 (ddd, J = 12.6, 8.8, 3.7 Hz, 1H), 4.08-3.91 (m, 1H), 3.31 (h, J = 7.5 Hz, 1H), 2.50 (dtd, J = 12.3, 8.0, 3.5 Hz, 1H), 1.87 (dq, J = 12.5, 8.8 Hz, 1H), 1.46 (d, J = 7.0 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-d) δ 166.56 (d, JC-F = 14.3 Hz), 164.5 (q, JC-F = 8.8 Hz), 163.57 (d, JC-F = 15.0 Hz), 161.44 (d, JC-F = 14.9 Hz), 157.50 (d, JC-F = 3.6 Hz), 153.03 (d, JC-F = 14.4 Hz), 108.77 (dd, JC-F = 21.8, 4.5 Hz), 102.56 (dd, JC-F = 26.9, 24.6 Hz), 44.67, 38.96, 28.27, 16.95. 19F NMR (471 MHz, CDCl3) δ -101.02, -101.04, -101.06, -101.08, -106.09, -106.11, -106.14. HRMS (ESI-TOF) m/z: [M+H]+ Calcd for C12H11F2N2O 237.0834, Found 237.0839.

K. Copies of ^{1}H and ^{13}C NMR spectra

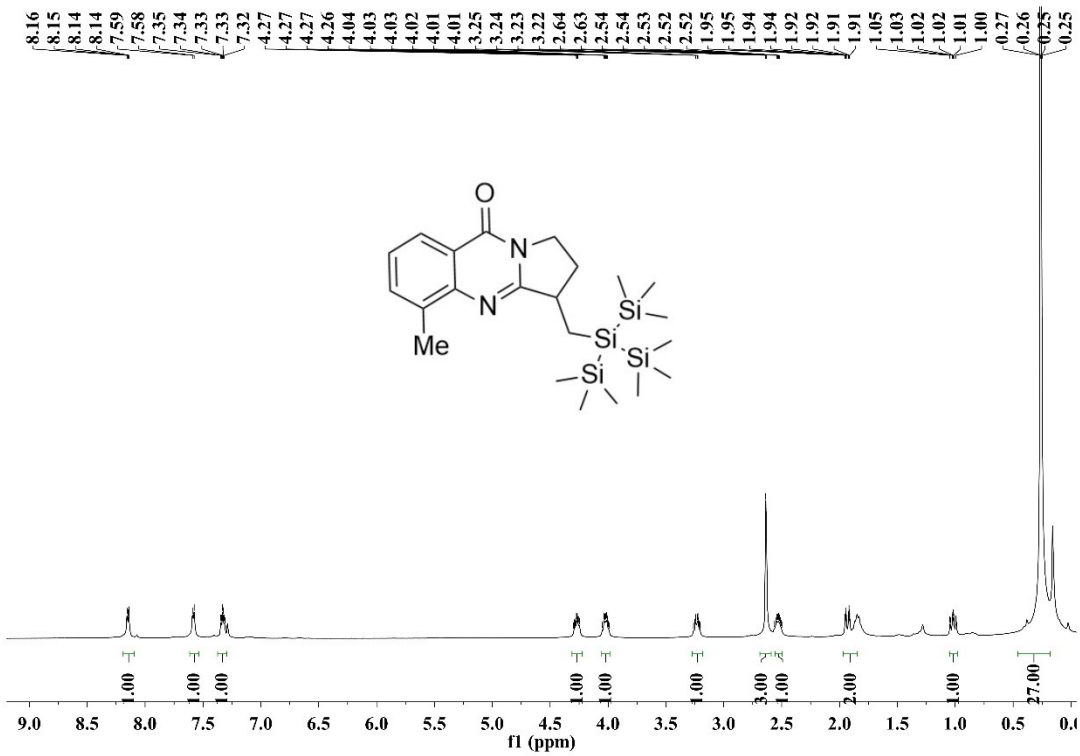
^{1}H NMR spectrum of 3a (500 MHz, $CDCl_3$)



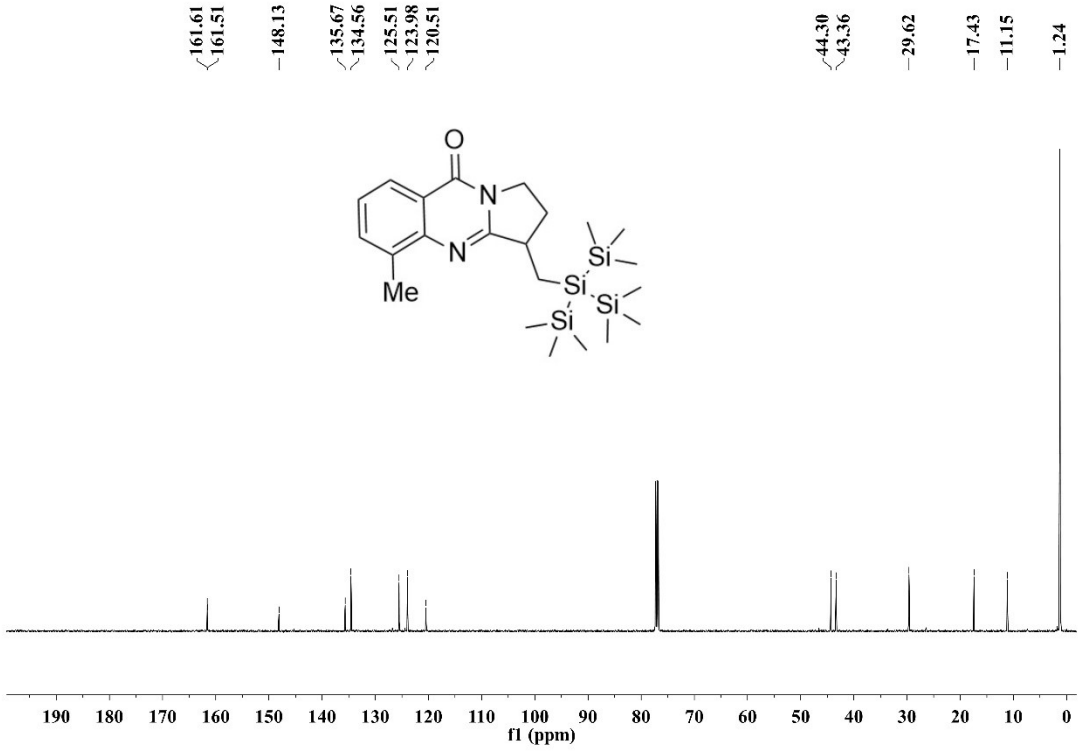
$^{13}C\{^{1}H\}$ NMR spectrum of 3a (125 MHz, $CDCl_3$)



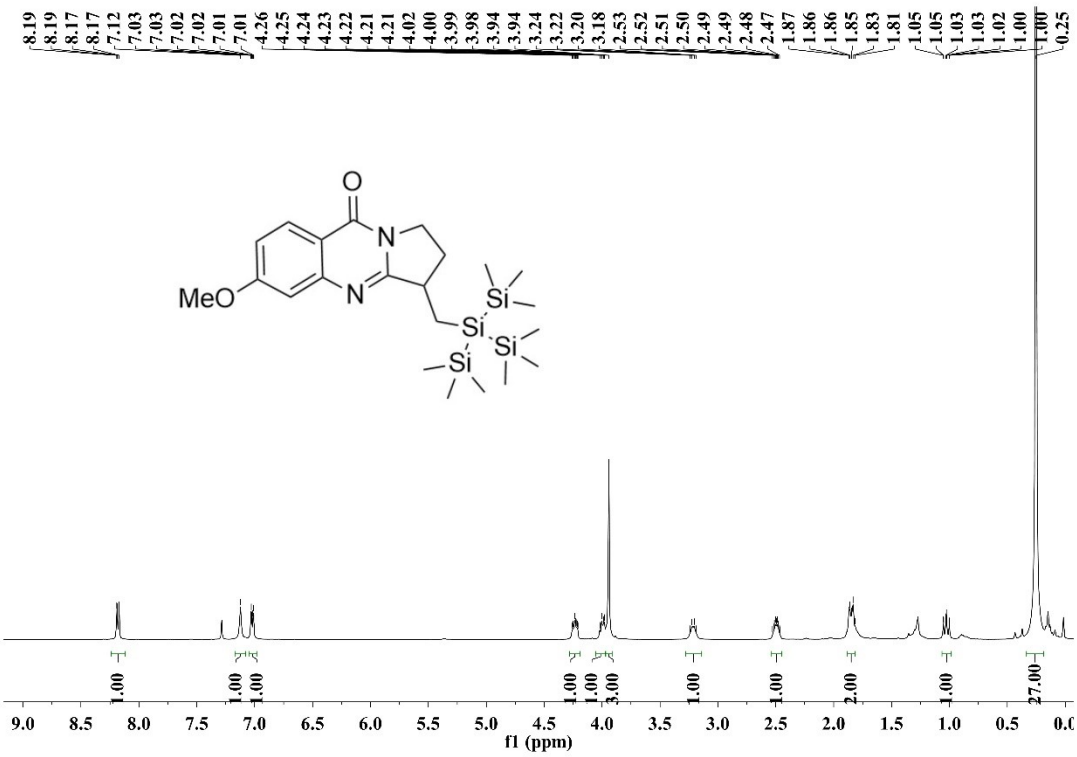
^{1}H NMR spectrum of 3b (500 MHz, $CDCl_3$)



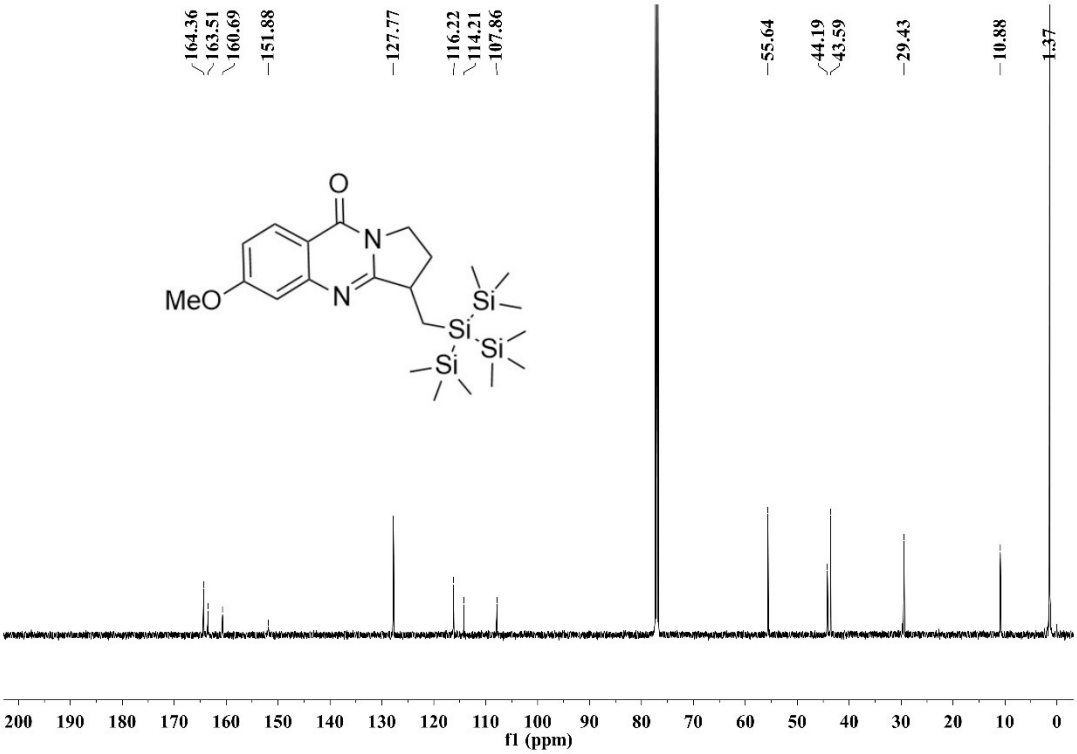
^{13}C{^{1}H} NMR spectrum of 3b (125 MHz, $CDCl_3$)



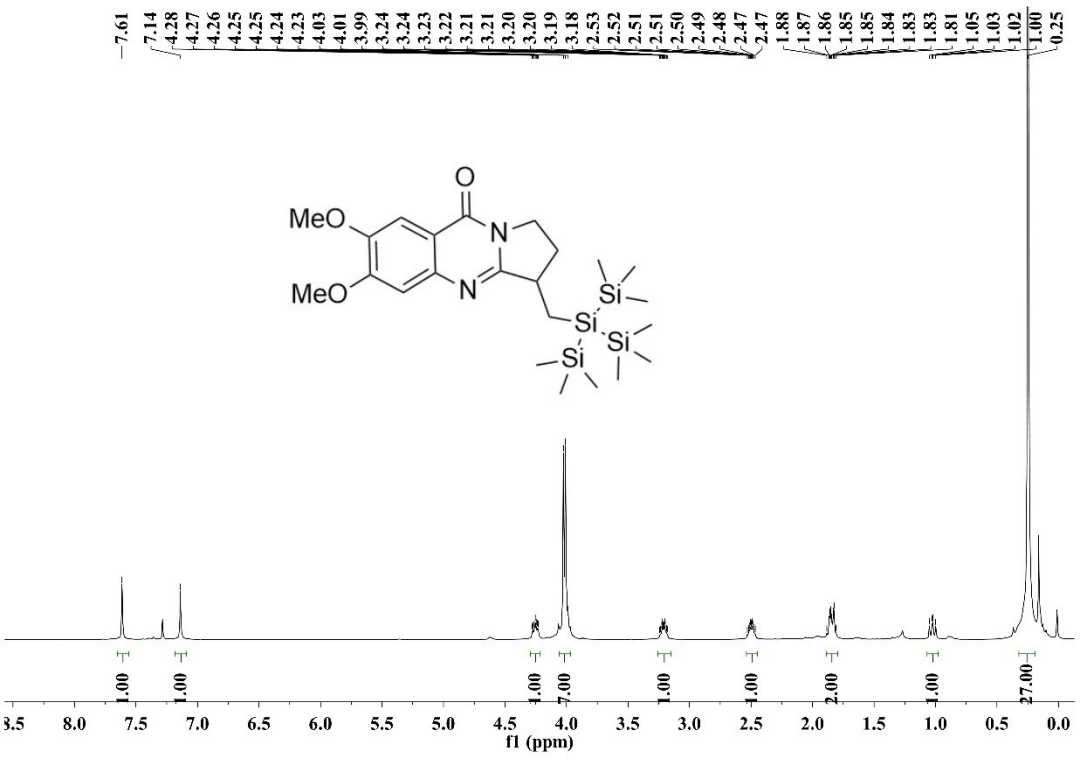
^{1}H NMR spectrum of 3c (500 MHz, $CDCl_3$)



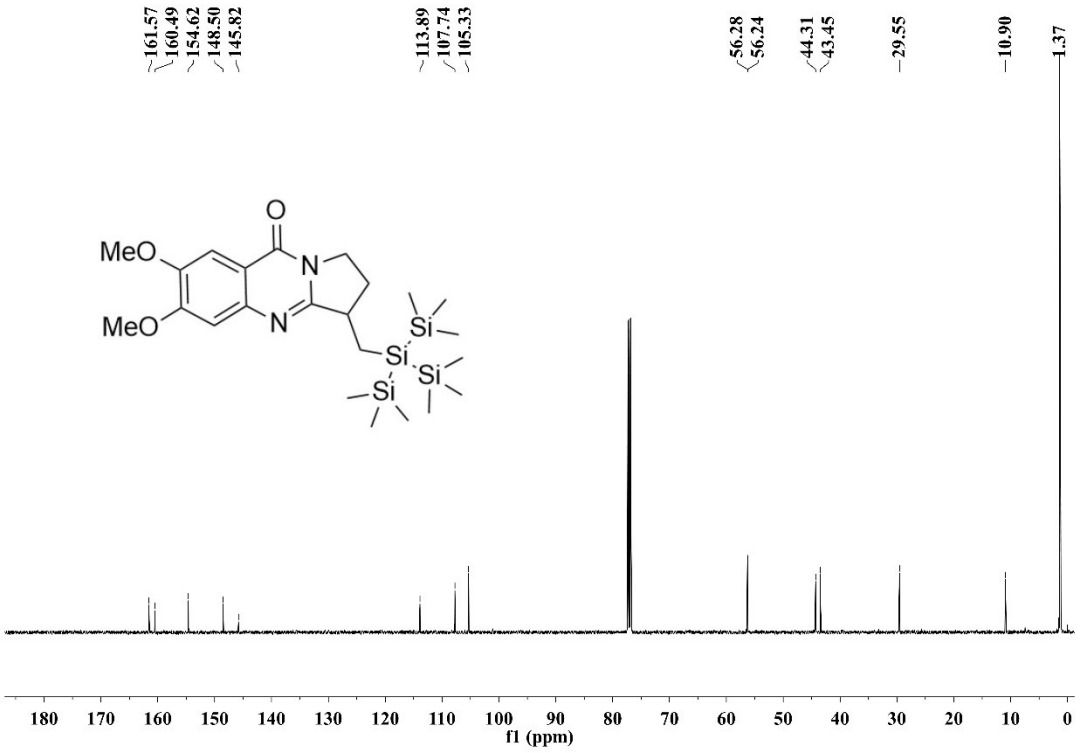
^{13}C{^{1}H} NMR spectrum of 3c (125 MHz, $CDCl_3$)



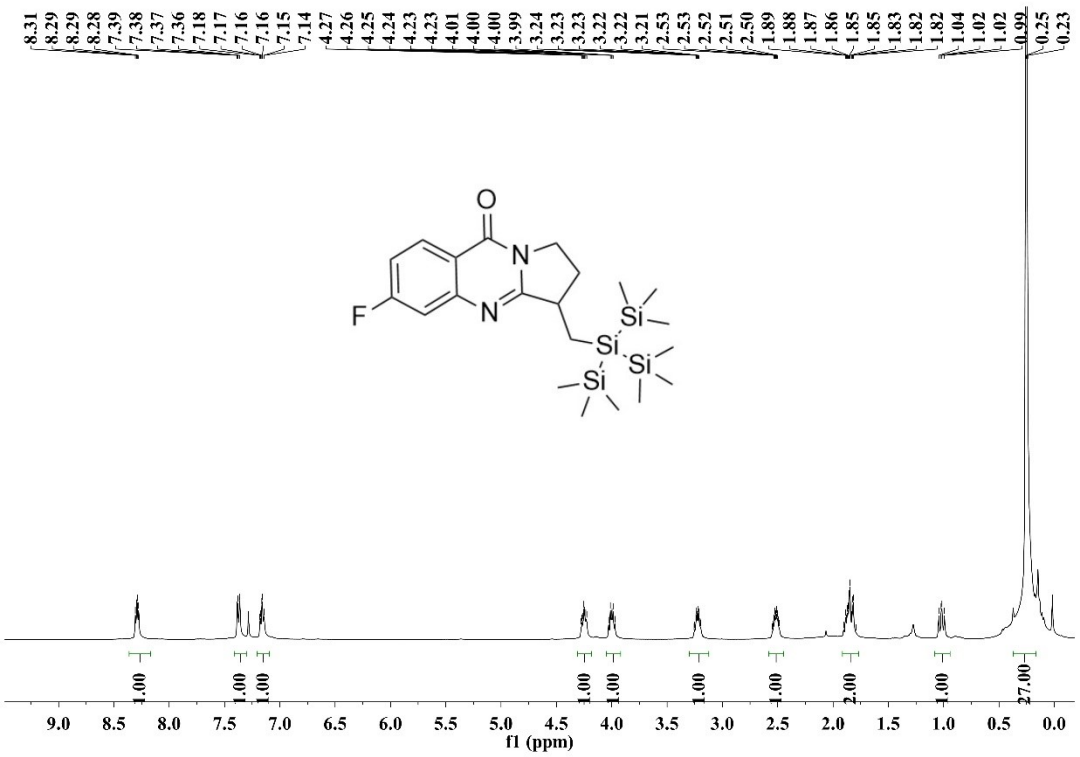
^{1}H NMR spectrum of 3d (500 MHz, $CDCl_3$)



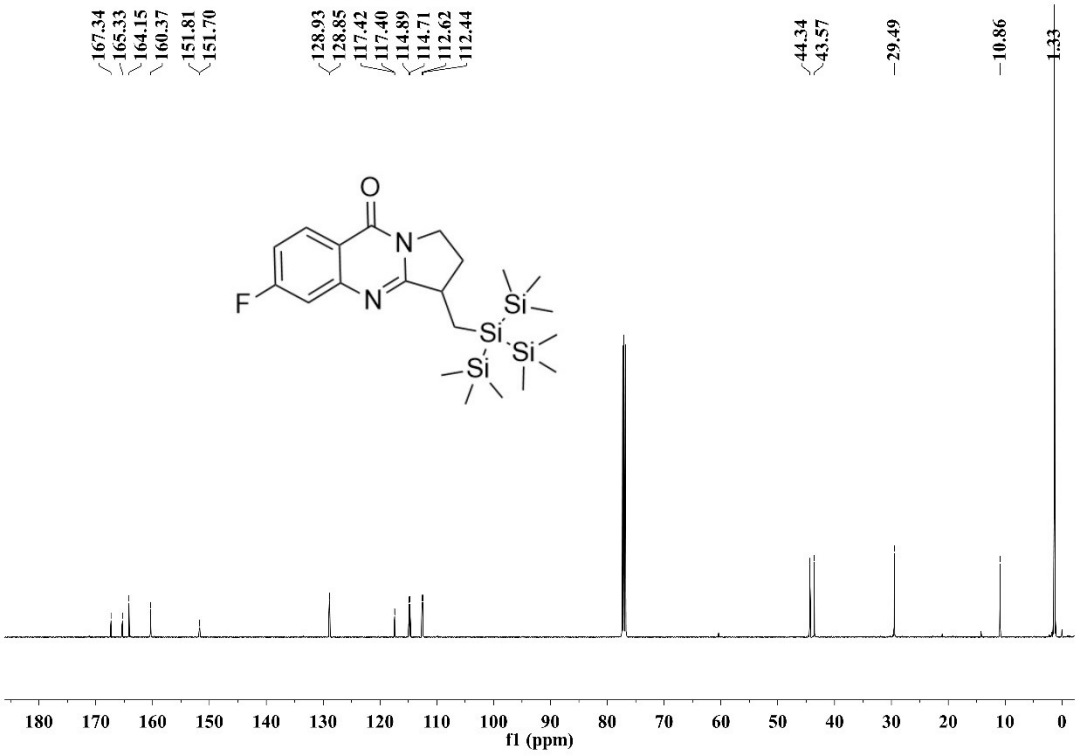
^{13}C{^{1}H} NMR spectrum of 3d (125 MHz, $CDCl_3$)



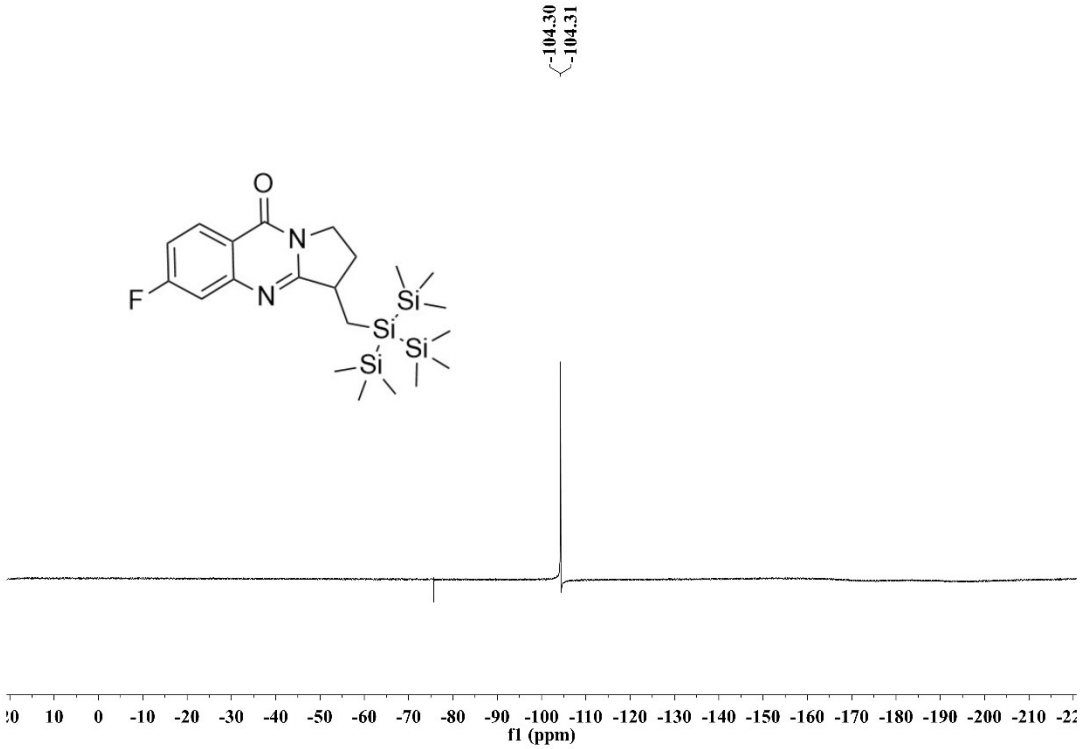
^{1}H NMR spectrum of 3e (500 MHz, $CDCl_3$)



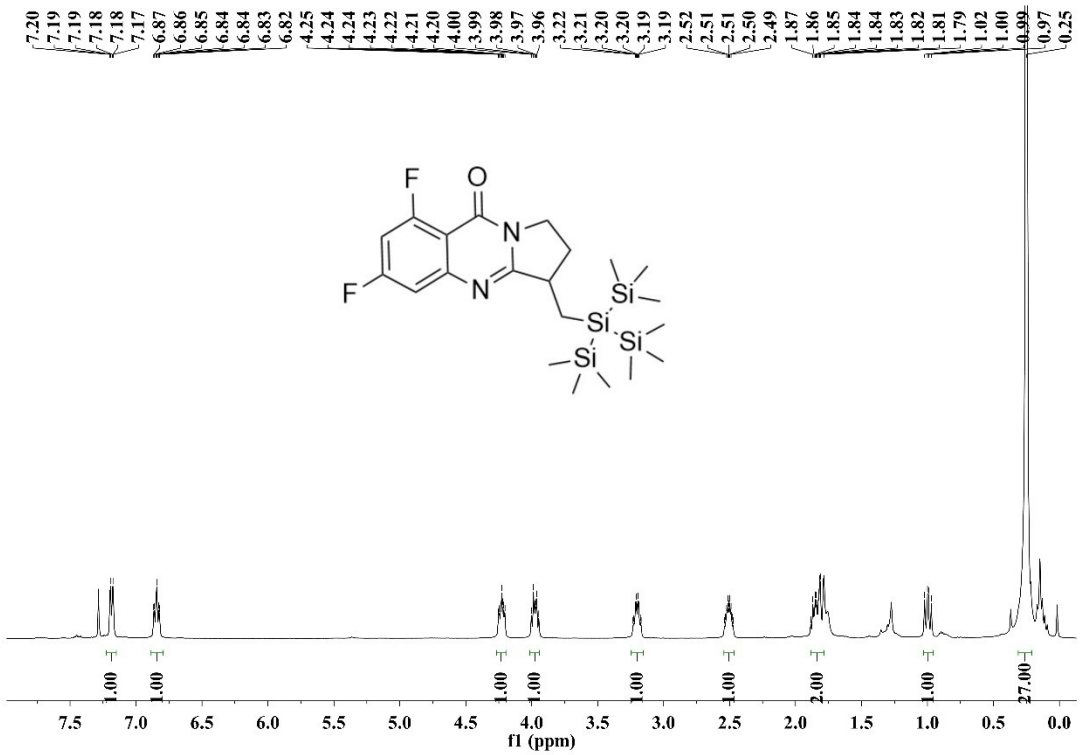
^{13}C{^{1}H} NMR spectrum of 3e (125 MHz, $CDCl_3$)



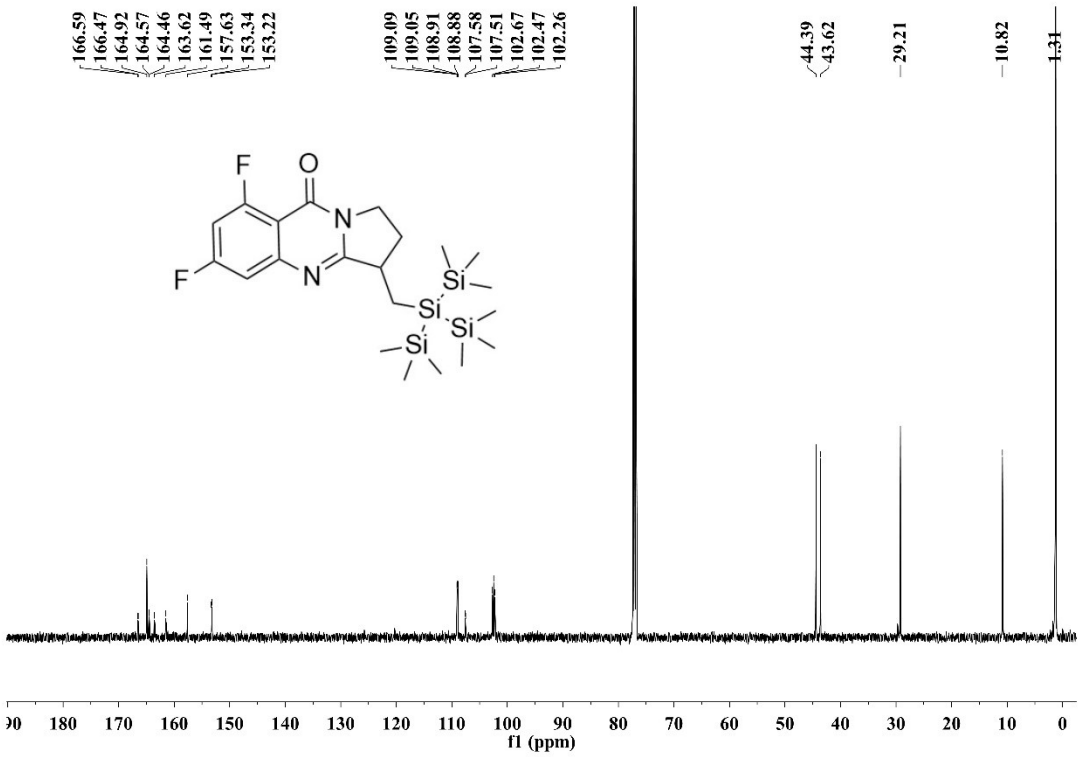
^{19}F NMR spectrum of 3e (125 MHz, $CDCl_3$)



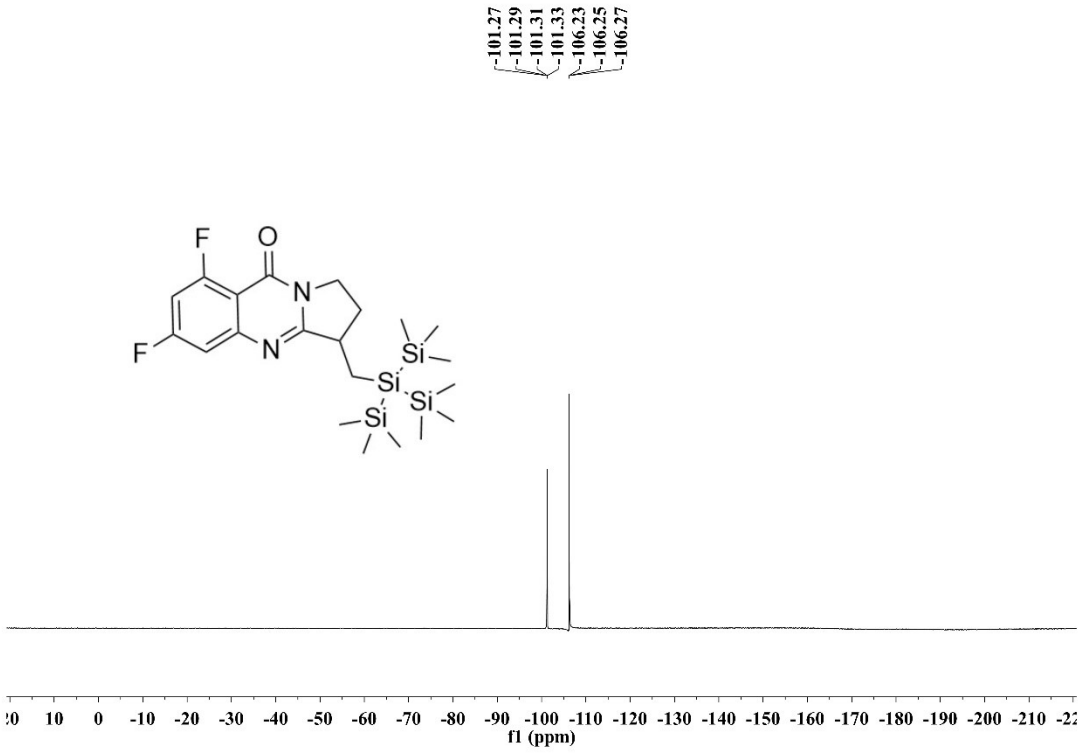
^{1}H NMR spectrum of 3f (500 MHz, $CDCl_3$)



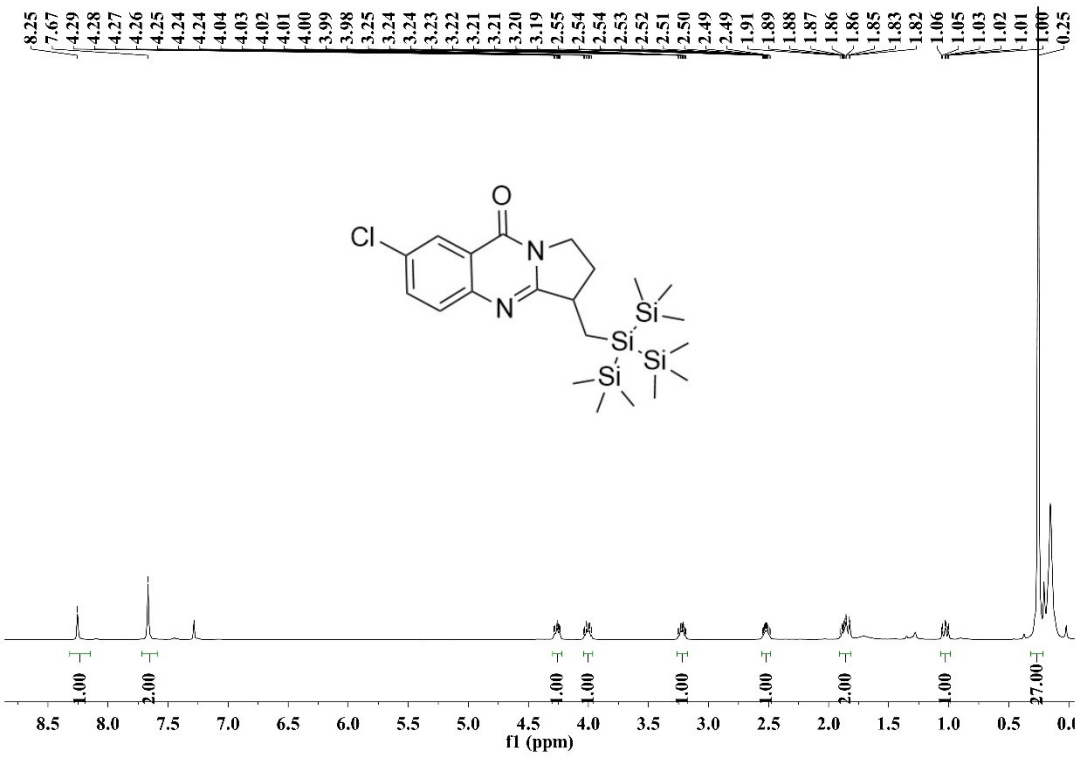
$^{13}C\{^{1}H\}$ NMR spectrum of 3f (125 MHz, $CDCl_3$)



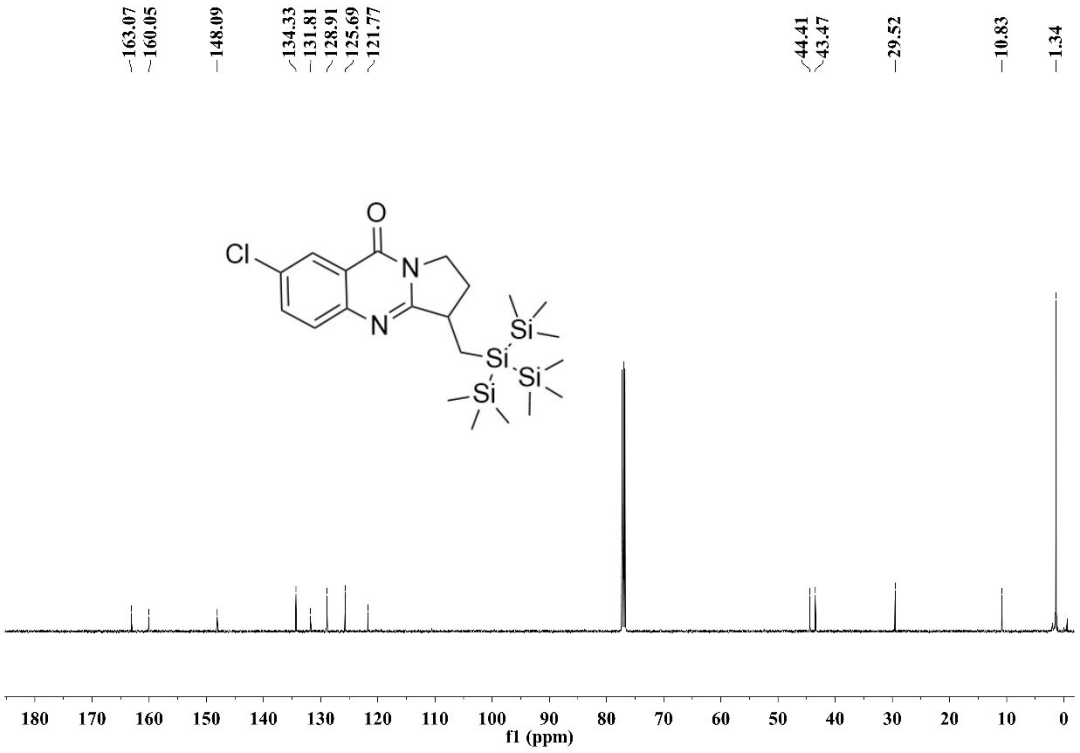
^{19}F NMR spectrum of 3f (125 MHz, $CDCl_3$)



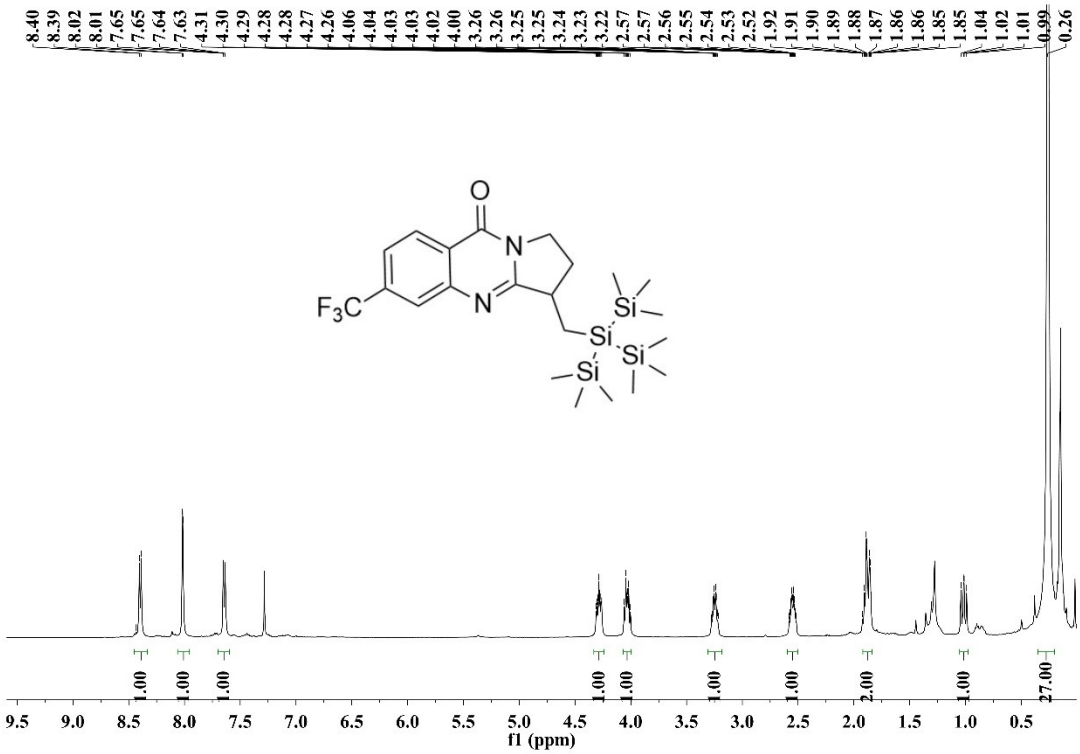
^{1}H NMR spectrum of 3g (500 MHz, $CDCl_3$)



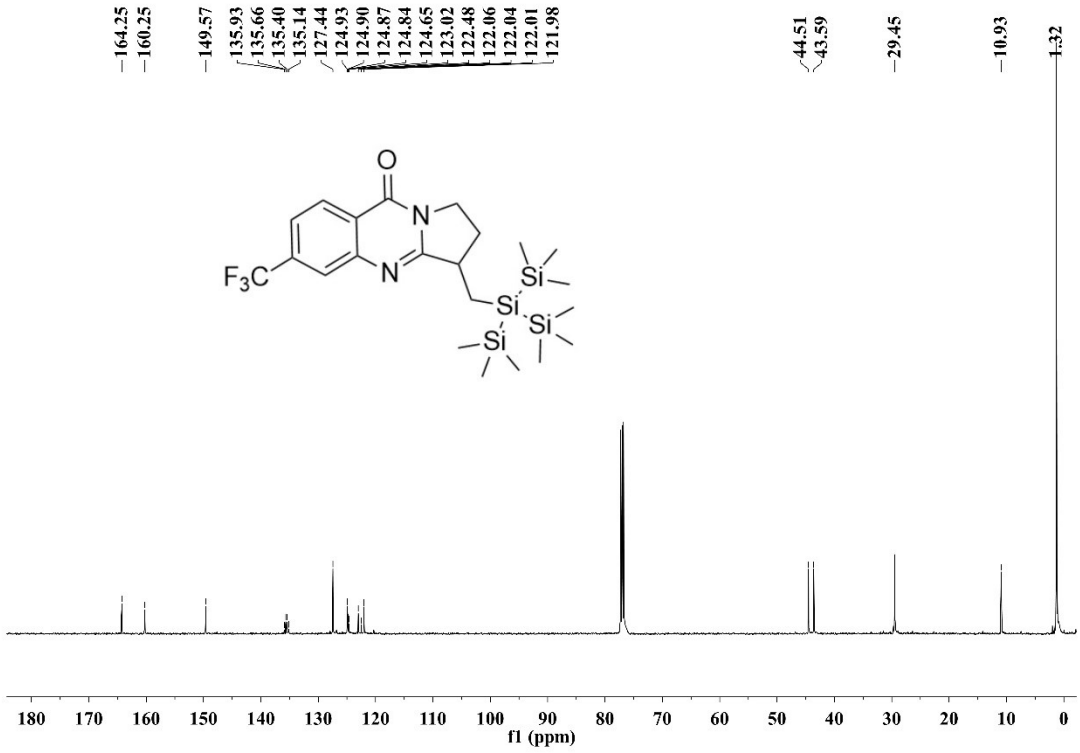
^{13}C{^{1}H} NMR spectrum of 3g (125 MHz, $CDCl_3$)



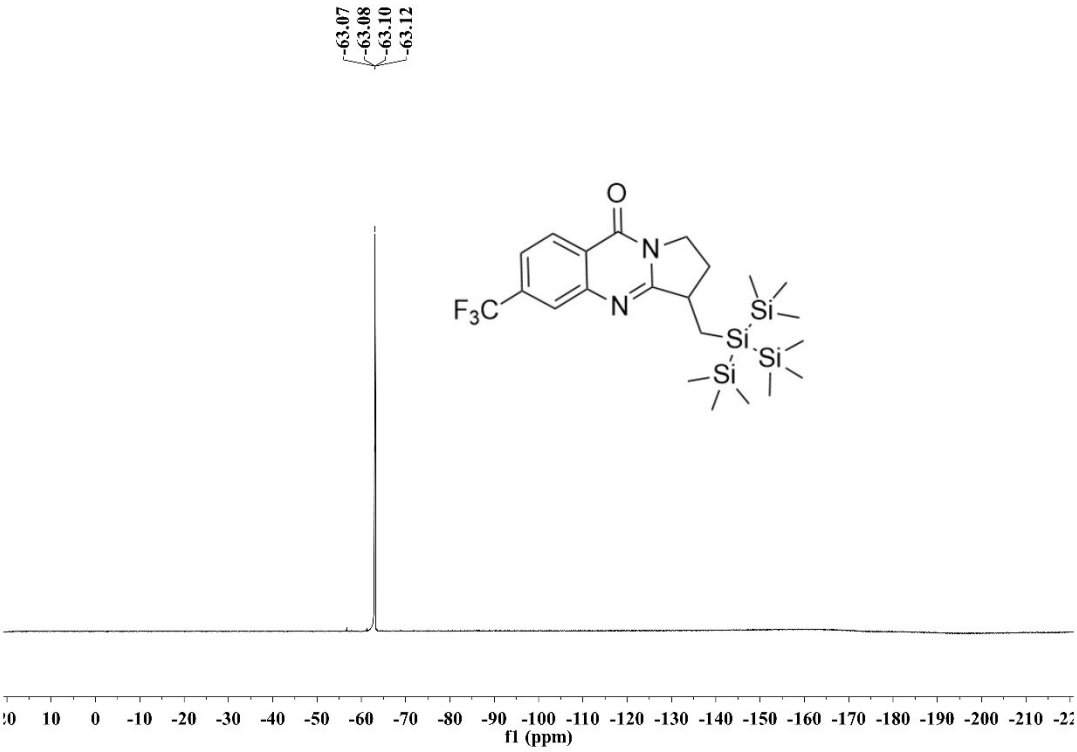
^{1}H NMR spectrum of 3h (500 MHz, $CDCl_3$)



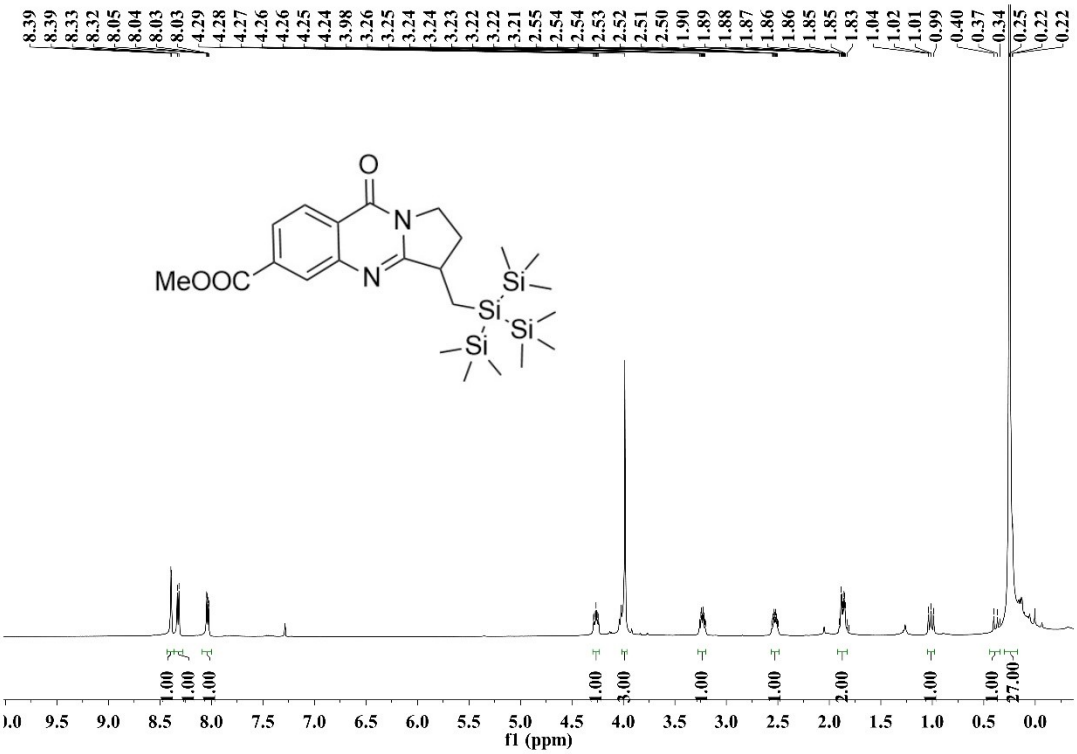
^{13}C{^{1}H} NMR spectrum of 3h (125 MHz, $CDCl_3$)



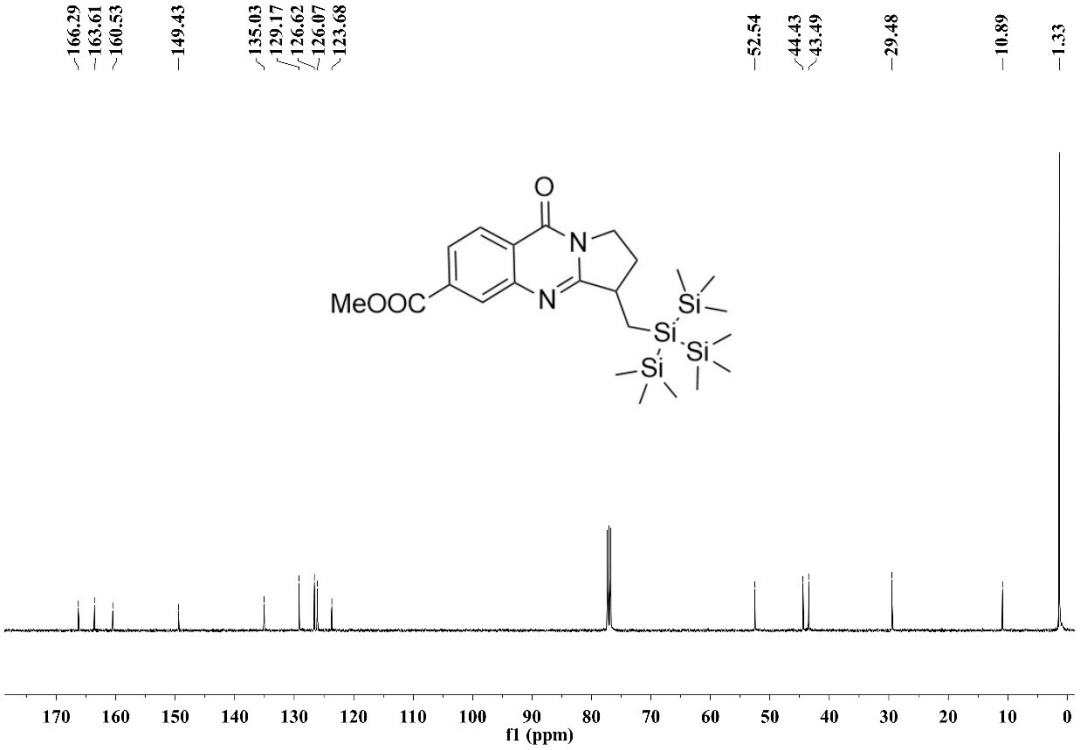
^{19}F NMR spectrum of 3h (125 MHz, $CDCl_3$)



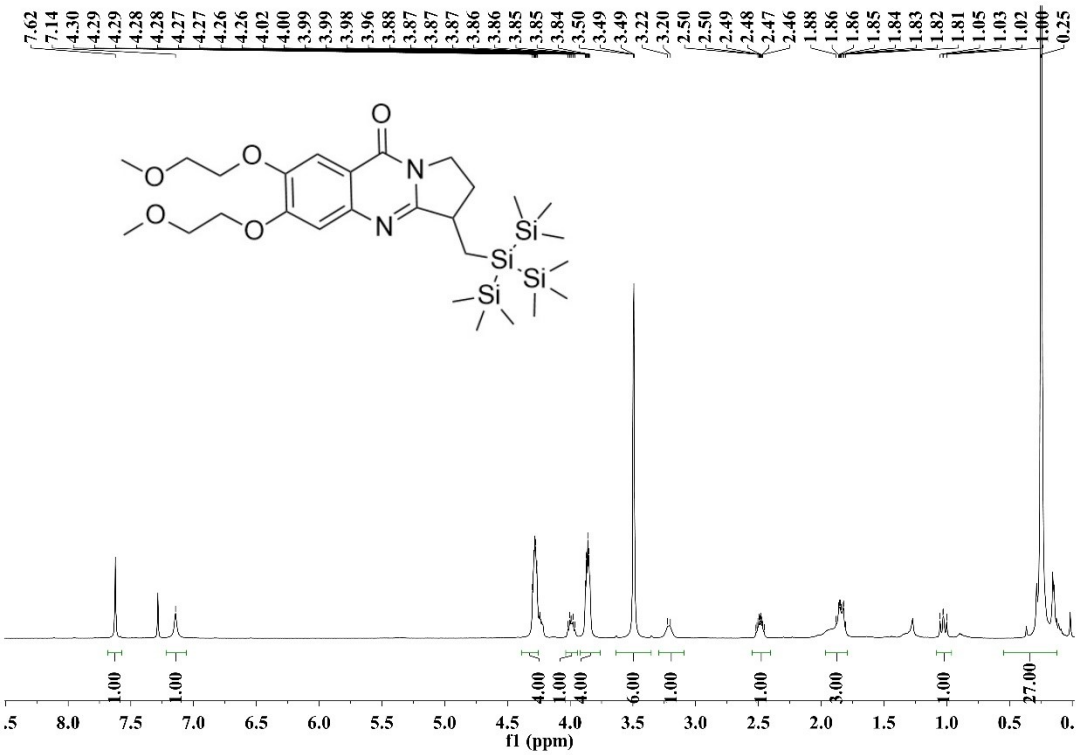
^{1}H NMR spectrum of 3i (500 MHz, $CDCl_3$)



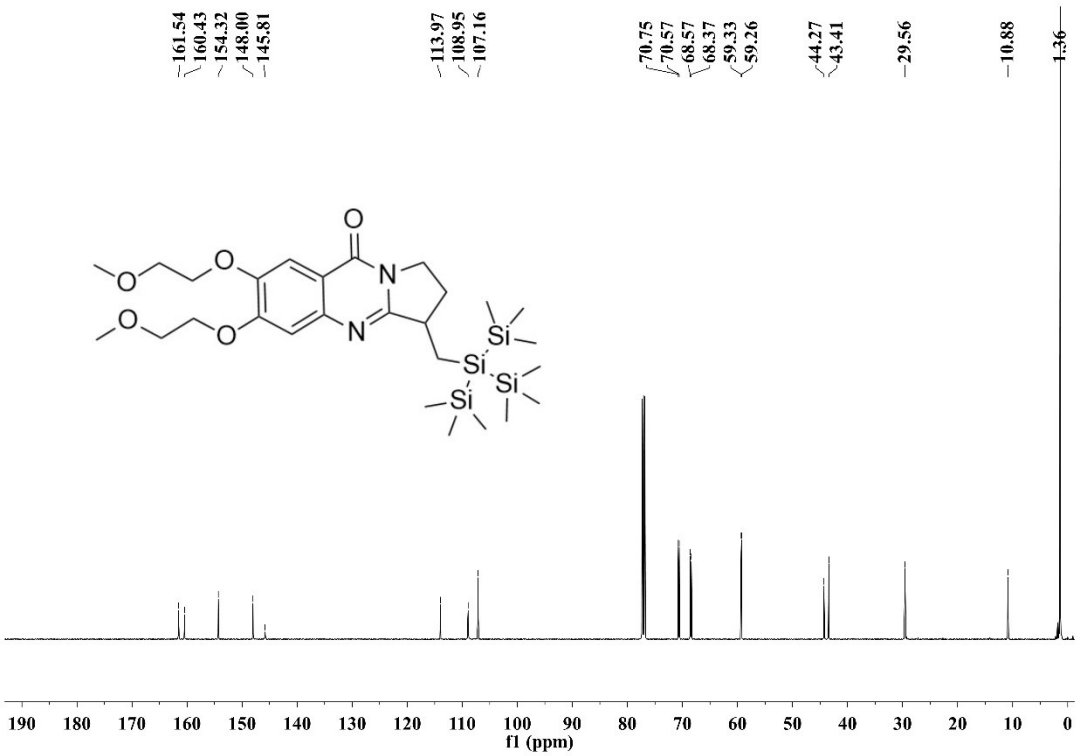
$^{13}C\{^{1}H\}$ NMR spectrum of 3i (125 MHz, $CDCl_3$)



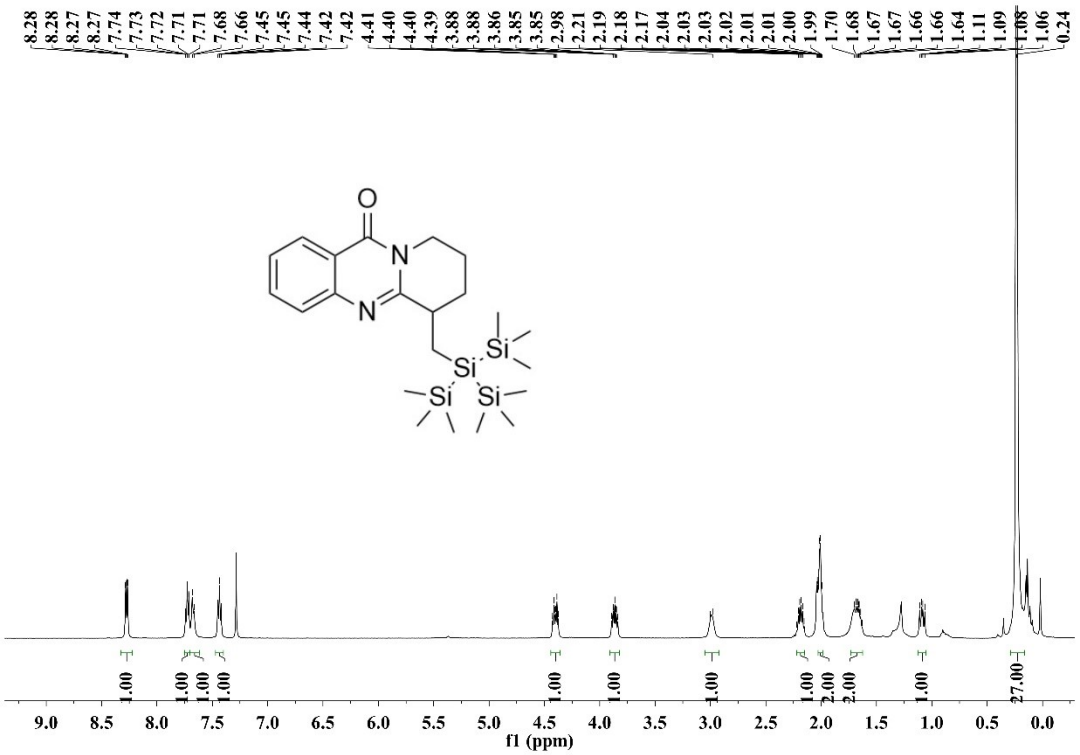
^{1}H NMR spectrum of 3j (500 MHz, $CDCl_3$)



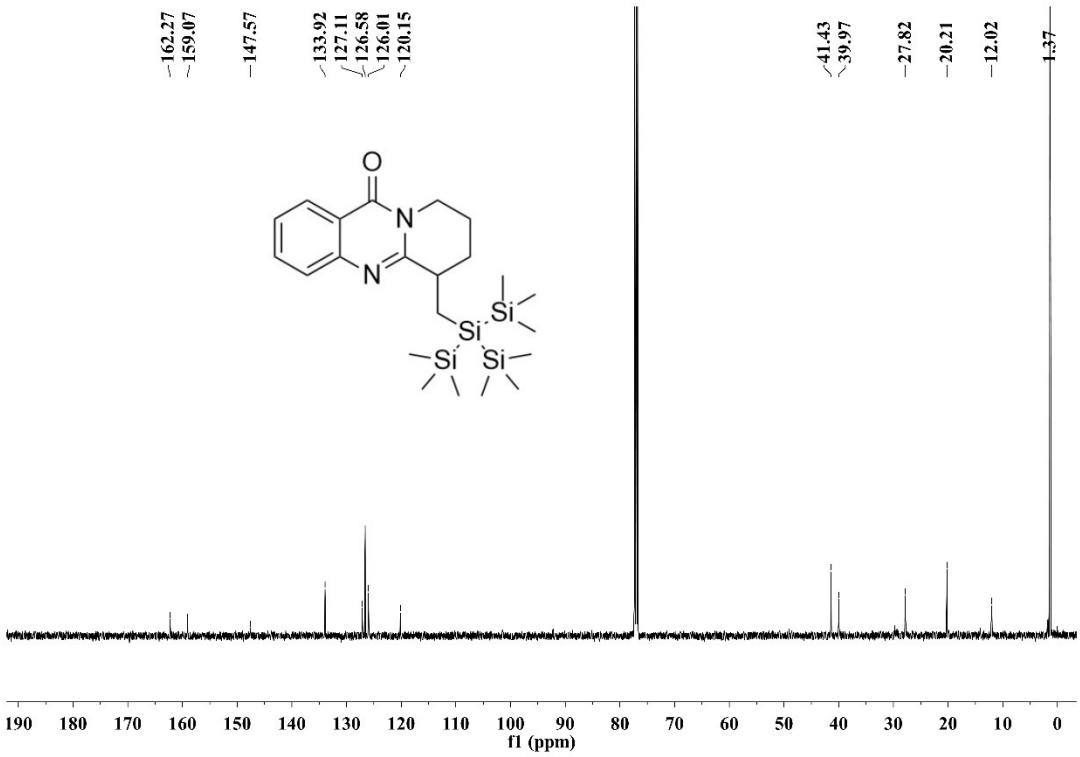
$^{13}C\{^{1}H\}$ NMR spectrum of 3j (125 MHz, $CDCl_3$)



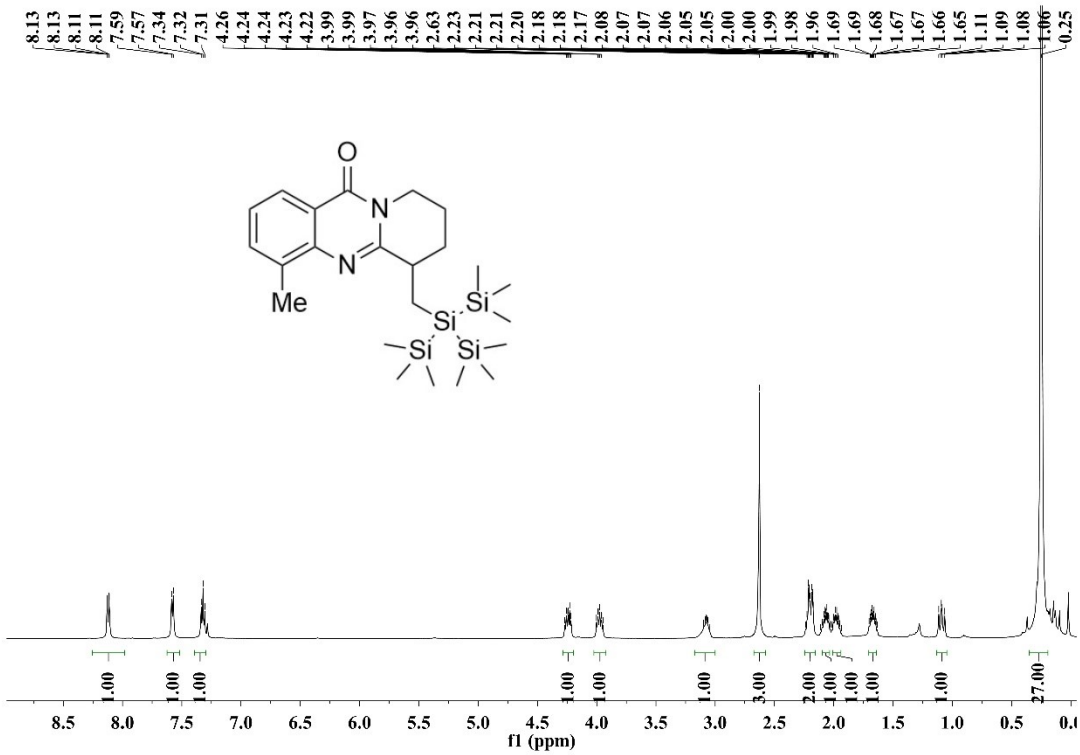
^{1}H NMR spectrum of 4a (500 MHz, $CDCl_3$)



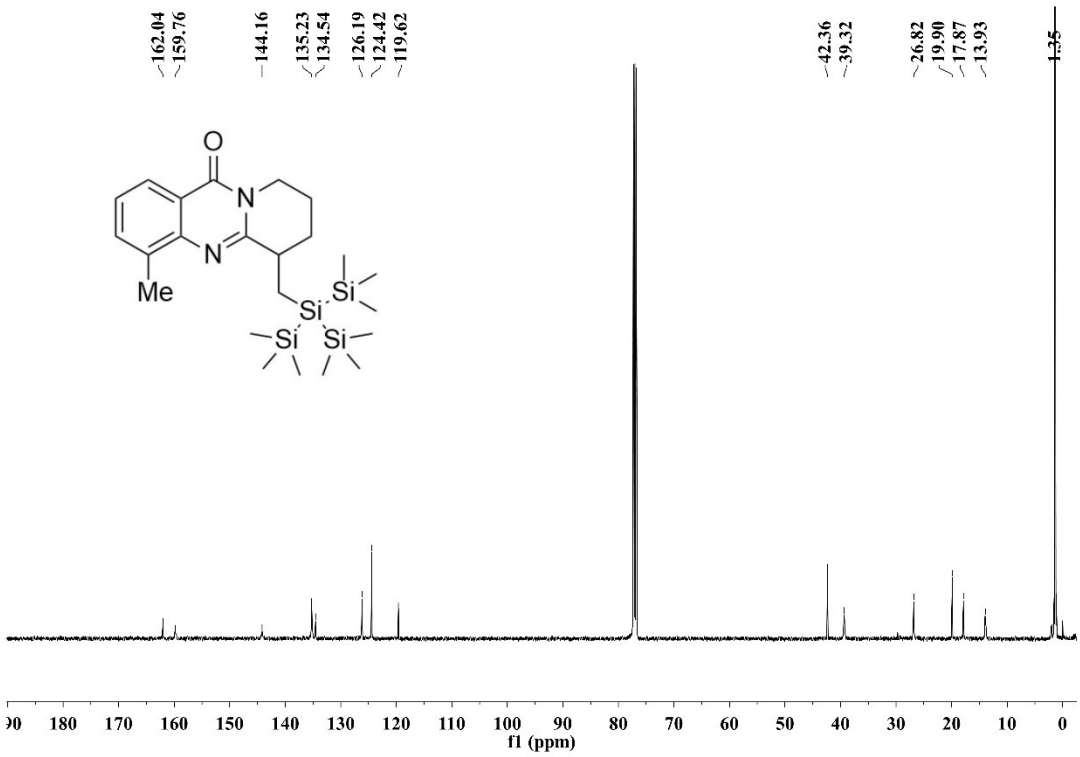
$^{13}C\{^{1}H\}$ NMR spectrum of 4a (125 MHz, $CDCl_3$)



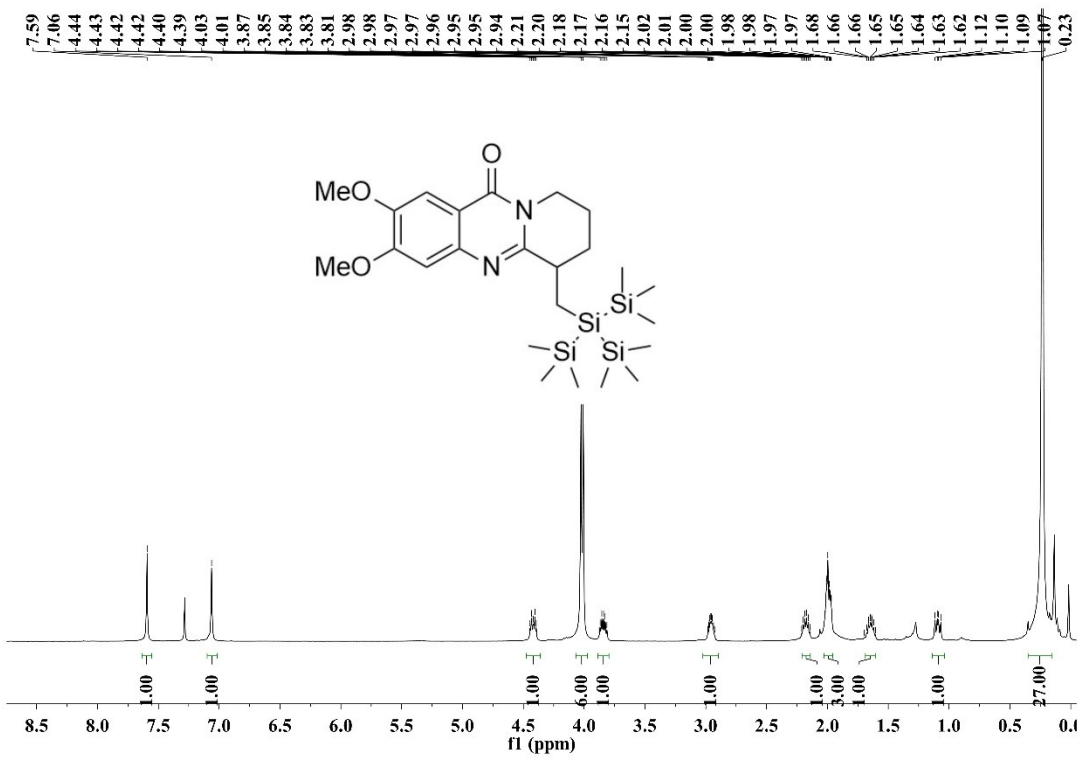
^{1}H NMR spectrum of 4b (500 MHz, $CDCl_3$)



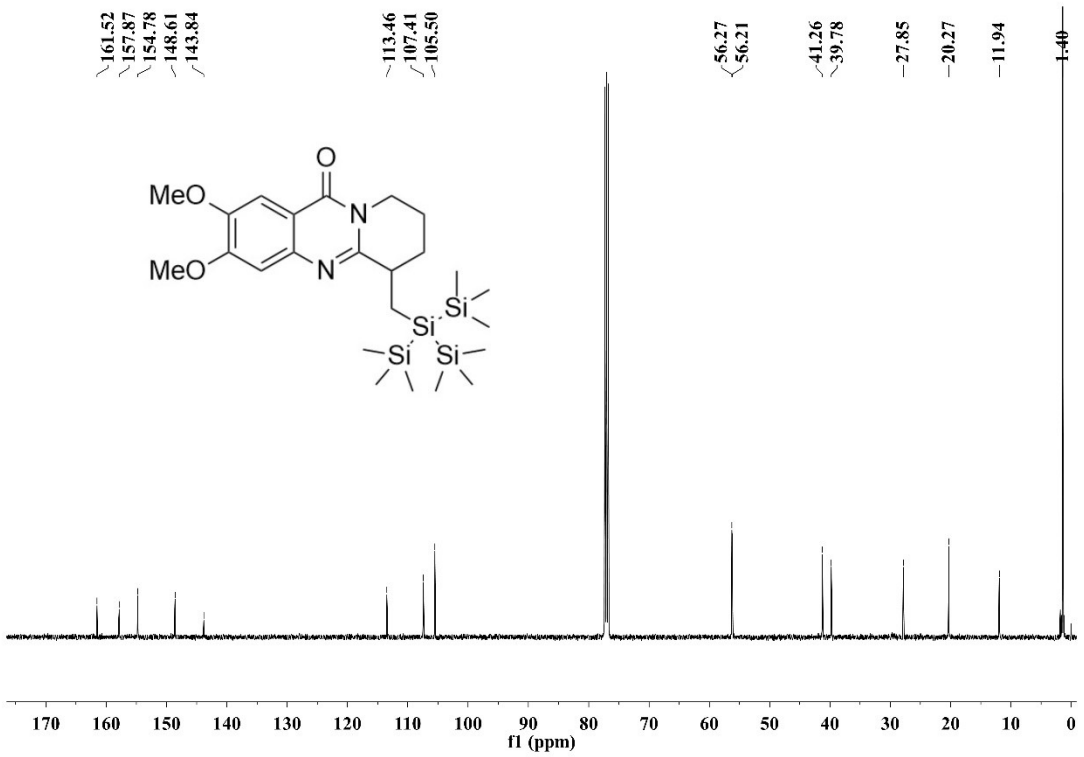
$^{13}C\{^{1}H\}$ NMR spectrum of 4b (125 MHz, $CDCl_3$)



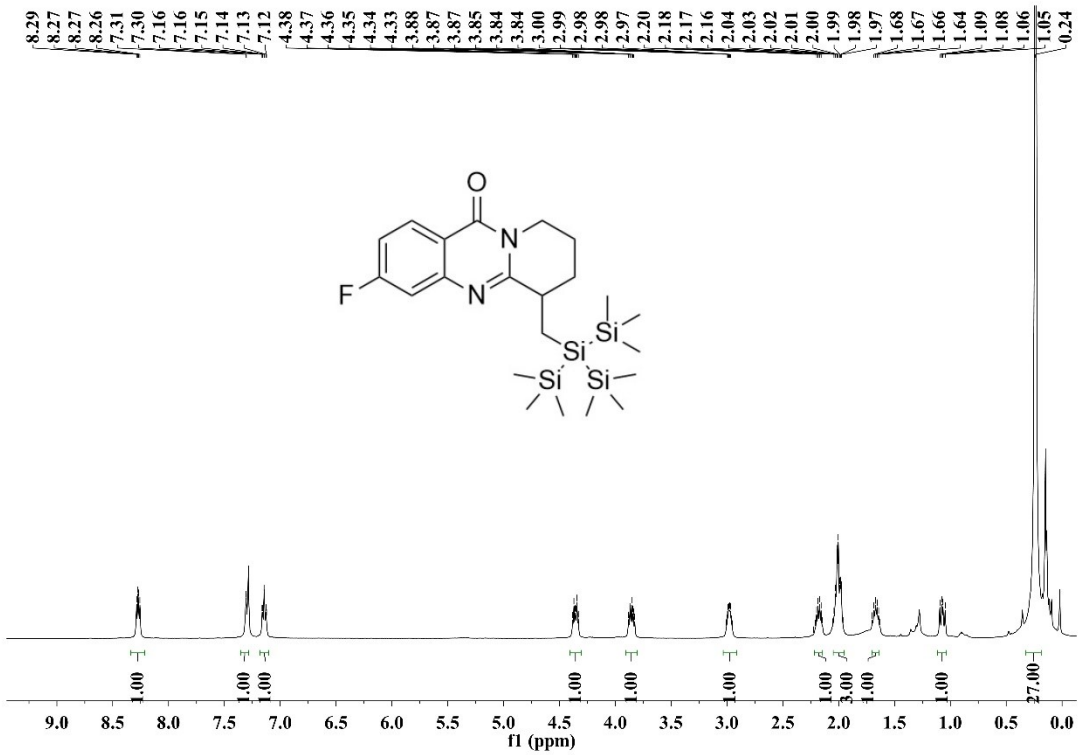
^{1}H NMR spectrum of 4c (500 MHz, $CDCl_3$)



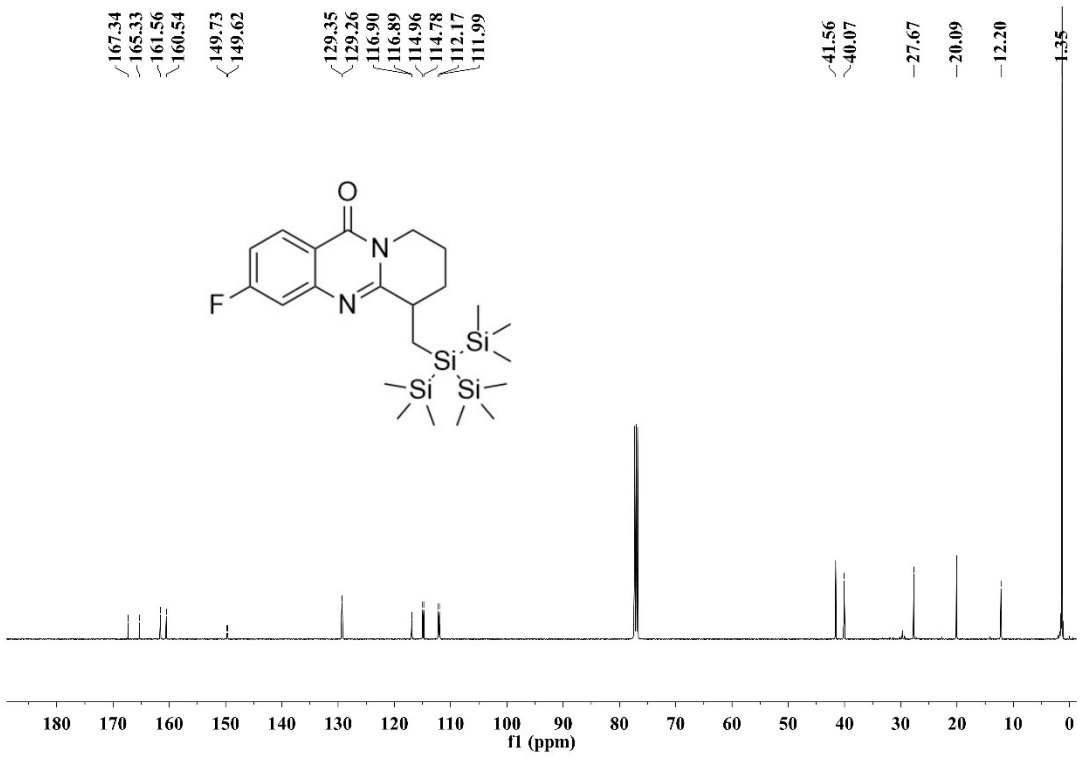
$^{13}C\{^{1}H\}$ NMR spectrum of 4c (125 MHz, $CDCl_3$)



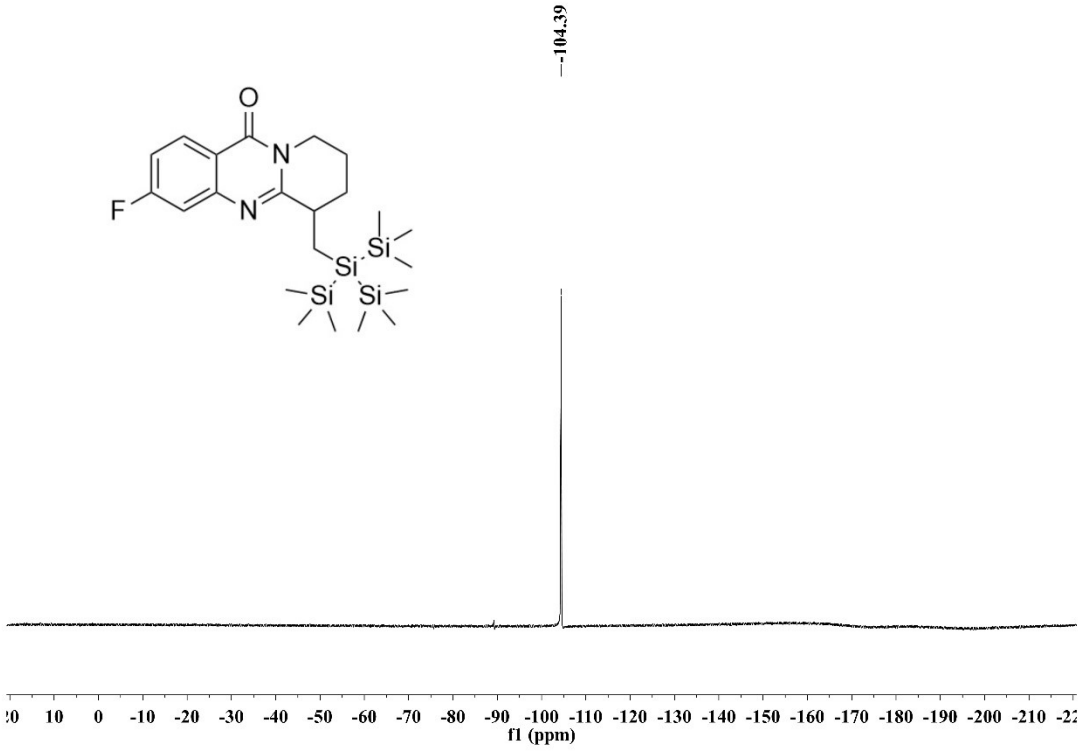
^{1}H NMR spectrum of 4d (500 MHz, $CDCl_3$)



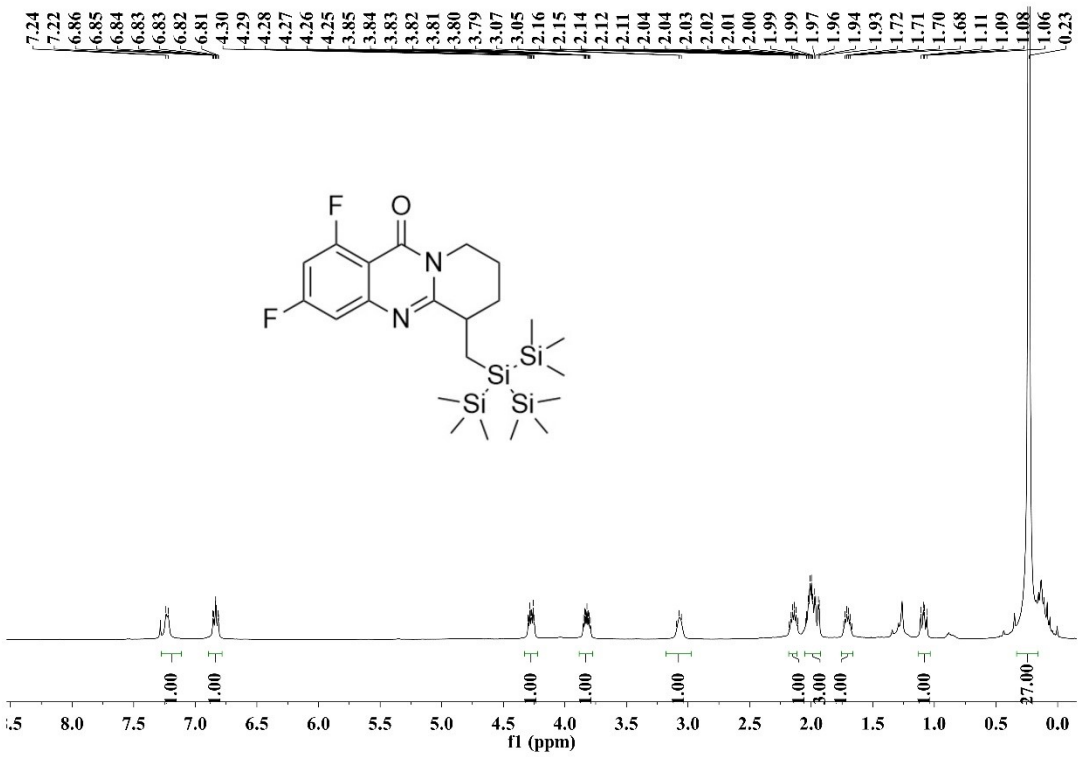
$^{13}C\{^{1}H\}$ NMR spectrum of 4d (125 MHz, $CDCl_3$)



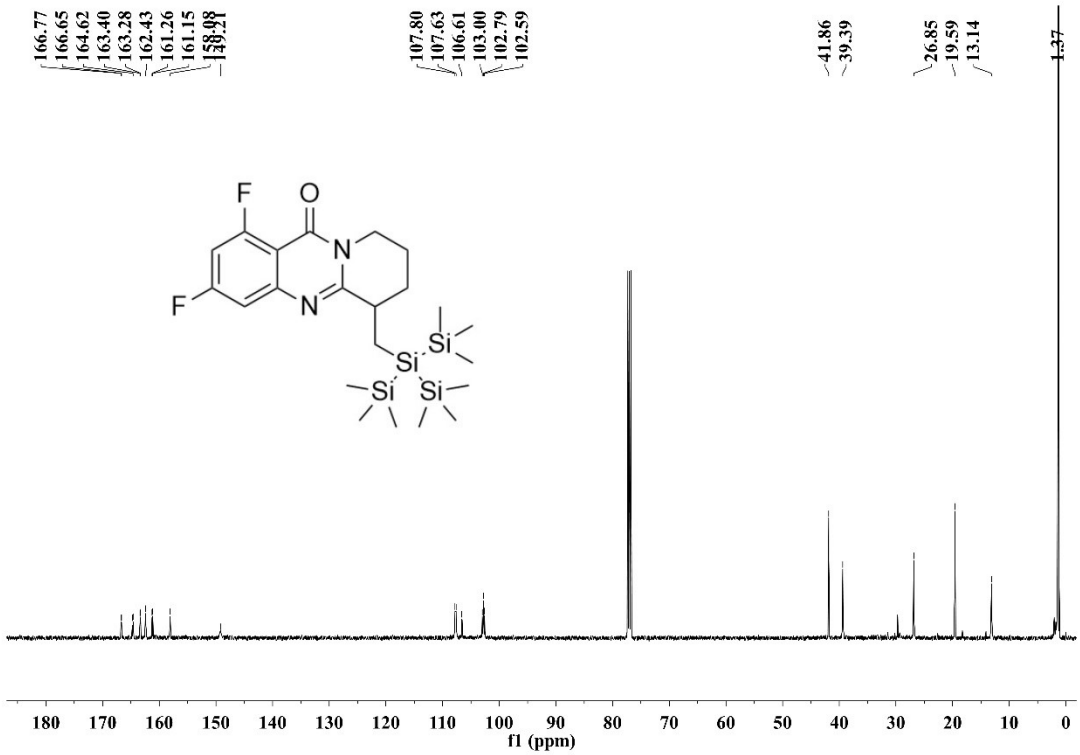
^{19}F NMR spectrum of 4d (125 MHz, $CDCl_3$)



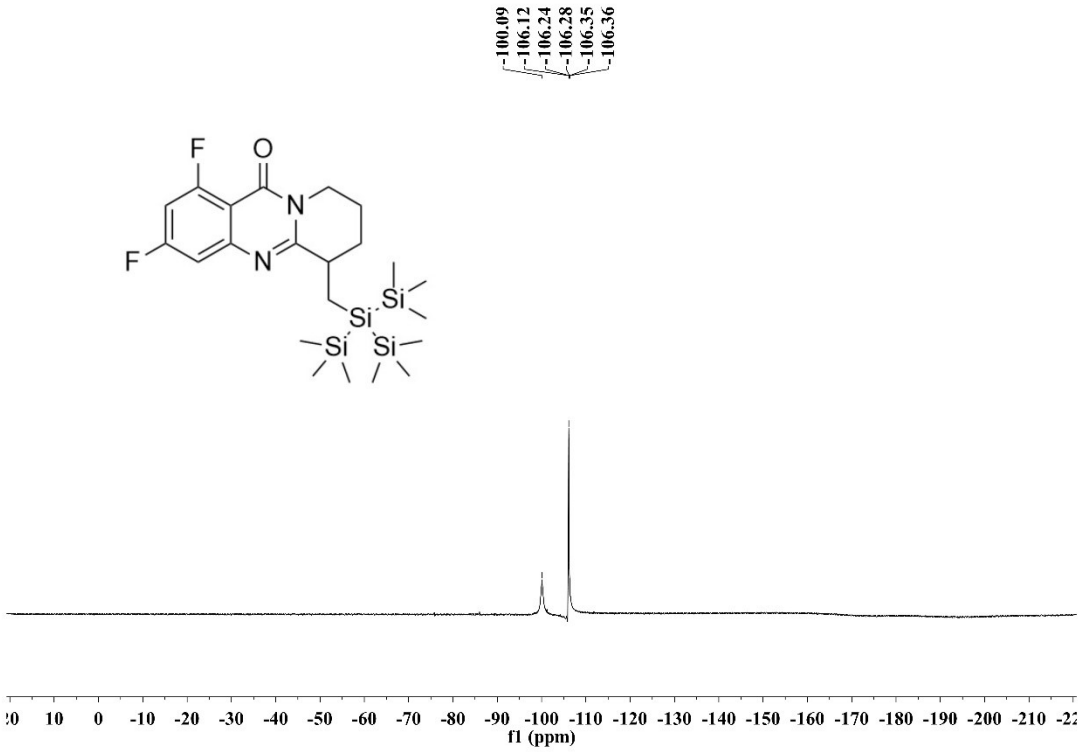
^{1}H NMR spectrum of 4e (500 MHz, $CDCl_3$)



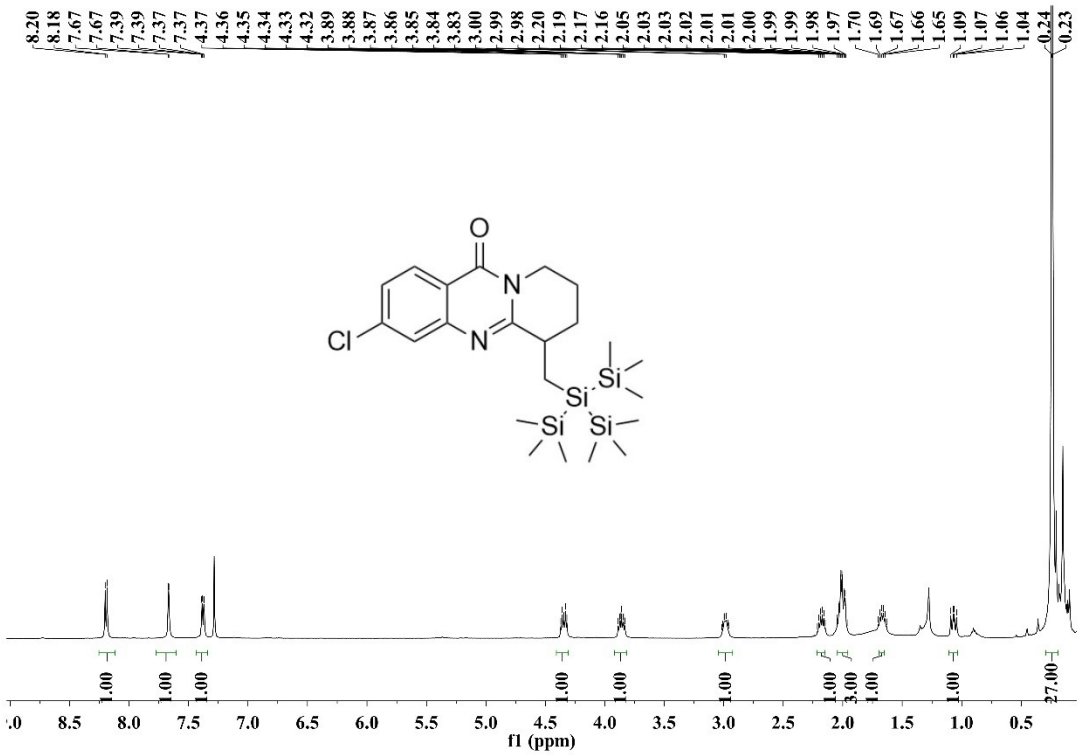
^{13}C{^{1}H} NMR spectrum of 4e (125 MHz, $CDCl_3$)



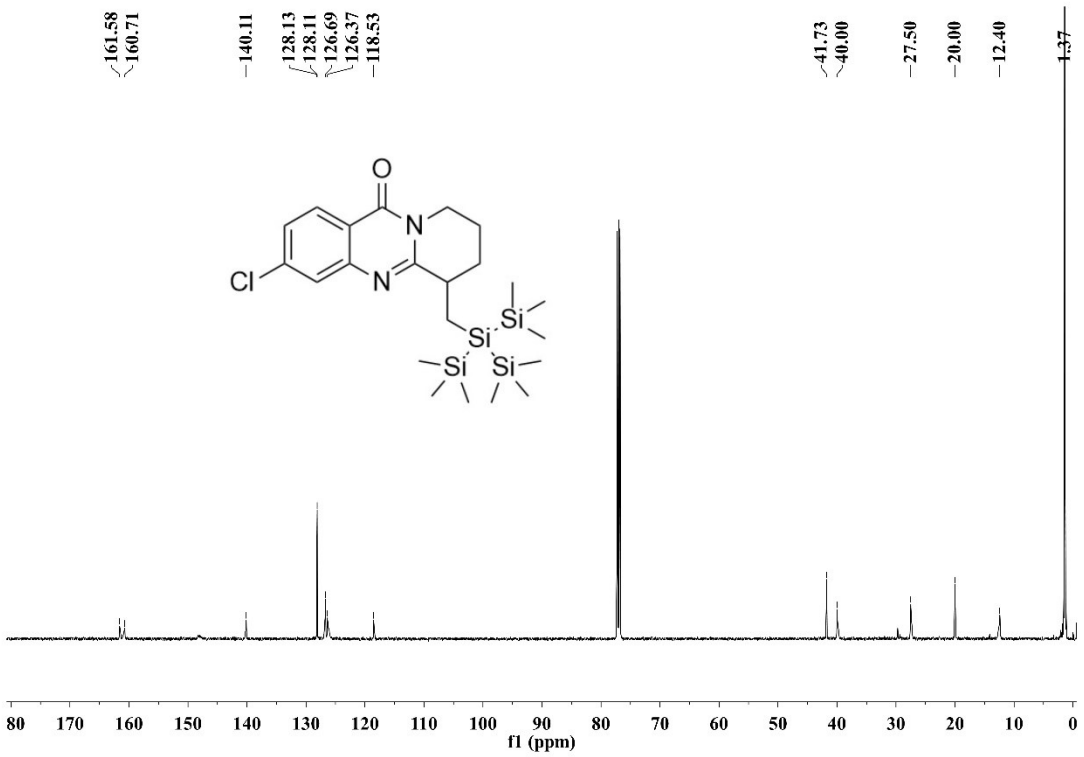
^{19}F NMR spectrum of 4e (125 MHz, $CDCl_3$)



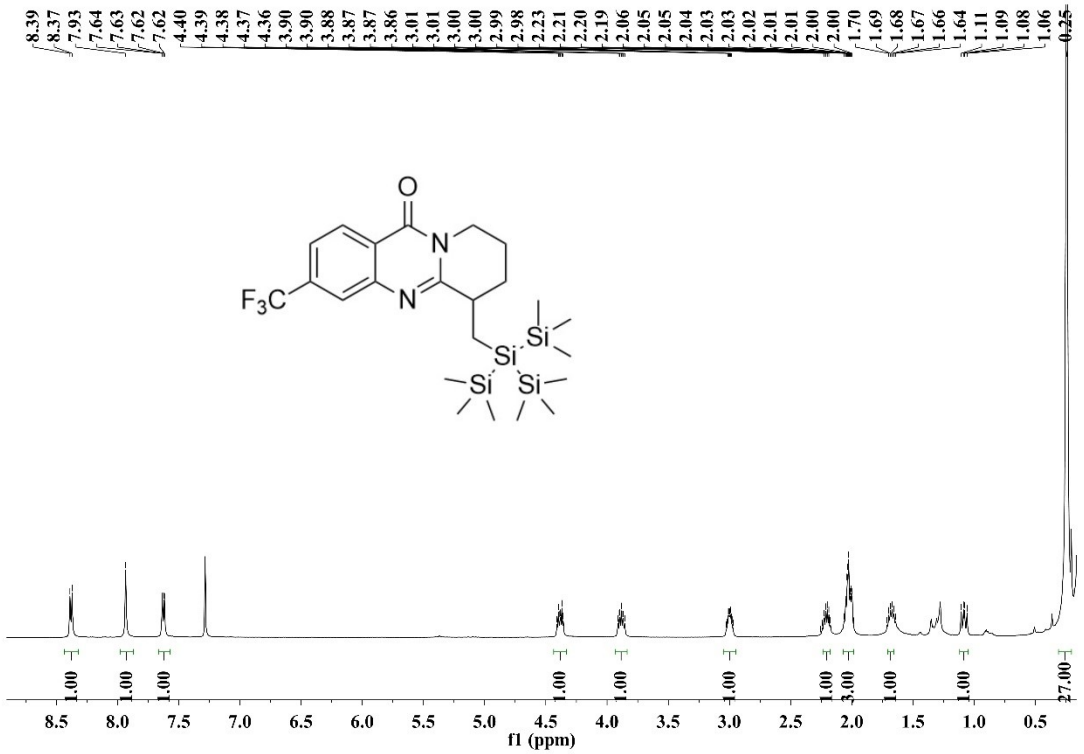
^{1}H NMR spectrum of 4f (500 MHz, $CDCl_3$)



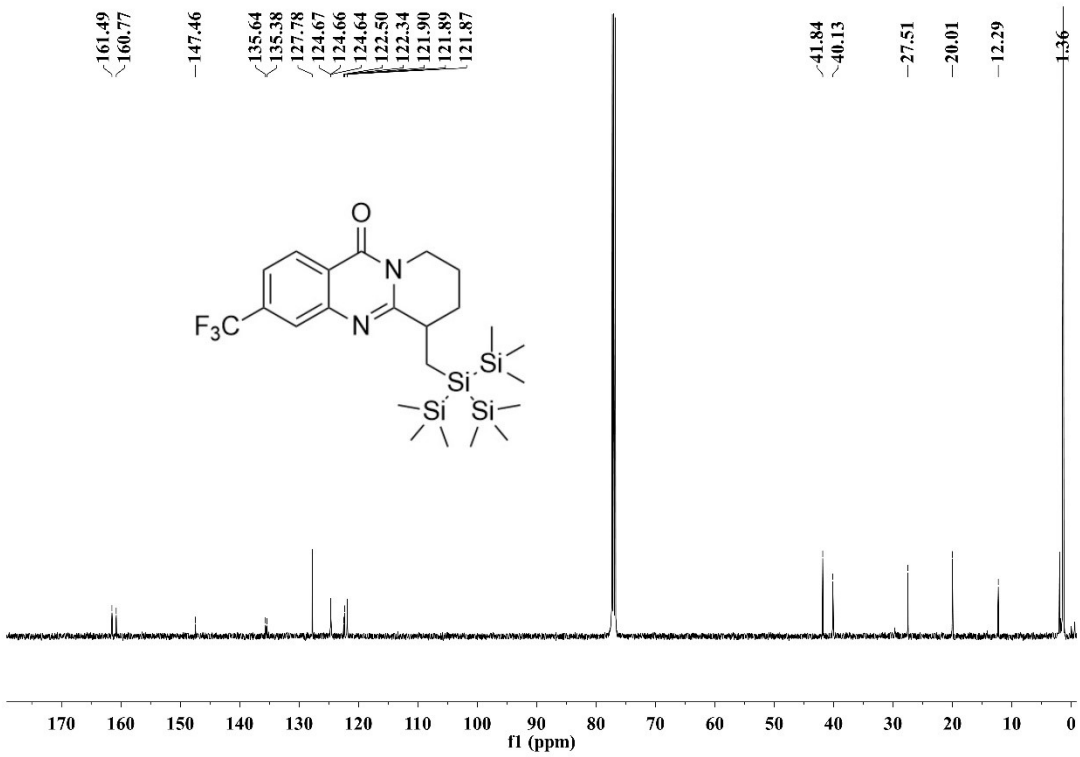
$^{13}C\{^{1}H\}$ NMR spectrum of 4f (125 MHz, $CDCl_3$)



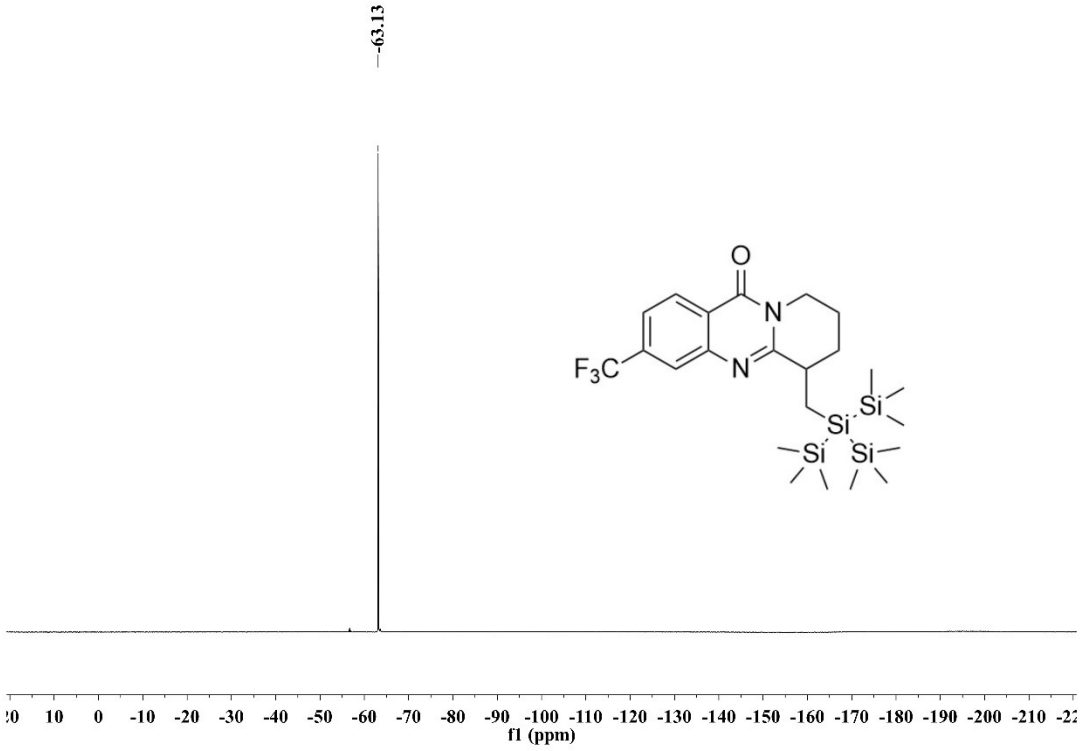
^{1}H NMR spectrum of 4g (500 MHz, $CDCl_3$)



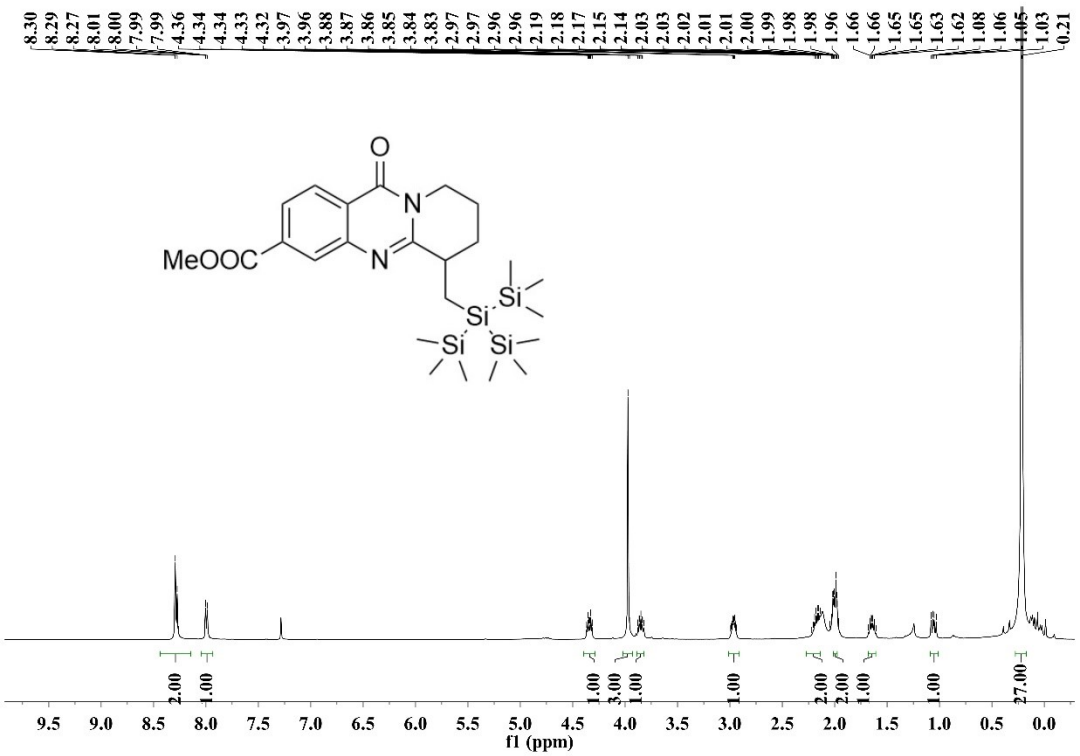
$^{13}C\{^{1}H\}$ NMR spectrum of 4g (125 MHz, $CDCl_3$)



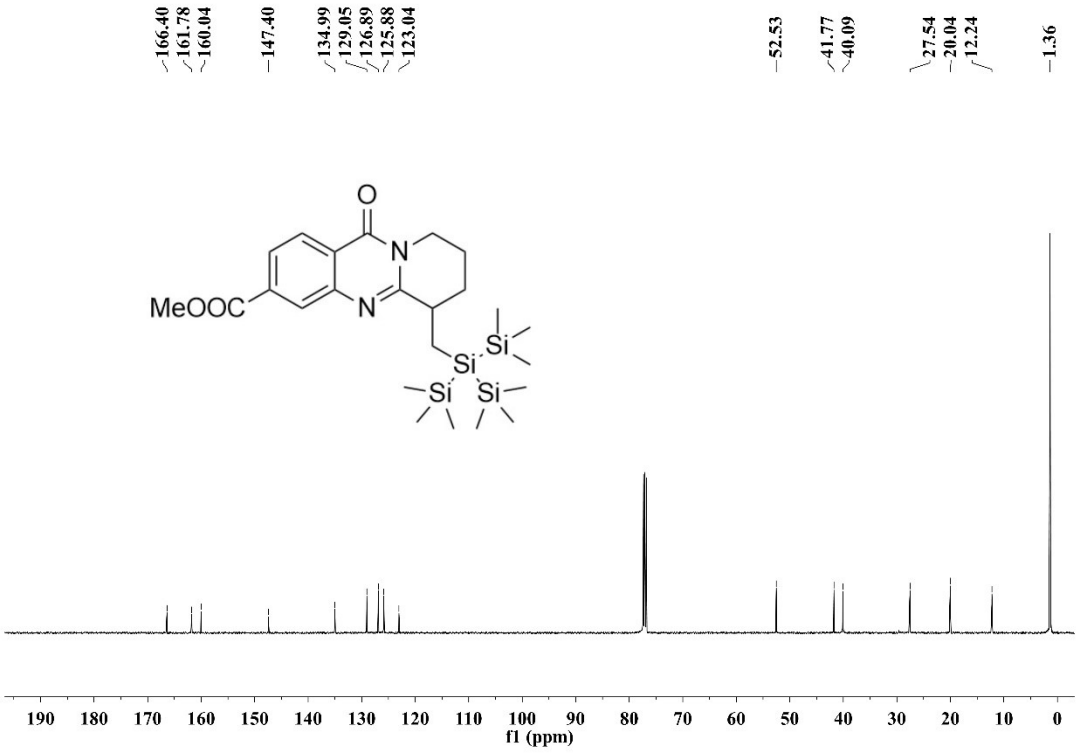
^{19}F NMR spectrum of 4g (125 MHz, $CDCl_3$)



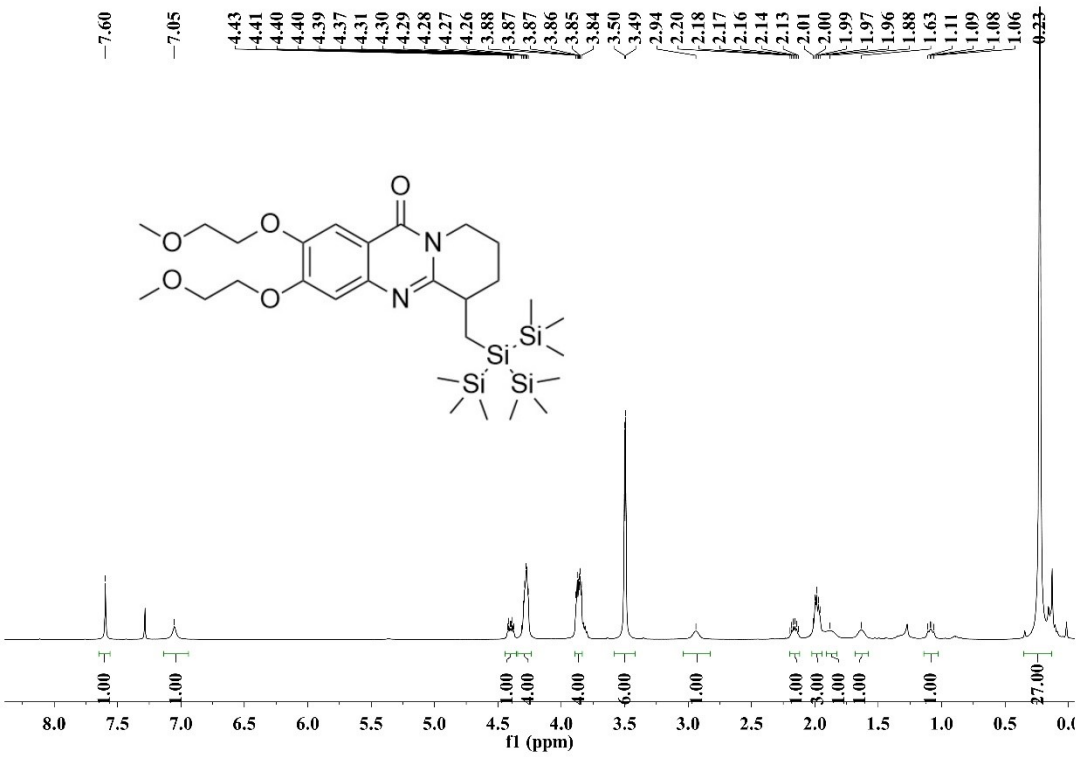
^{1}H NMR spectrum of 4h (500 MHz, $CDCl_3$)



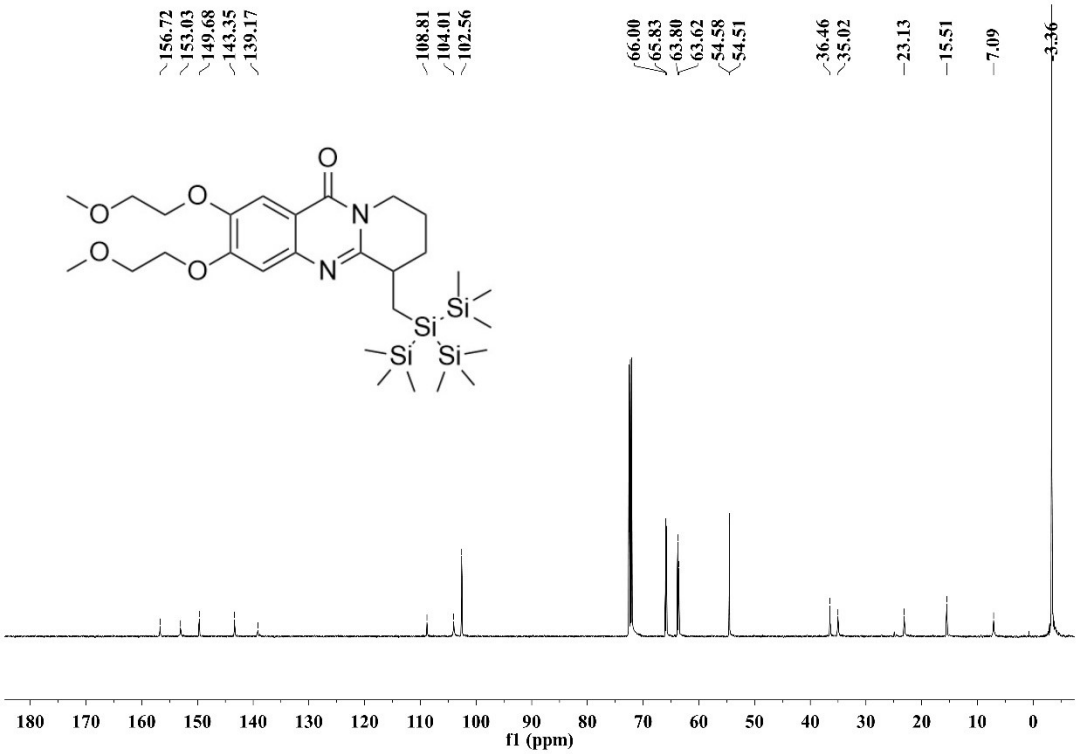
^{13}C{^{1}H} NMR spectrum of 4h (125 MHz, $CDCl_3$)



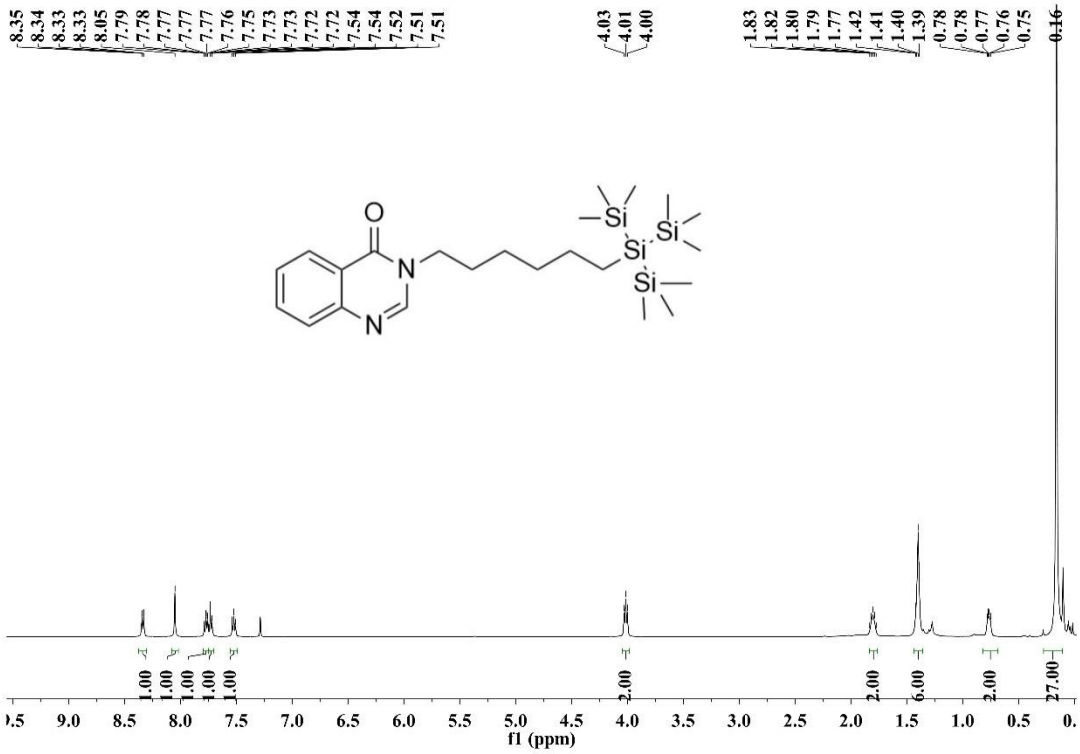
^{1}H NMR spectrum of 4i (500 MHz, $CDCl_3$)



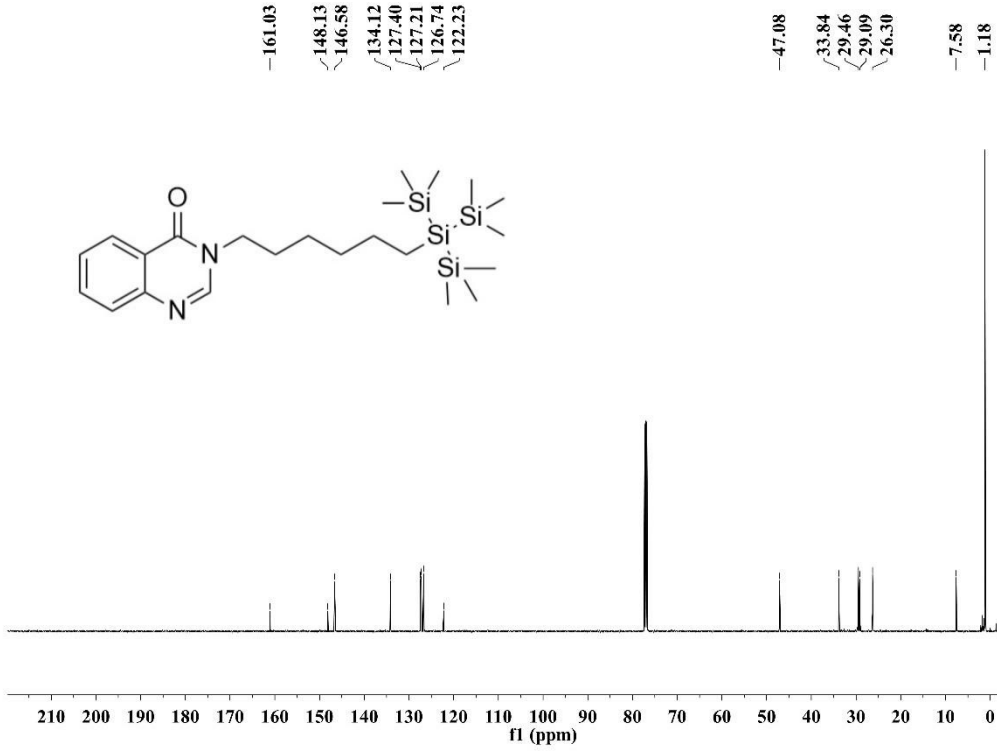
^{13}C{^{1}H} NMR spectrum of 4i (125 MHz, $CDCl_3$)



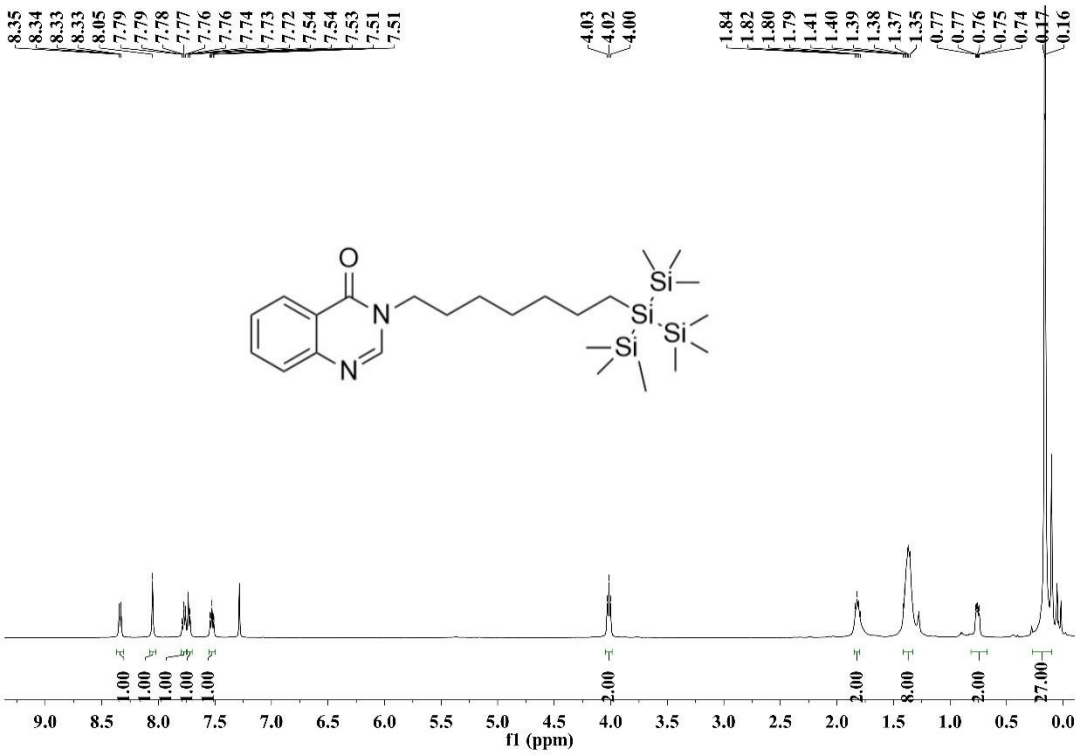
^{1}H NMR spectrum of 1'j-A (500 MHz, $CDCl_3$)



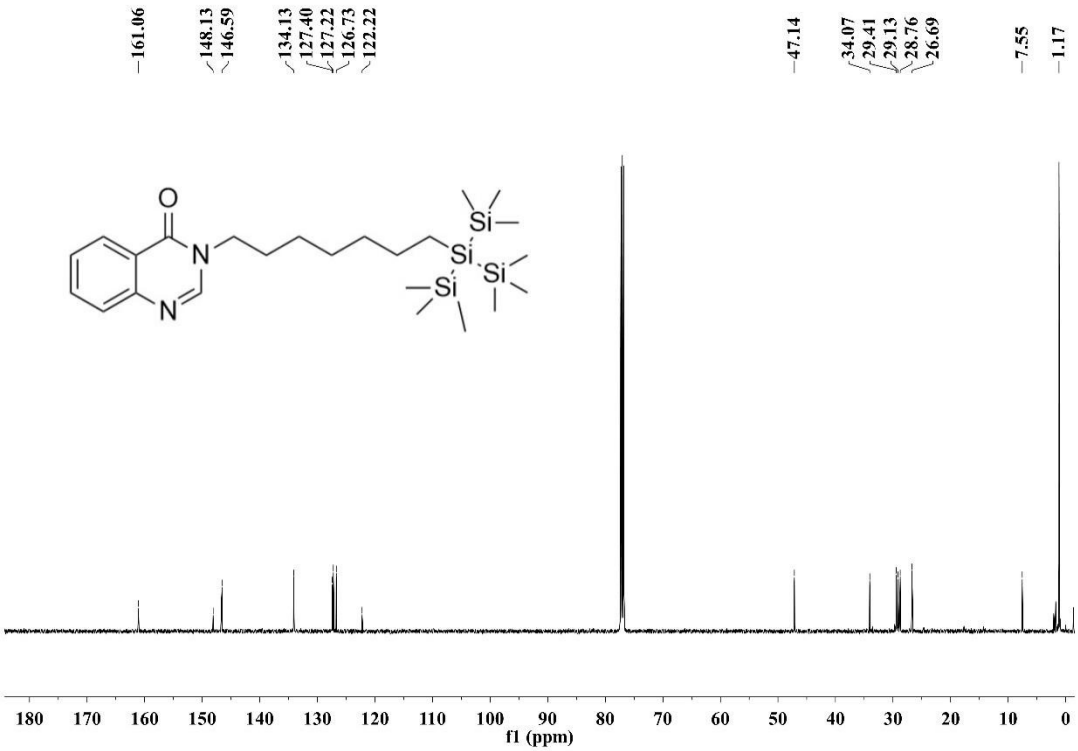
^{13}C{^{1}H} NMR spectrum of 1'j-A (125 MHz, $CDCl_3$)



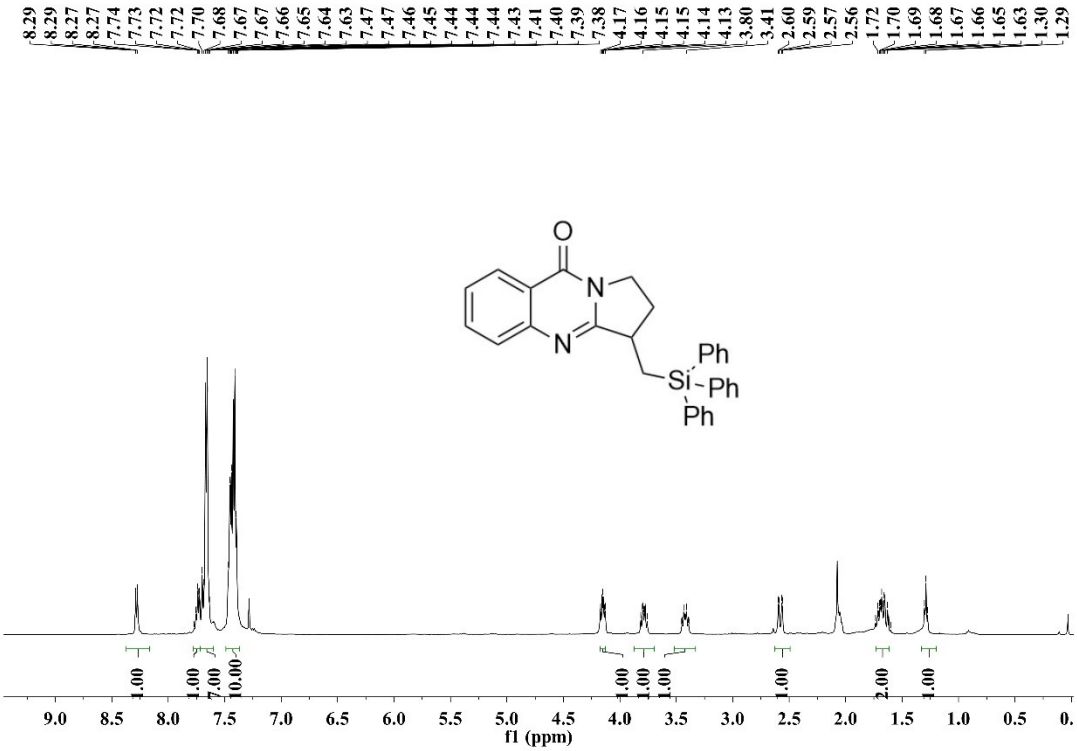
^{1}H NMR spectrum of 1'k-A (500 MHz, $CDCl_3$)



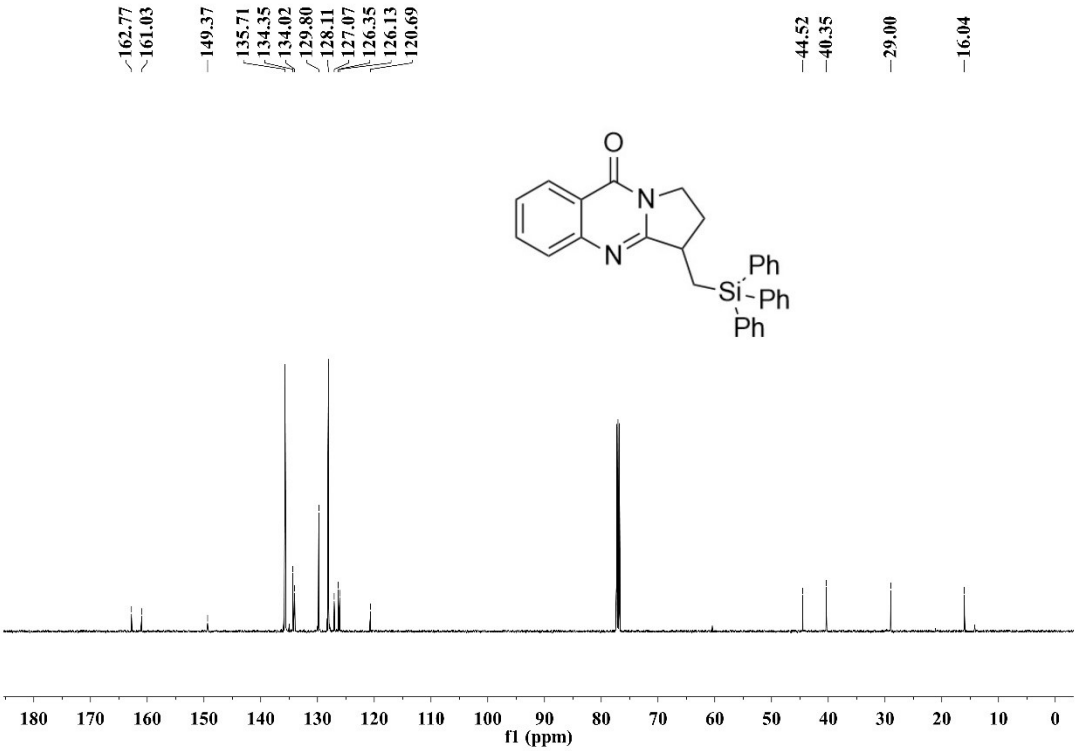
^{13}C{^{1}H} NMR spectrum of 1'k-A (125 MHz, $CDCl_3$)



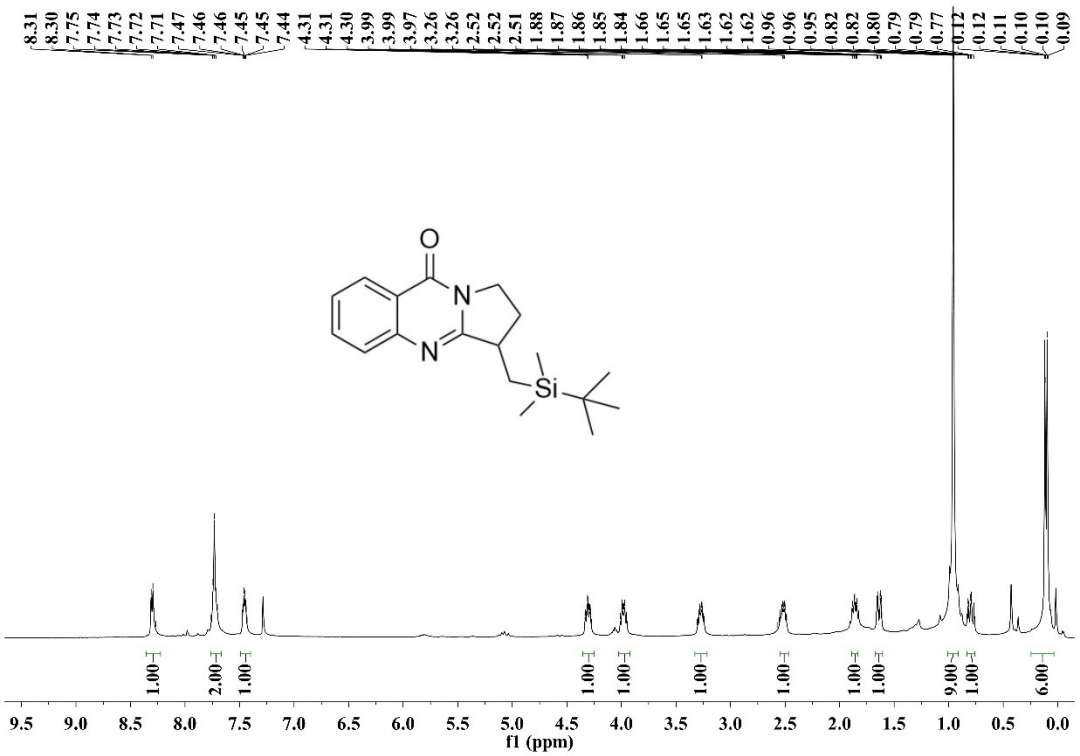
^{1}H NMR spectrum of 5a (500 MHz, $CDCl_3$)



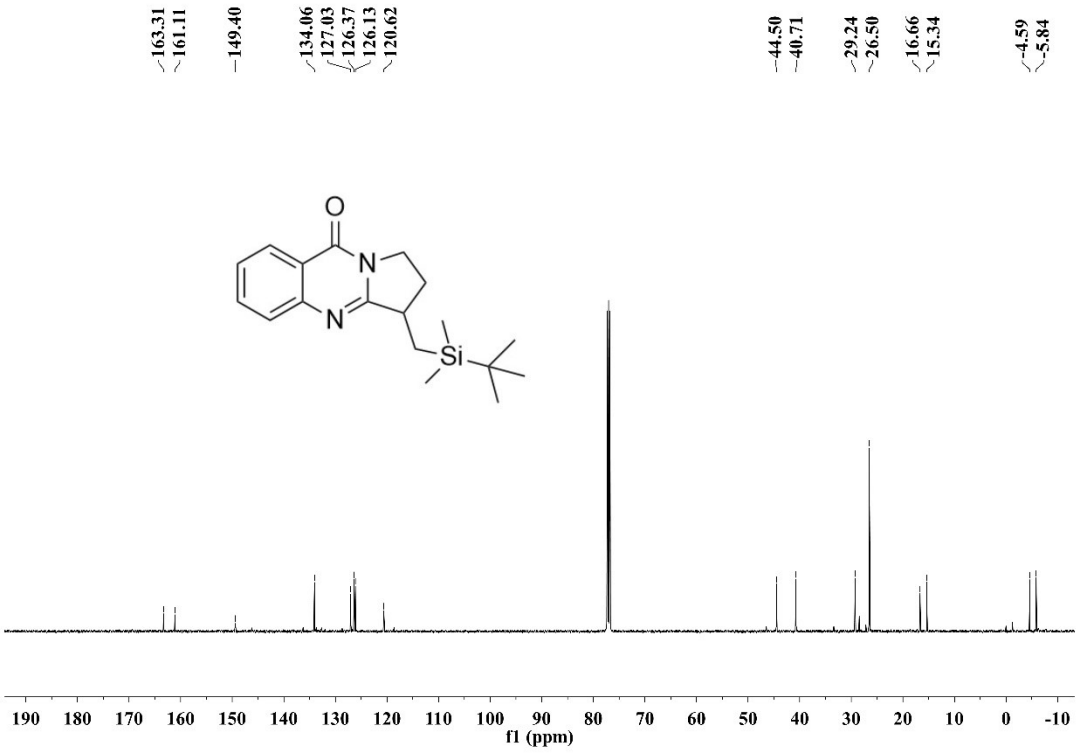
^{13}C{^{1}H} NMR spectrum of 5a (125 MHz, $CDCl_3$)



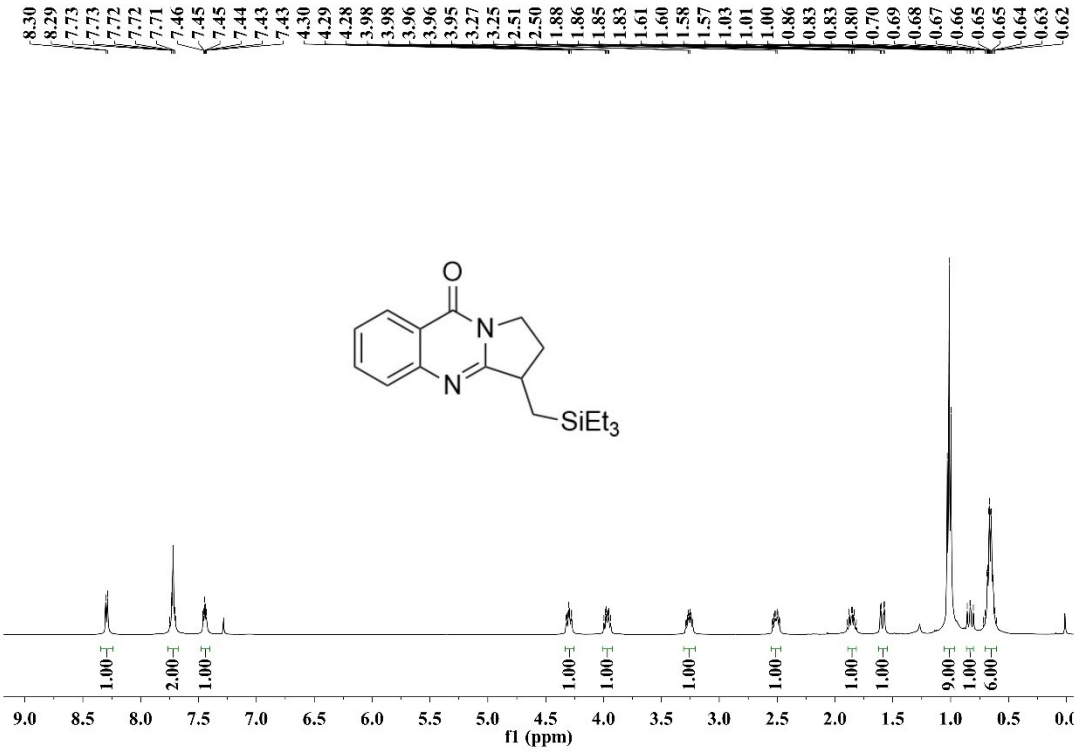
^{1}H NMR spectrum of 5b (500 MHz, $CDCl_3$)



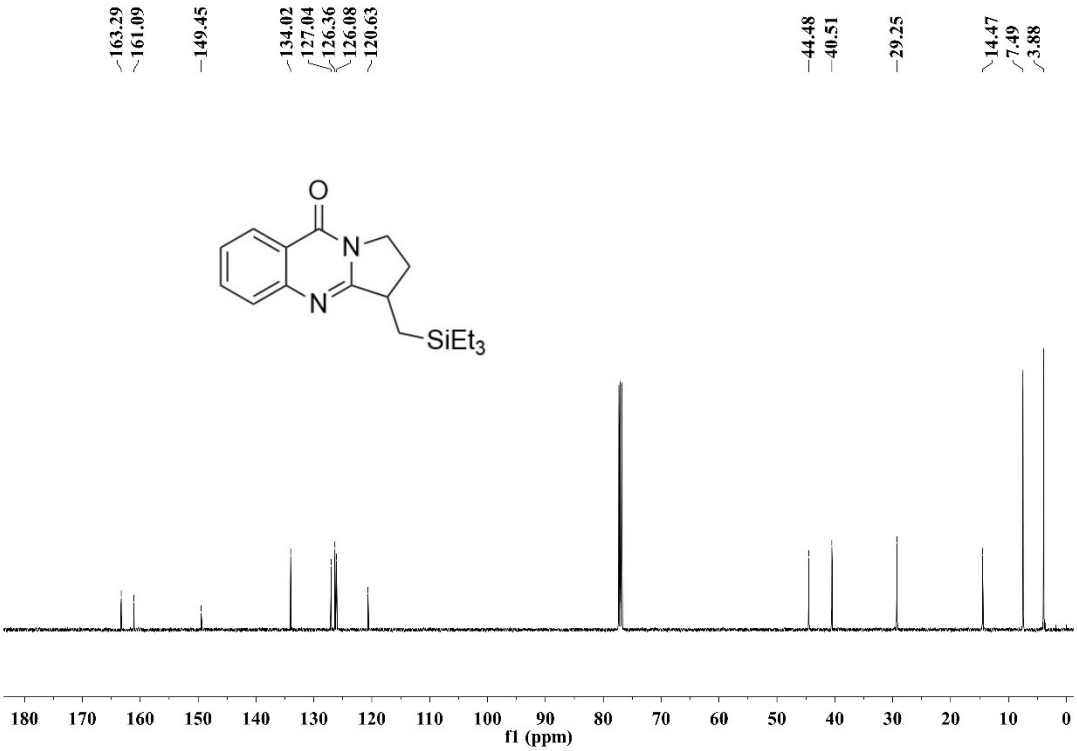
^{13}C{^{1}H} NMR spectrum of 5b (125 MHz, $CDCl_3$)



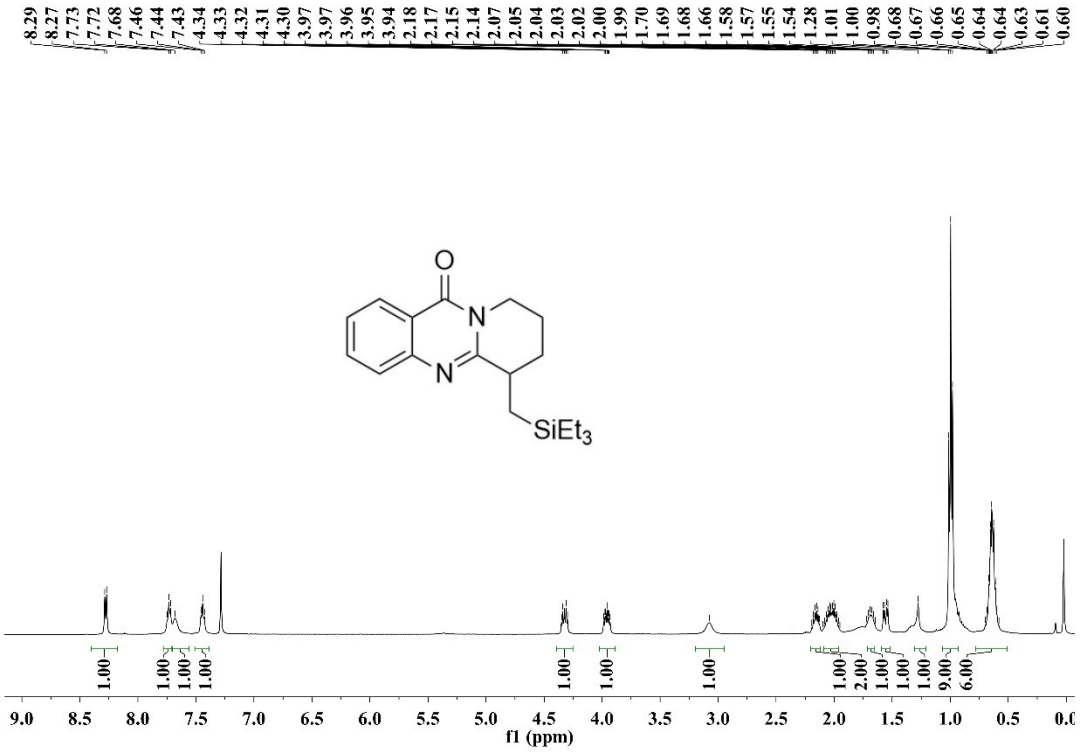
^{1}H NMR spectrum of 5c (500 MHz, $CDCl_3$)



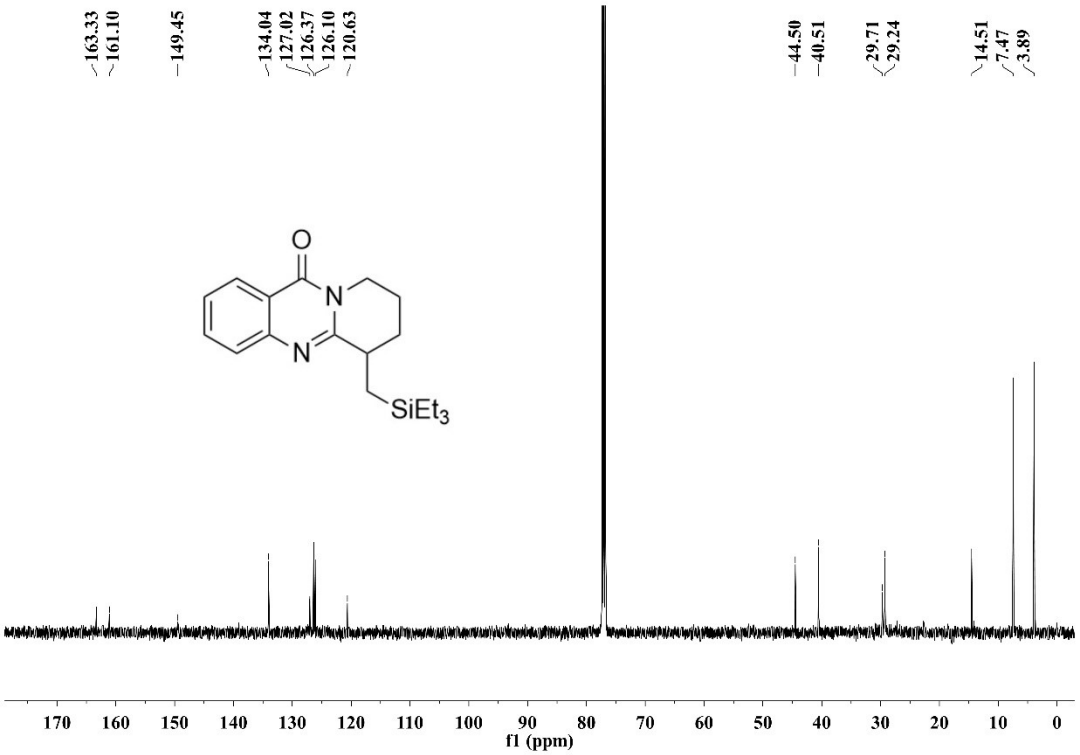
^{13}C{^{1}H} NMR spectrum of 5c (125 MHz, $CDCl_3$)



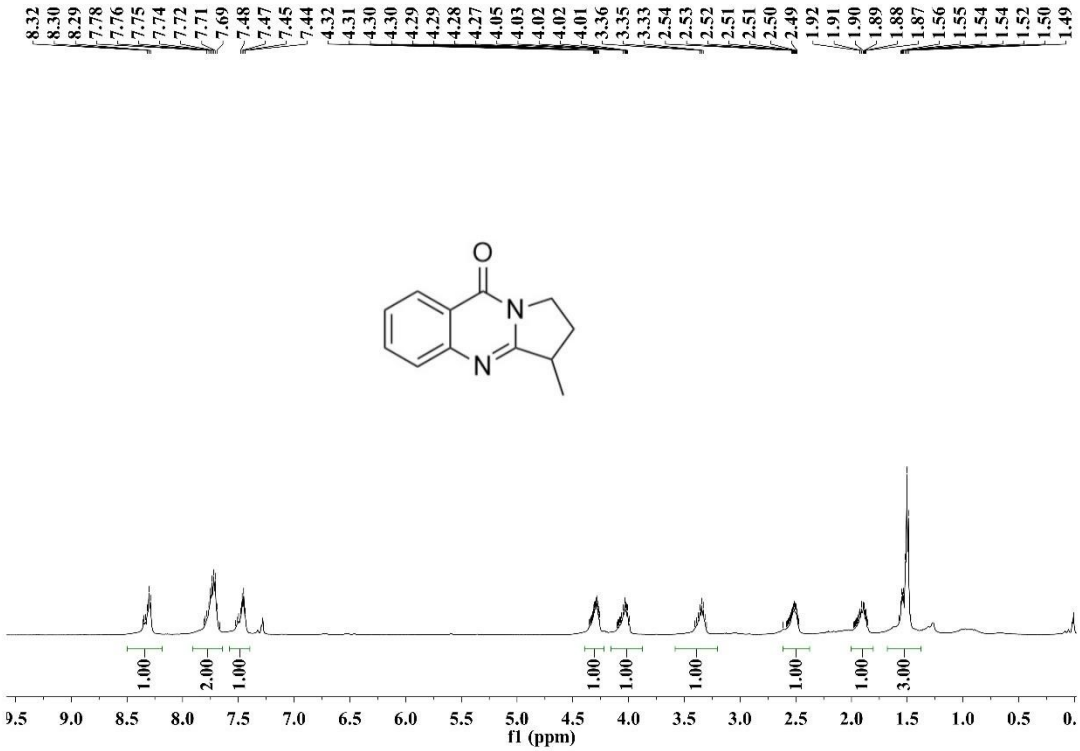
^{1}H NMR spectrum of 5d (500 MHz, $CDCl_3$)



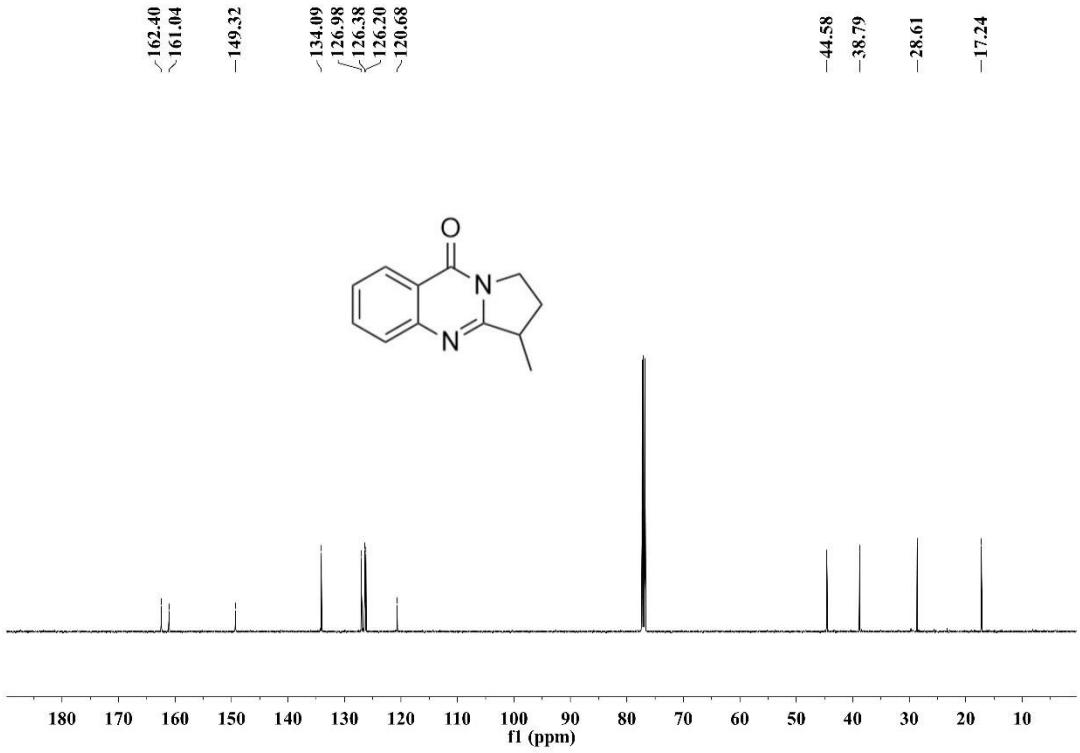
^{13}C{^{1}H} NMR spectrum of 5d (125 MHz, $CDCl_3$)



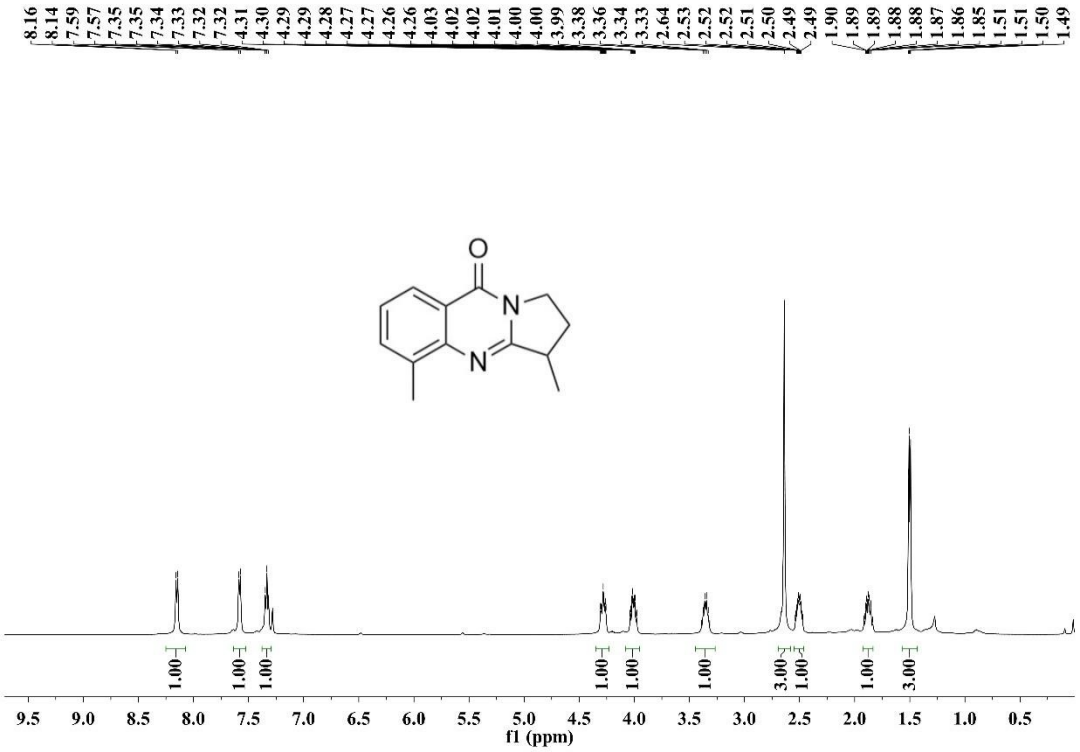
^{1}H NMR spectrum of 6a (500 MHz, $CDCl_3$)



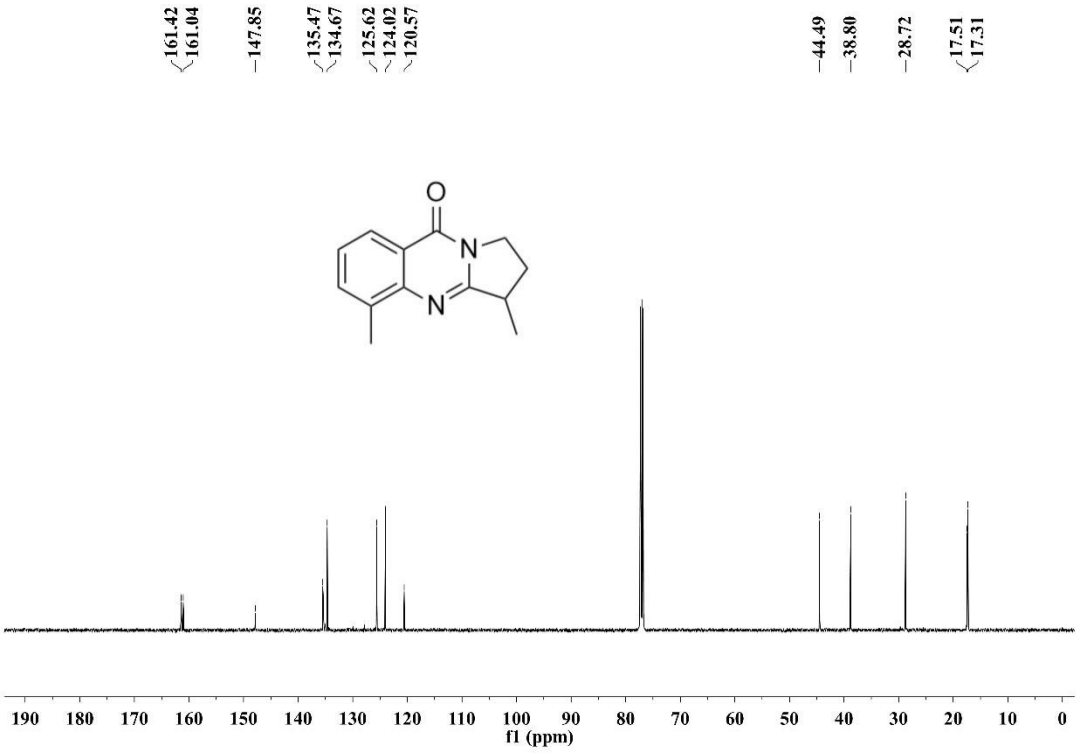
^{13}C{^{1}H} NMR spectrum of 6a (125 MHz, $CDCl_3$)



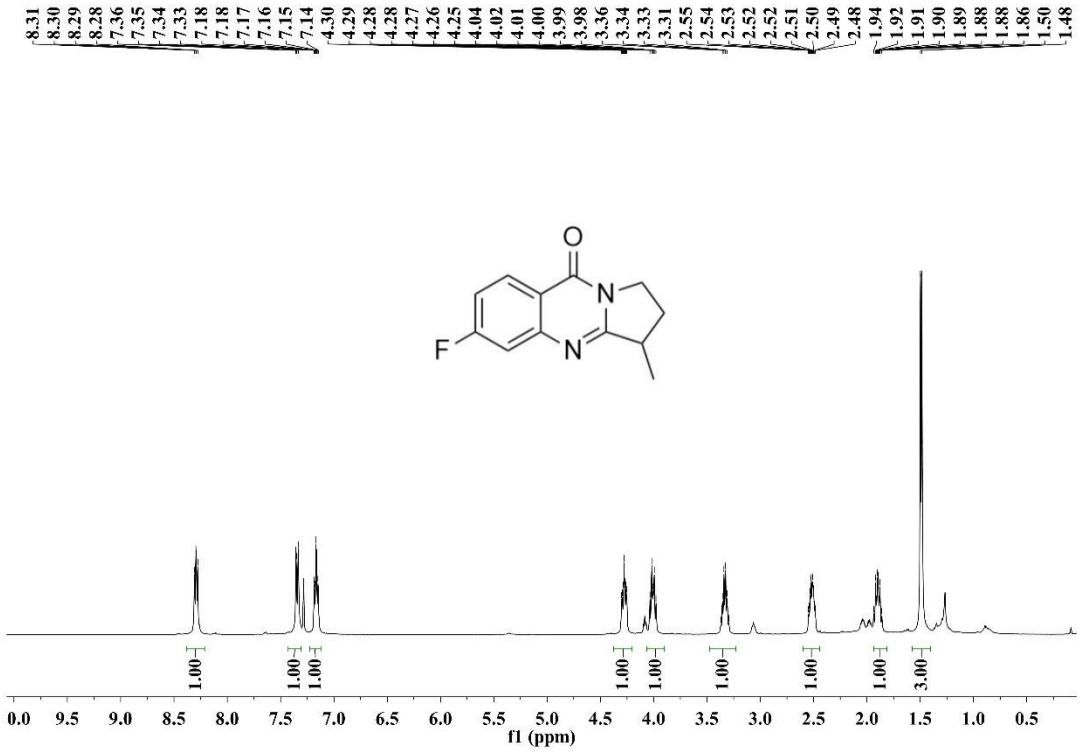
^{1}H NMR spectrum of 6b (500 MHz, $CDCl_3$)



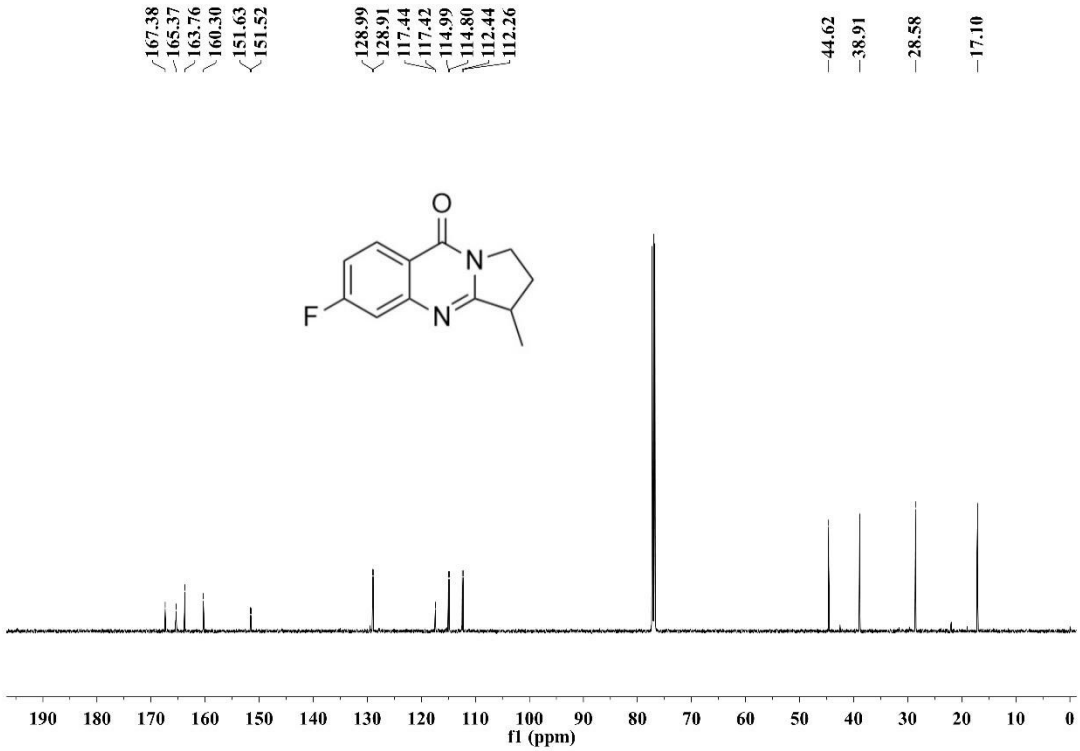
^{13}C{^{1}H} NMR spectrum of 6b (125 MHz, $CDCl_3$)



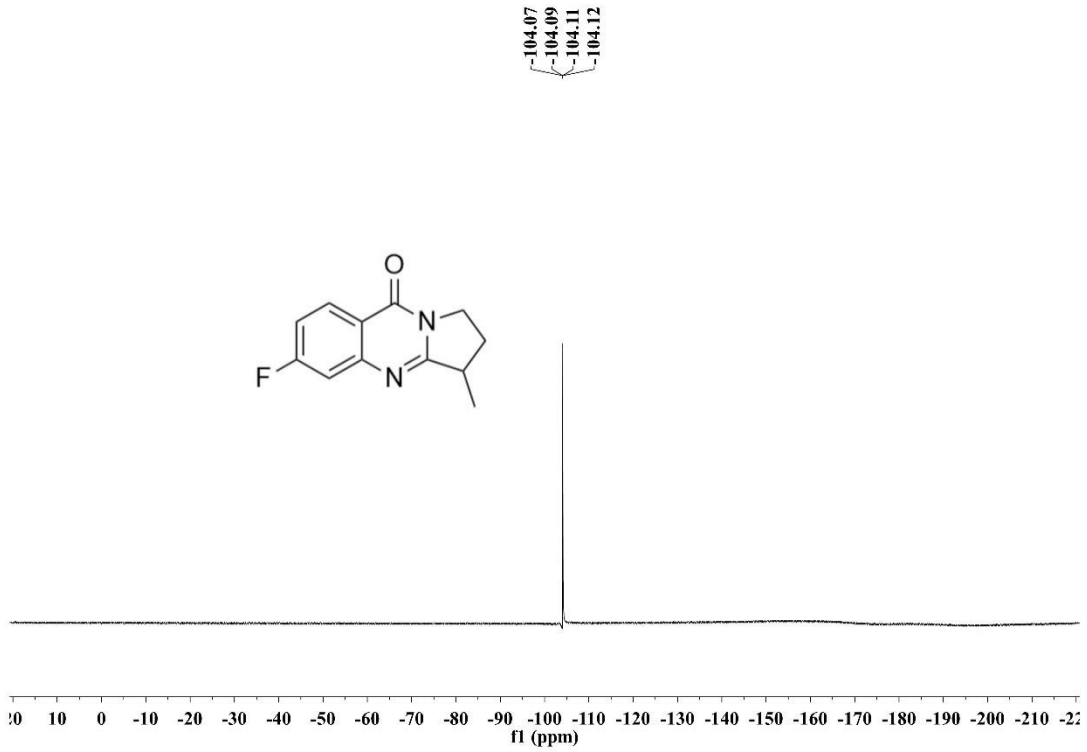
^{1}H NMR spectrum of 6c (500 MHz, $CDCl_3$)



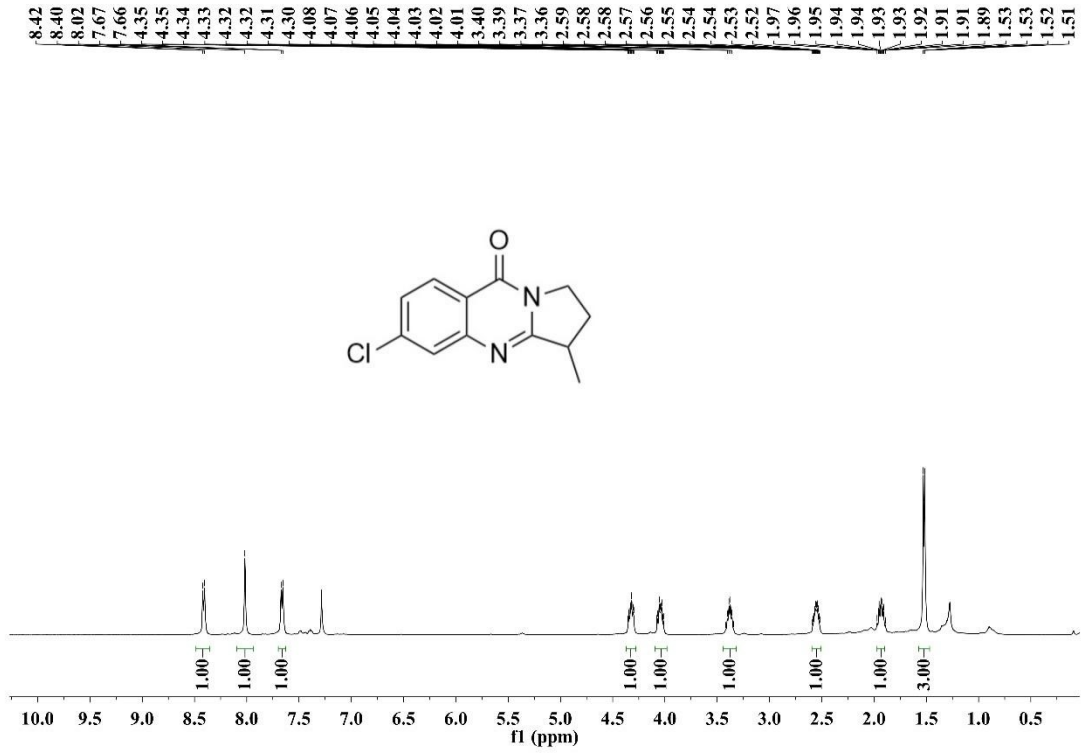
^{13}C{^{1}H} NMR spectrum of 6c (125 MHz, $CDCl_3$)



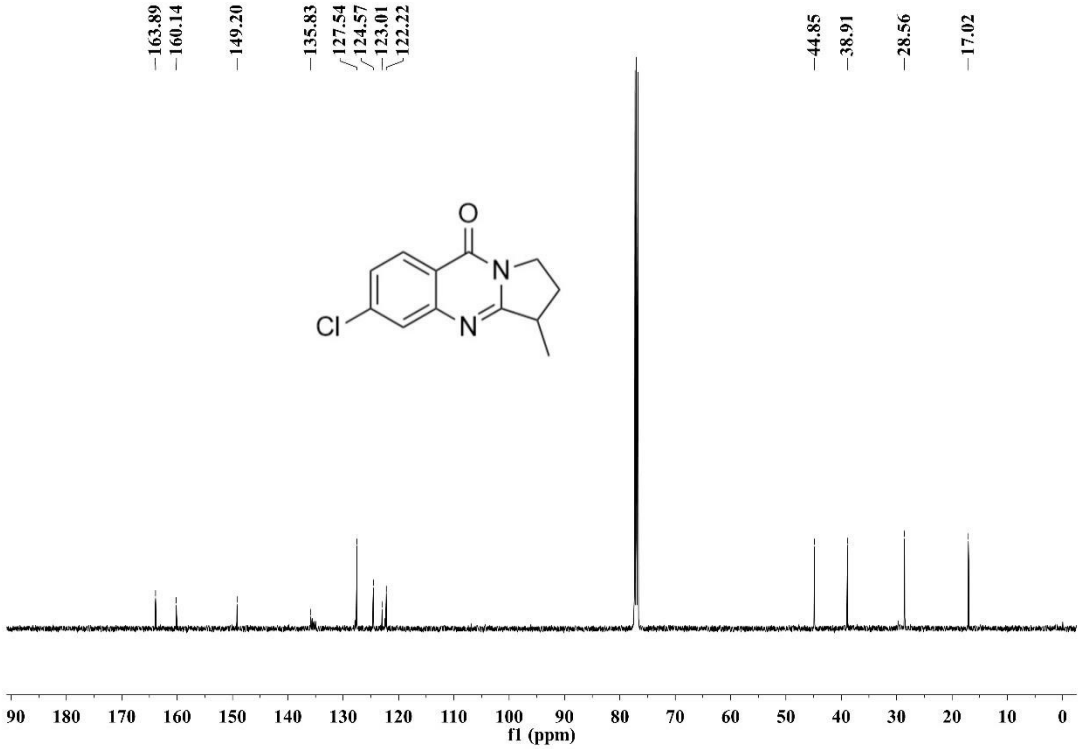
^{19}F NMR spectrum of 6c (125 MHz, $CDCl_3$)



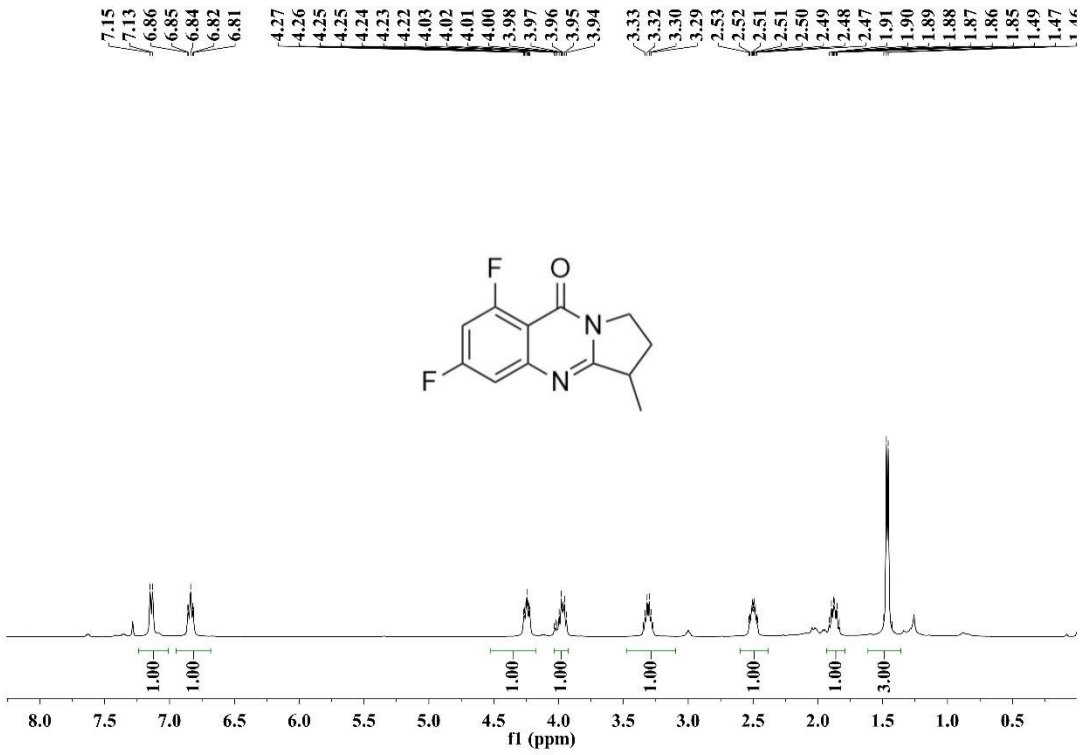
^{1}H NMR spectrum of 6d (500 MHz, $CDCl_3$)



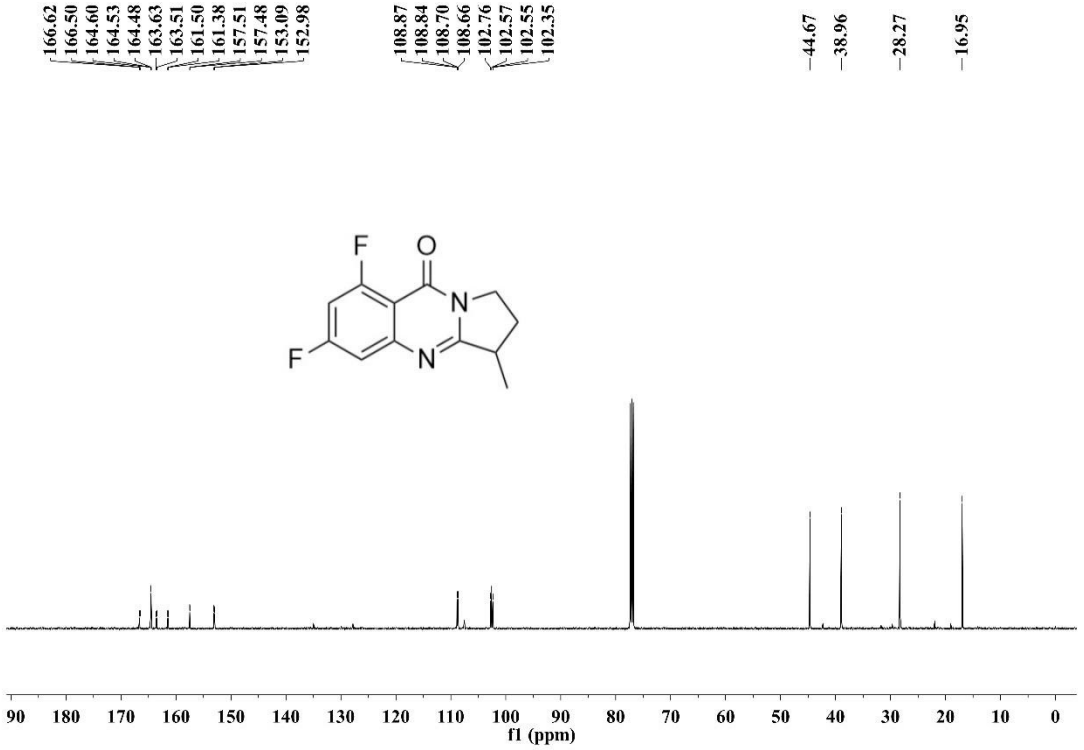
$^{13}C\{^{1}H\}$ NMR spectrum of 6d (125 MHz, $CDCl_3$)



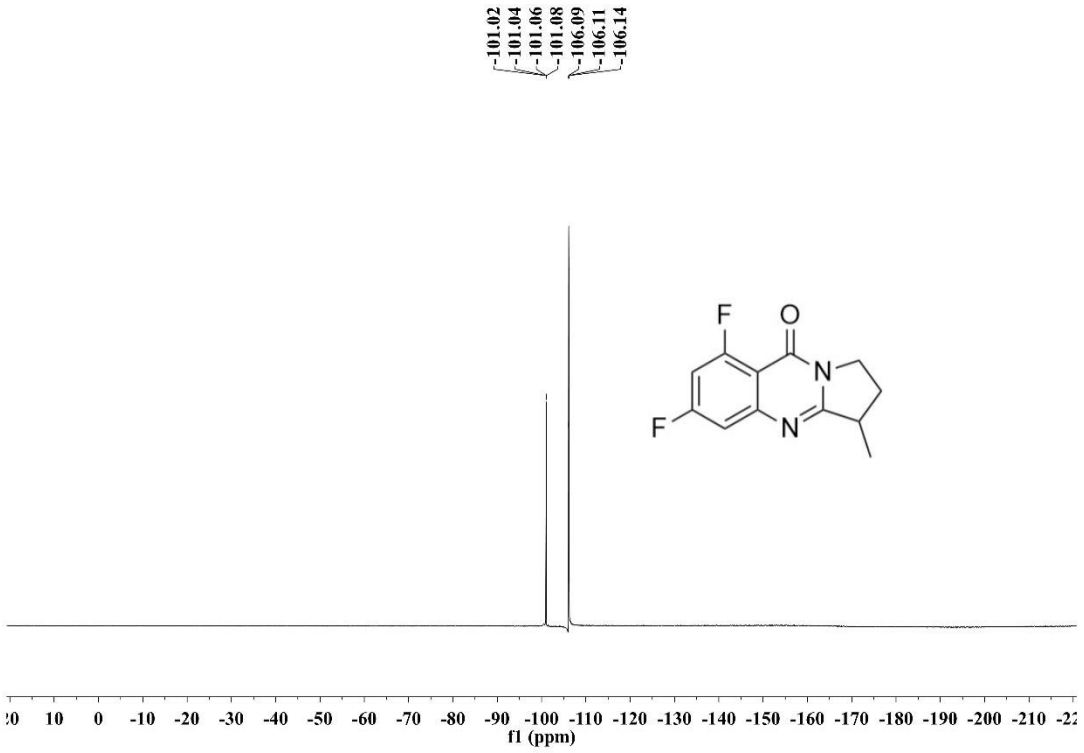
^{1}H NMR spectrum of 6e (500 MHz, $CDCl_3$)



$^{13}C\{^{1}H\}$ NMR spectrum of 6e (125 MHz, $CDCl_3$)

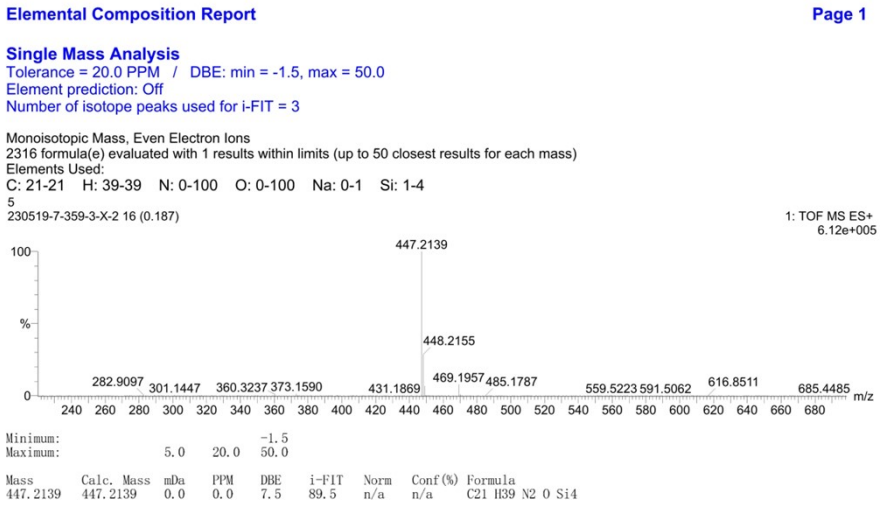


^{19}F NMR spectrum of 6e (125 MHz, $CDCl_3$)

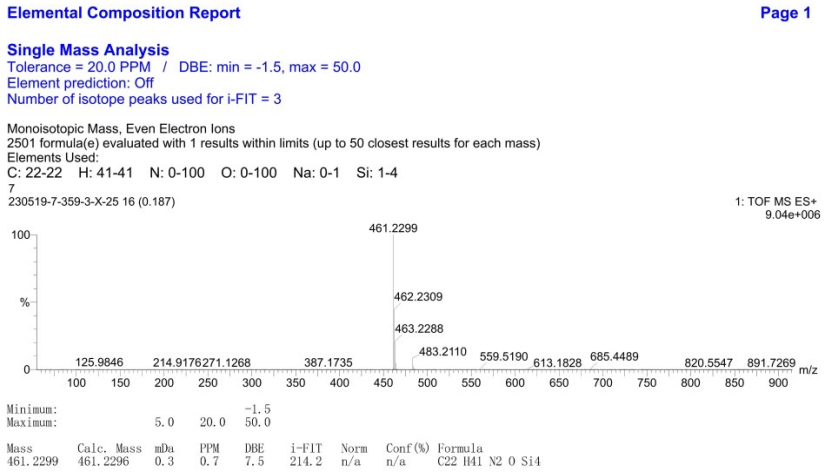


M. Copies of HRMS Spectra

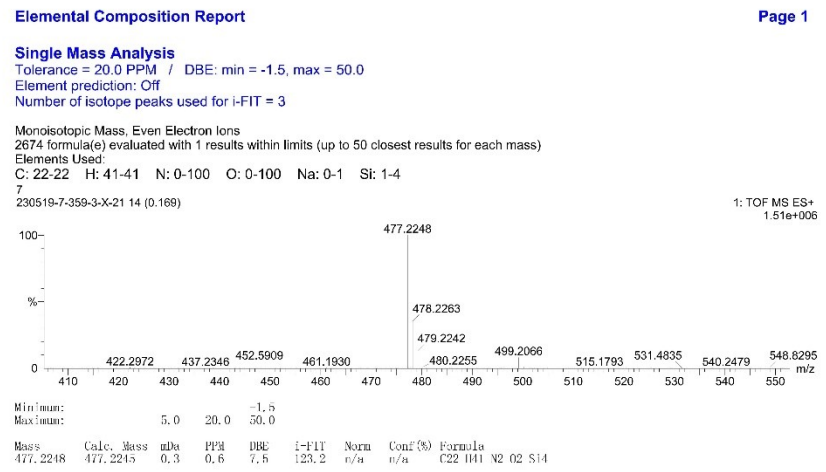
HRMS spectra of 3a: $[M+H]^+$ Calcd for $C_{21}H_{39}N_2OSi_4$ 447.2134; Found 447.2139.



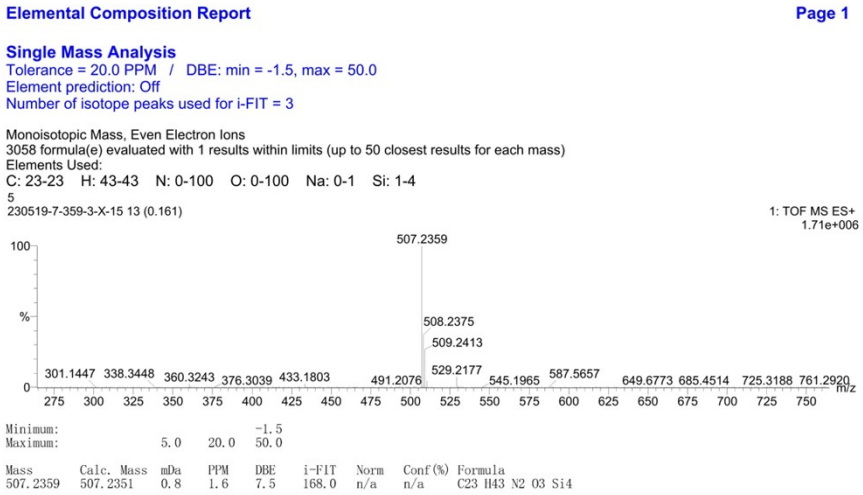
HRMS spectra of 3b: $[M+H]^+$ Calcd for $C_{22}H_{41}N_2OSi_4$ 461.2290; Found 461.2299.



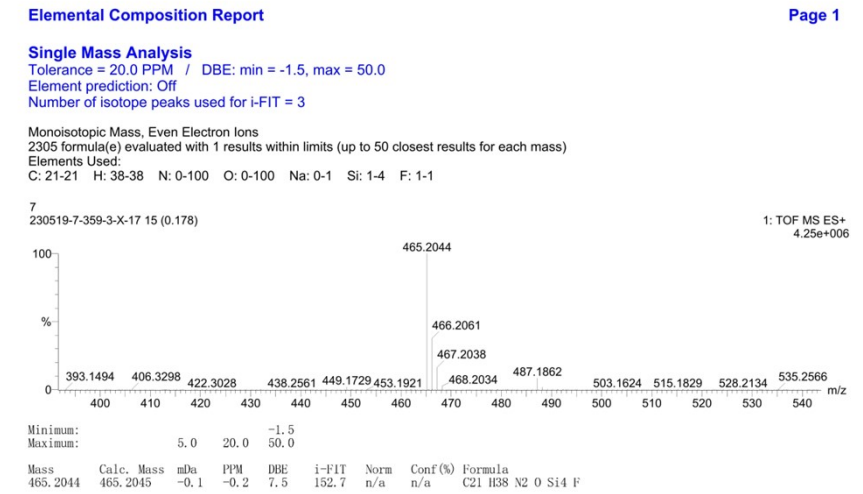
HRMS spectra of 3c: $[M+H]^+$ Calcd for $C_{22}H_{41}N_2O_2Si_4$ 477.2240; Found 477.2248.



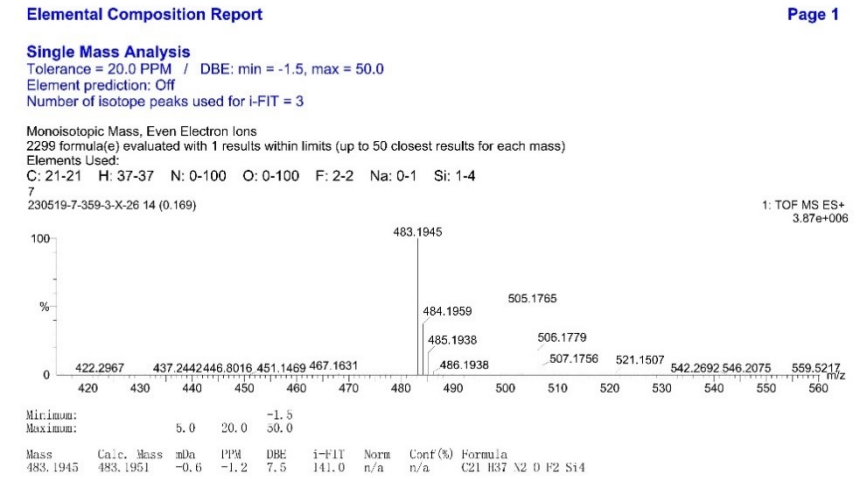
HRMS spectra of 3d: $[M+H]^+$ Calcd for $C_{23}H_{43}N_2O_3Si_4$ 507.2345; Found 507.2359.



HRMS spectra of 3e: $[M+H]^+$ Calcd for $C_{21}H_{37}FN_2OSi_4$ 465.2040; Found 465.2044.



HRMS spectra of 3f: $[M+H]^+$ Calcd for $C_{21}H_{37}F_2N_2OSi_4$ 483.1946; Found 483.1945.



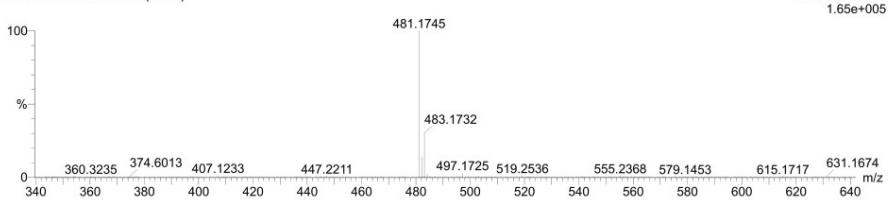
HRMS spectra of 3g: $[M+H]^+$ Calcd for $C_{21}H_{38}ClN_2OSi_4$ 481.1744; Found 481.1745.

Elemental Composition Report Page 1

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
9944 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 21-21 H: 38-38 N: 0-100 O: 0-100 Na: 0-1 Si: 1-4 Cl: 0-4

5
230519-7-359-3-X-13 22 (0.254)



Minimum:				-1.5			
Maximum:		5.0	20.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
481.1745	481.1750	-0.5	-1.0	7.5	148.7	n/a	n/a	C21 H38 N2 O Si4 Cl

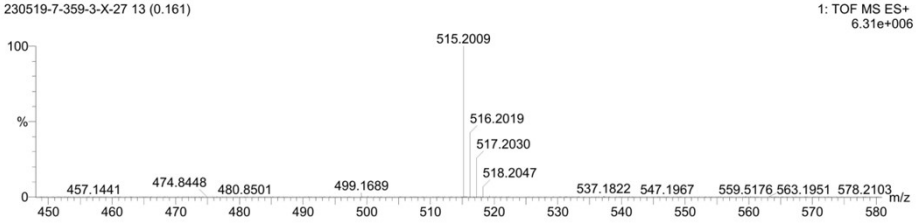
HRMS spectra of 3h: $[M+H]^+$ Calcd for $C_{22}H_{38}F_3N_2OSi_4$ 515.2008; Found 515.2009.

Elemental Composition Report Page 1

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
2470 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 22-22 H: 38-38 N: 0-100 O: 0-100 F: 3-3 Na: 0-1 Si: 1-4

7
230519-7-359-3-X-27 13 (0.161)



Minimum:				-1.5			
Maximum:		5.0	20.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
515.2009	515.2013	-0.4	-0.8	7.5	181.7	n/a	n/a	C22 H38 N2 O F3 Si4

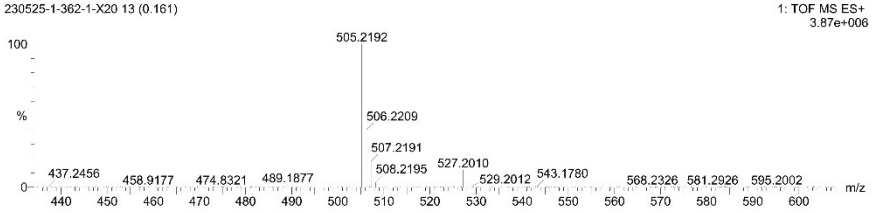
HRMS spectra of 3i: $[M+H]^+$ Calcd for $C_{23}H_{41}N_2O_3Si_4$ 505.2189; Found 505.2192.

Elemental Composition Report Page 1

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

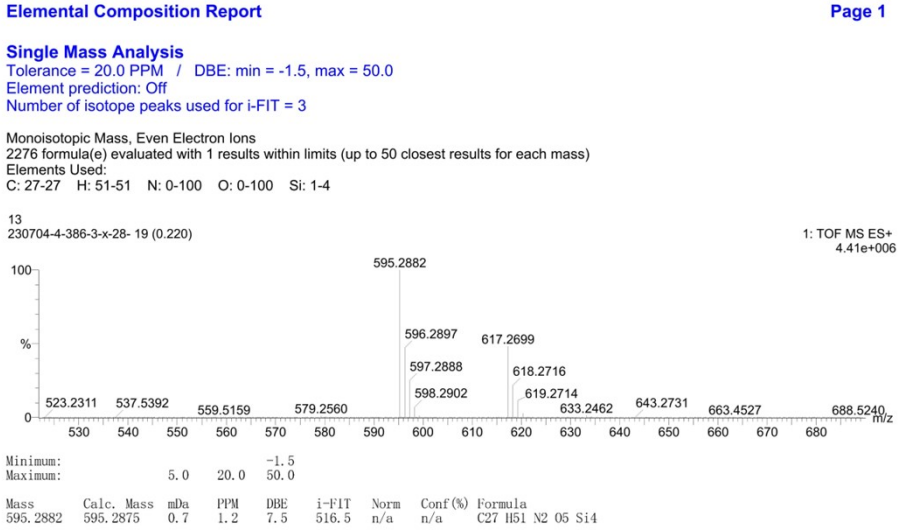
Monoisotopic Mass, Even Electron Ions
1590 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 23-23 H: 41-41 N: 0-100 O: 0-100 Si: 1-4

2
230525-1-362-1-X20 13 (0.161)

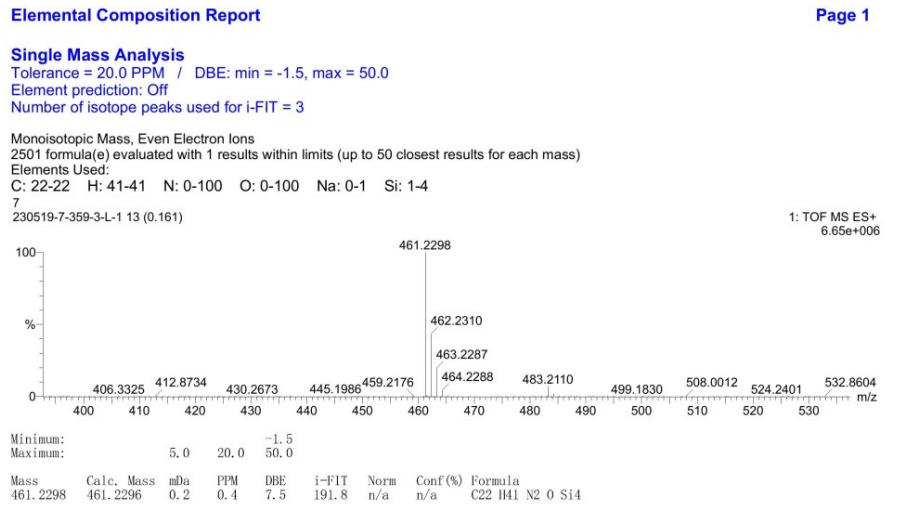


Minimum:				-1.5			
Maximum:		5.0	20.0	50.0			
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
505.2192	505.2194	-0.2	-0.4	8.5	116.8	n/a	n/a	C23 H41 N2 O3 Si4

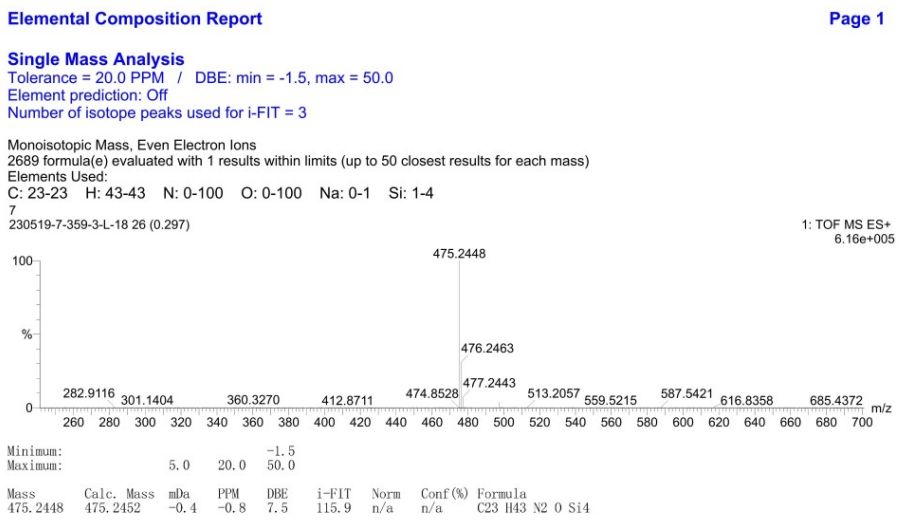
HRMS spectra of 3j: $[M+H]^+$ Calcd for $C_{27}H_{51}N_2O_5Si_4$ 595.2870; Found 595.2882.



HRMS spectra of 4a: $[M+H]^+$ Calcd for $C_{22}H_{41}N_2OSi_4$ 461.2290; Found 461.2298.



HRMS spectra of 4b: $[M+H]^+$ Calcd for $C_{23}H_{43}N_2OSi_4$ 475.2447; Found 475.2448.



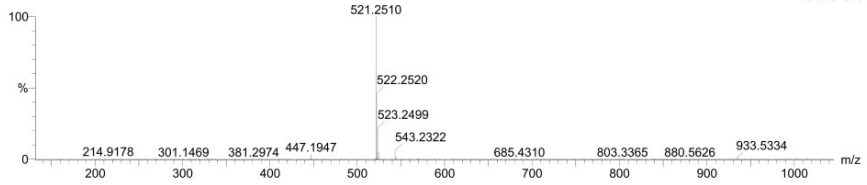
HRMS spectra of 4c: $[M+H]^+$ Calcd for $C_{24}H_{45}N_2O_3Si_4$ 521.2502; Found 521.2510.

Elemental Composition Report Page 1

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
3266 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 24-24 H: 45-45 N: 0-100 O: 0-100 Na: 0-1 Si: 1-4

7
230519-7-359-3-L-14 11 (0.136) 1: TOF MS ES+ 6.67e+006



Minimum:			-1.5
Maximum:		5.0	20.0 50.0

Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
521.2510	521.2507	0.3	0.6	7.5	238.4	n/a	n/a	C24 H45 N2 O3 Si4

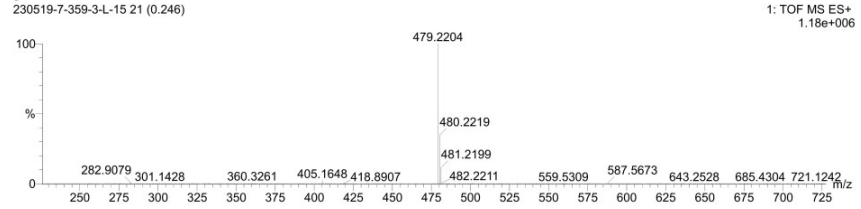
HRMS spectra of 4d: $[M+H]^+$ Calcd for $C_{22}H_{40}FN_2OSi_4$ 479.2202; Found 479.2204.

Elemental Composition Report Page 1

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
2490 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 22-22 H: 40-40 N: 0-100 O: 0-100 Na: 0-1 Si: 1-4 F: 1-1

5
230519-7-359-3-L-15 21 (0.246) 1: TOF MS ES+ 1.18e+006



Minimum:			-1.5
Maximum:		5.0	20.0 50.0

Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
479.2204	479.2202	0.2	0.4	7.5	120.8	n/a	n/a	C22 H40 N2 O Si4 F

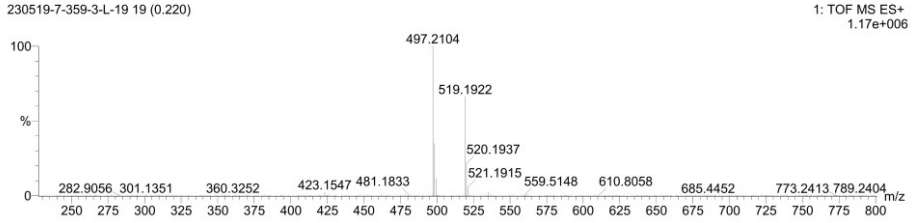
HRMS spectra of 4e: $[M+H]^+$ Calcd for $C_{22}H_{39}F_2N_2OSi_4$ 497.2108; Found 497.2104.

Elemental Composition Report Page 1

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
2482 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 22-22 H: 39-39 N: 0-100 O: 0-100 Na: 0-1 Si: 1-4 F: 2-2

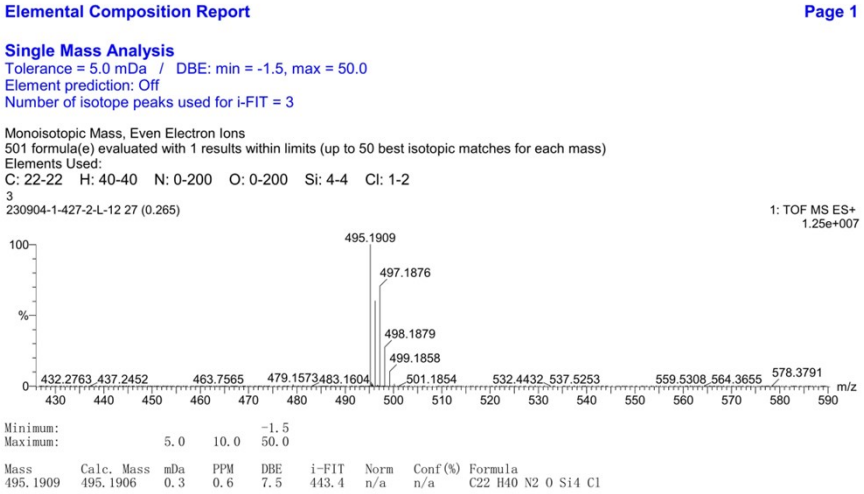
7
230519-7-359-3-L-19 19 (0.220) 1: TOF MS ES+ 1.17e+006



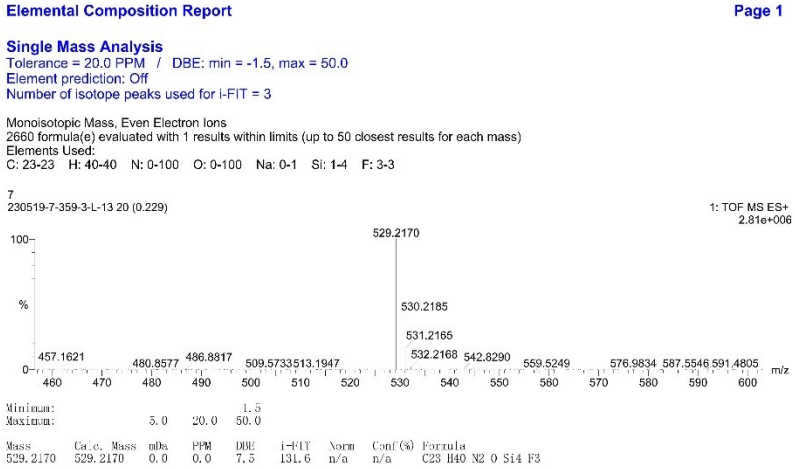
Minimum:			-1.5
Maximum:		5.0	20.0 50.0

Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
497.2104	497.2108	-0.4	-0.8	7.5	104.9	n/a	n/a	C22 H39 N2 O Si4 F2

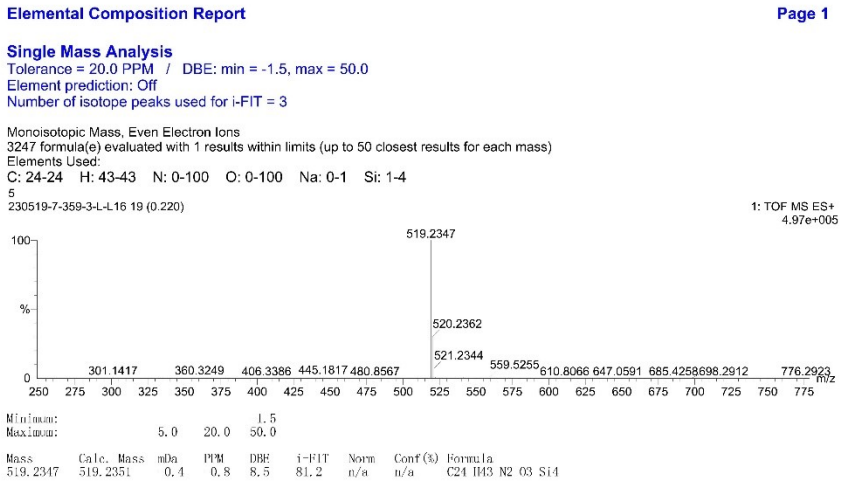
HRMS spectra of 4f: $[M+H]^+$ Calcd for $C_{22}H_{40}ClN_2OSi_4$ 495.1901; Found 495.1909.



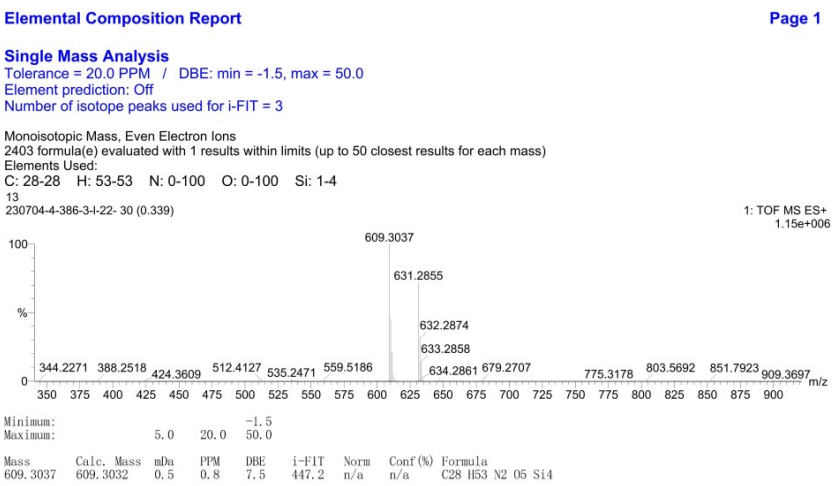
HRMS spectra of 4g: $[M+H]^+$ Calcd for $C_{23}H_{40}F_3N_2OSi_4$ 529.2170; Found 529.2170.



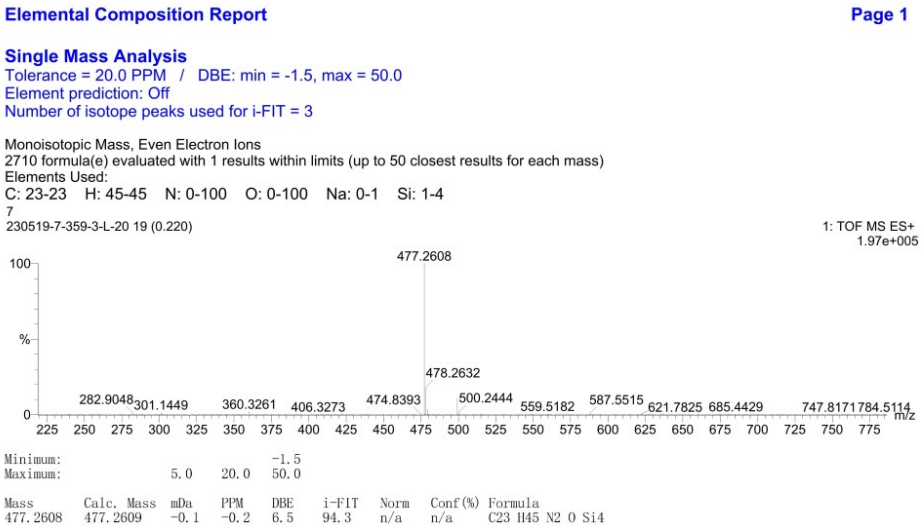
HRMS spectra of 4h: $[M+H]^+$ Calcd for $C_{24}H_{43}N_2O_3Si_4$ 519.2351; Found 519.2347.



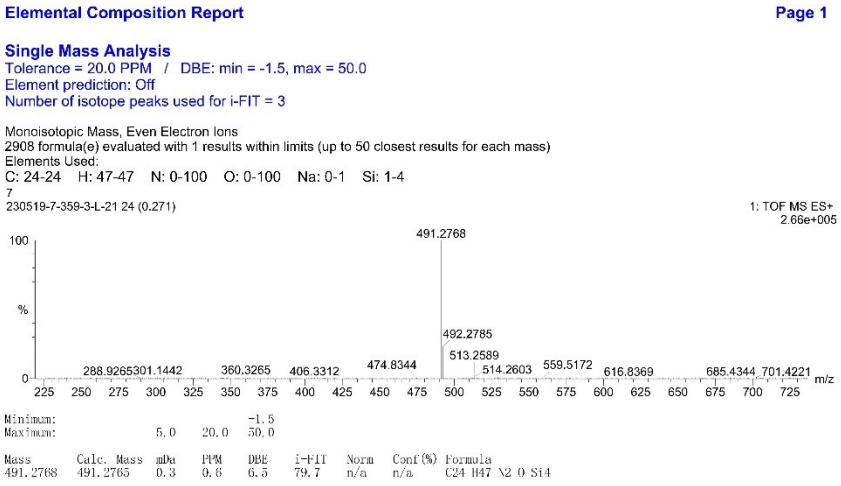
HRMS spectra of 4i: $[M+H]^+$ Calcd for $C_{28}H_{53}N_2O_5Si_4$ 609.3032; Found 609.3037.



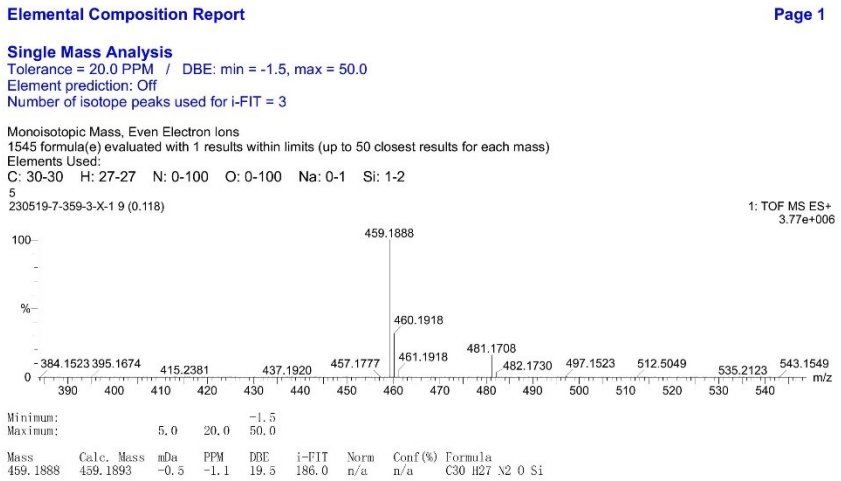
HRMS spectra of 1'j-A: $[M+H]^+$ Calcd for $C_{23}H_{45}N_2OSi_4$ 477.2603; Found 477.2608.



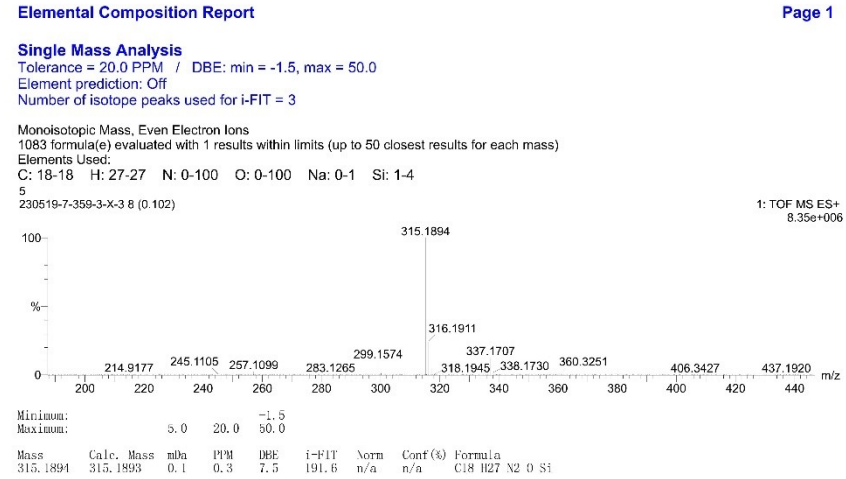
HRMS spectra of 1'k-A: $[M+H]^+$ Calcd for $C_{24}H_{47}N_2OSi_4$ 491.2760; Found 491.2768.



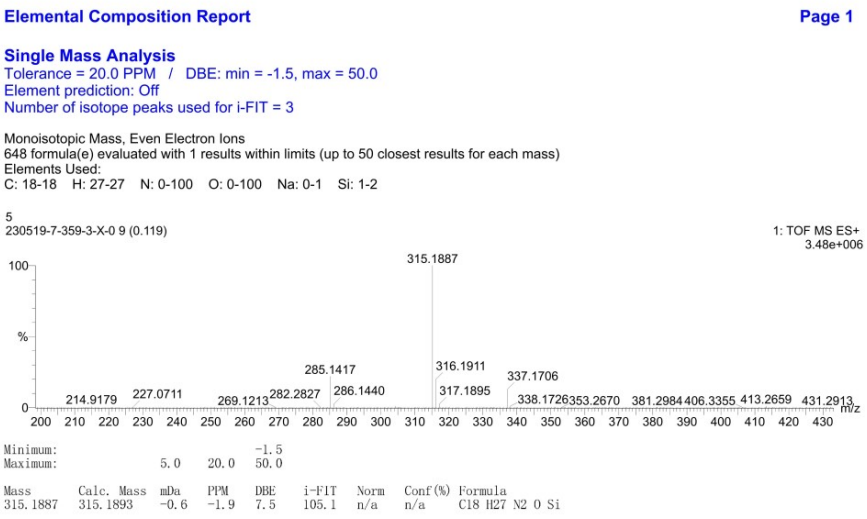
HRMS spectra of 5a: $[M+H]^+$ Calcd for $C_{30}H_{27}N_2OSi$ 459.1893; Found 459.1888.



HRMS spectra of 5b: $[M+H]^+$ Calcd for $C_{18}H_{27}N_2OSi$ 315.1893; Found 315.1894.



HRMS spectra of 5c: $[M+H]^+$ Calcd for $C_{18}H_{27}N_2OSi$ 315.1893; Found 315.1887.

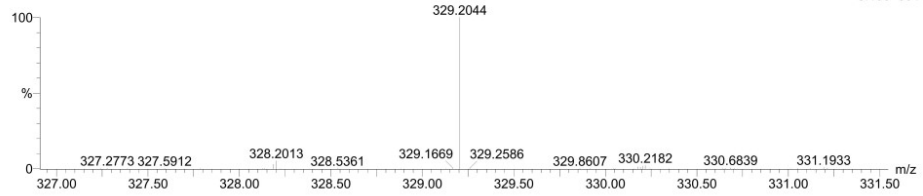


HRMS spectra of 5d: $[M+H]^+$ Calcd for $C_{19}H_{29}N_2OSi$ 329.2049; Found 329.2044.

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 20.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
1206 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 19-19 H: 29-29 N: 0-100 O: 0-100 Na: 0-1 Si: 1-4
5
230519-7-359-3-X-12 10 (0.127) 1: TOF MS ES+
3.10e+004



Minimum:				-1.5				
Maximum:		5.0	20.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
329.2044	329.2049	-0.5	-1.5	7.5	180.7	n/a	n/a	C19 H29 N2 O Si