Generation of 4-Polyfluoroaryl Pyrrolo[1,2-*a*]quinolines via C-H Bond Activation

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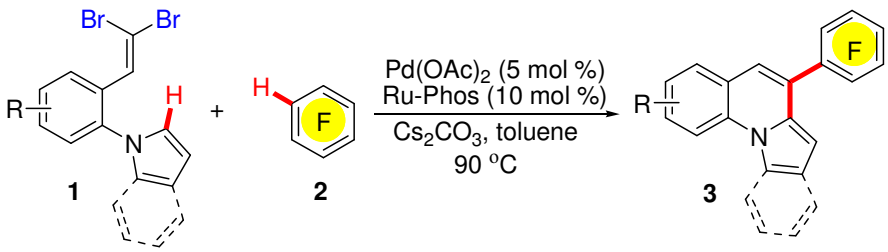
Supporting Information

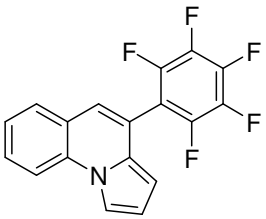
General experimental methods:

Unless otherwise stated, all commercial reagents were used as received. All solvents were dried and distilled according to standard procedures. Flash column chromatography was performed using silica gel (60-Å pore size, 32–63μm, standard grade). Analytical thin–layer chromatography was performed using glass plates pre-coated with 0.25 mm 230–400 mesh silica gel impregnated with a fluorescent indicator (254 nm). Thin layer chromatography plates were visualized by exposure to ultraviolet light. Organic solutions were concentrated on rotary evaporators at ~20 Torr at 25–35°C. Nuclear magnetic resonance (NMR) spectra are recorded in parts per million from internal tetramethylsilane on the δ scale. ^{1}H and ^{13}C NMR spectra were recorded in $CDCl_3$ on a Bruker DRX-400 spectrometer operating at 400 MHz and 100 MHz, respectively. All chemical shift values are quoted in ppm and coupling constants quoted in Hz. High resolution mass spectrometry (HRMS) spectra were obtained on a micrOTOF II Instrument.

*General experimental procedure for the palladium-catalyzed reaction of 1-[2-(2,2-dibromoethenyl)phenyl]-1H-pyrrole **1** with polyfluoroarene **2**.*

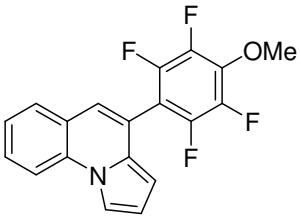


Polyfluoroarene **2** was added to a solution of 1-[2-(2,2-dibromoethenyl)phenyl]-1*H*-pyrrole **1** (0.4 mmol), $Pd(OAc)_2$ (5 mol %), Ru-Phos (10 mol %), and Cs_2CO_3 (3.0 equiv) in toluene (2.0 mL). The mixture was stirred at 90 °C for 12 hours. After completion of the reaction as indicated by TLC, the residue was purified directly by flash chromatography on silica gel to afford products **3**.



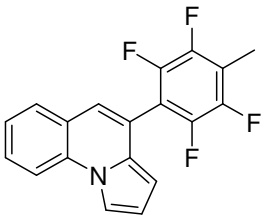
4-(Perfluorophenyl)pyrrolo[1,2-*a*]quinoline (**3a**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.23 (s, 1H), 6.78 (t, J = 3.2 Hz, 1H), 6.99 (s, 1H), 7.32 (t, J = 7.3 Hz, 1H), 7.54 (t, J = 7.3 Hz, 1H), 7.63 (d, J = 7.8 Hz, 1H), 7.86-7.88 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 102.8, 112.8 (m), 112.9, 113.0, 114.2, 117.2, 121.8, 122.9, 123.9, 129.0,129.1, 129.3, 133.2, 137.7 (dm, J_F = 247.5 Hz), 141.1 (dm, J_F = 250.8 Hz), 144.3 (dm, J_F = 247.9 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -138.9 (s, 2F), -154.1 (d, J_F = 23.2 Hz, 1F), -161.4 (t, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{18}H_8F_5N$: C, 64.87; H, 2.42; N, 4.20; Found: C, 64.61; H, 2.28; N, 4.20; HRMS (ESI) calcd for $C_{18}H_8F_5N$: 334.0650 (M + H^+), found: 334.0663; calcd / found : 0.999996.



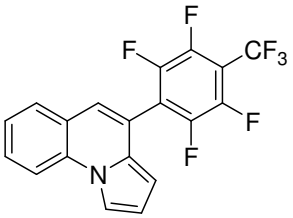
4-(2,3,5,6-Tetrafluoro-4-methoxyphenyl)pyrrolo[1,2-*a*]quinoline (**3b**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 4.14 (s, 3H), 6.26 (s, 1H), 6.78 (s, 1H), 6.99 (s, 1H), 7.29 (t, J = 7.3 Hz, 1H), 7.50 (t, J = 7.3 Hz, 1H), 7.62 (d, J = 7.8 Hz, 1H), 7.84-7.86 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 62.1, 102.9, 110.9 (t, J_F = 19.1 Hz), 112.7, 112.9, 114.1, 118.0, 121.6, 123.0, 123.8, 128.7, 128.9, 129.6, 133.1, 138.1 (m), 141.1 (dm, J_F = 246.0 Hz), 144.9 (dm, J_F = 245.9 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -140.8 (d, J_F = 23.2 Hz, 2F), -157.5 (d, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{19}H_{11}F_4NO$: C, 66.09; H, 3.21; N, 4.06; Found: C, 66.19; H, 2.94; N, 4.02; HRMS (ESI) calcd for $C_{19}H_{11}F_4NO$: 346.0850 (M + H^+), found: 346.0854; calcd / found : 0.999999.



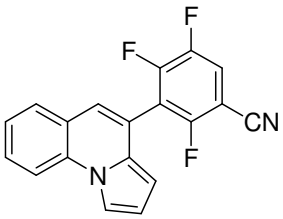
4-(2,3,5,6-Tetrafluoro-4-methylphenyl)pyrrolo[1,2-*a*]quinoline (**3c**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 2.35 (s, 3H), 6.27 (s, 1H), 6.78 (s, 1H), 7.01 (s, 1H), 7.32 (t, J = 7.3 Hz, 1H), 7.52 (t, J = 7.3 Hz, 1H), 7.64 (d, J = 7.3 Hz, 1H), 7.87-7.89 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 7.07, 102.9, 112.7,112.9, 114.1, 114.7 (t, J_F = 17.2 Hz), 116.0 (t, J_F = 19.1 Hz), 118.5, 121.5, 123.0, 123.8, 128.7, 129.0, 129.5, 133.2, 144.2 (dm, J_F = 256.5 Hz), 145.2 (dm, J_F = 246.0 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -141.3 (s, 2F), -143.4 (d, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{19}H_{11}F_4N$: C, 69.30; H, 3.37; N, 4.25; Found: C, 69.21; H, 3.55; N, 4.33; HRMS (ESI) calcd for $C_{19}H_{11}F_4N$: 330.0900 (M + H^+), found: 330.0918; calcd / found : 0.999995.



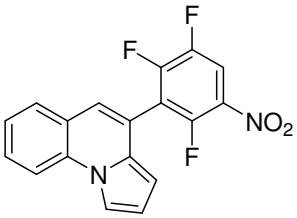
4-(2,3,5,6-Tetrafluoro-4-(trifluoromethyl)phenyl)pyrrolo[1,2-*a*]quinoline (**3d**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.25 (s, 1H), 6.79 (s, 1H), 7.02 (s, 1H), 7.32 (t, J = 7.3 Hz, 1H), 7.54 (t, J = 7.3 Hz, 1H), 7.64 (d, J = 7.8 Hz, 1H), 7.86-7.88 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 102.9, 109.2-109.6 (m), 113.1, 113.2, 116.9, 120.9 (q, J_F = 272.7 Hz), 121.7, 121.9 (q, J_F = 27.7 Hz), 122.6, 124.0, 128.5, 129.2, 129.3, 133.3, 144.3 (dm, J_F = 259.3 Hz), 144.8 (dm, J_F = 246.0 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -56.1 (d, J_F = 23.2 Hz, 3F), -136.8 (s, 2F), -140.0 (s, 2F); Elem. Anal. Calcd for $C_{19}H_8F_7N$: C, 59.54; H, 2.10; N, 3.65; Found: C, 59.65; H, 2.26; N, 3.79; HRMS (ESI) calcd for $C_{19}H_8F_7N$: 384.0618 (M + H^+), found: 384.0624; calcd / found : 0.999998.



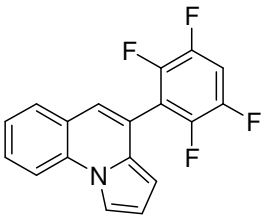
2,4,5-Trifluoro-3-(pyrrolo[1,2-*a*]quinolin-4-yl)benzonitrile (**3e**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.21 (s, 1H), 6.79 (s, 1H), 7.01 (s, 1H), 7.33 (t, J = 7.3 Hz, 1H), 7.49-7.57 (m, 2H), 7.64 (d, J = 7.8 Hz, 1H), 7.87-7.89 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 97.4-97.6 (m), 102.7, 112.2, 113.0, 113.1, 114.2, 116.9, 119.0 (m), 119.8 (d, J_F = 21.0 Hz), 121.7, 122.6, 123.9, 128.7, 129.1, 129.2, 133.2, 147.1 (dm, J_F = 249.8 Hz), 152.1 (dm, J_F = 256.5 Hz), 157.6 (dm, J_F = 256.5 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -107.7 (s, 1F), -121.4 (d, J_F = 23.2 Hz, 1F), -137.0 (s, 1F); Elem. Anal. Calcd for $C_{19}H_9F_3N_2$: C, 70.81; H, 2.81; N, 8.69; Found: C, 70.72; H, 2.97; N, 8.77; HRMS (ESI) calcd for $C_{19}H_9F_3N_2$: 323.0791 (M + H^+), found: 323.0792; calcd / found : 0.999999.



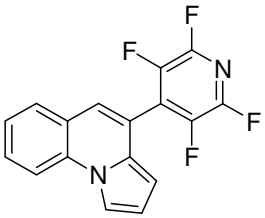
4-(2,3,6-Trifluoro-5-nitrophenyl)pyrrolo[1,2-*a*]quinoline (**3f**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.22 (s, 1H), 6.79 (s, 1H), 7.04 (s, 1H), 7.34 (t, J = 7.3 Hz, 1H), 7.57 (t, J = 7.3 Hz, 1H), 7.66 (d, J = 7.8 Hz, 1H), 7.89-7.91 (m, 2H), 8.05 (q, J = 8.3 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 102.7, 113.1, 113.2, 113.8 (d, J_F = 22.9 Hz), 114.3, 116.9, 119.8 (t, J_F = 20.9 Hz), 121.9, 122.7, 124.0, 128.8, 129.2, 129.3, 133.3, 146.0 (dm, J_F = 250.7 Hz), 150.4 (dm, J_F = 266.0 Hz), 152.2 (dm, J_F = 251.7 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -117.3 (s, 1F), -120.8 (d, J_F = 23.2 Hz, 1F), -136.5 (s, 1F); Elem. Anal. Calcd for $C_{18}H_9F_3N_2O_2$: C, 63.16; H, 2.65; N, 8.18; Found: C, 62.96; H, 2.45; N, 8.24; HRMS (ESI) calcd for $C_{18}H_9F_3N_2O_2$: 343.0689 (M + H^+), found: 343.0701; calcd / found : 0.999996.



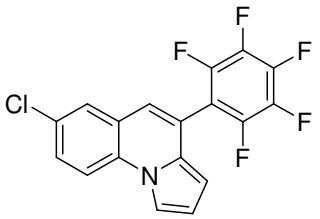
4-(2,3,5,6-Tetrafluorophenyl)pyrrolo[1,2-*a*]quinoline (**3g**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.26 (s, 1H), 6.79 (s, 1H), 7.02 (s, 1H), 7.11-7.16 (m, 1H), 7.32 (t, J = 7.3 Hz, 1H), 7.53 (t, J = 7.3 Hz, 1H), 7.64 (d, J = 7.8 Hz, 1H), 7.87-7.89 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 102.9, 105.7 (t, J_F = 21.9 Hz), 112.8, 113.0, 114.2, 118.2, 118.4 (m), 121.5, 122.9, 123.9, 128.9, 129.1, 129.3, 133.2, 144.3 (dm, J_F = 246.9 Hz), 146.1 (dm, J_F = 246.0 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -138.4 (s, 2F), -139.5 (s, 2F); Elem. Anal. Calcd for $C_{18}H_9F_4N$: C, 68.58; H, 2.88; N, 4.44; Found: C, 68.45; H, 2.67; N, 4.47; HRMS (ESI) calcd for $C_{18}H_9F_4N$: 316.0744 ($M + H^+$), found: 316.0752; calcd / found : 0.999997.



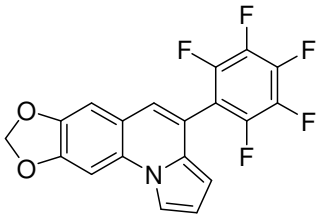
4-(Perfluoropyridin-4-yl)pyrrolo[1,2-*a*]quinoline (**3h**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.29 (s, 1H), 6.84 (s, 1H), 7.10 (s, 1H), 7.25 (s, 1H), 7.39 (t, J = 7.3 Hz, 1H), 7.63 (t, J = 7.3 Hz, 1H), 7.71 (d, J = 7.8 Hz, 1H), 7.93-7.96 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 102.9, 113.2, 113.3, 114.3, 116.7, 121.7, 122.4, 124.1, 127.8, 129.3, 129.6, 130.8 (m), 133.4, 140.0 (dm, J_F = 259.0 Hz), 143.8 (dm, J_F = 245.0 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -89.9 (d, J_F = 23.2 Hz, 2F), -140.0 (s, 2F); Elem. Anal. Calcd for $C_{17}H_8F_4N_2$: C, 64.56; H, 2.55; N, 8.86; Found: C, 64.48; H, 2.21; N, 8.80; HRMS (ESI) calcd for $C_{17}H_8F_4N_2$: 317.0696 ($M + H^+$), found: 317.0705; calcd / found : 0.999997.



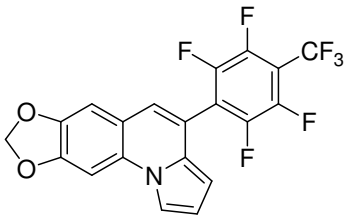
7-Chloro-4-(perfluorophenyl)pyrrolo[1,2-*a*]quinoline (**3i**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.26 (s, 1H), 6.80 (s, 1H), 6.92 (s, 1H), 7.51 (d, J = 9.2 Hz, 1H), 7.64 (s, 1H), 7.83 (d, J = 9.2 Hz, 1H), 7.87 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 103.5, 110.2, 112.1-112.3 (m), 113.3, 113.5, 115.7, 120.6, 122.3, 124.1, 128.1, 128.9, 129.2, 131.7, 137.8 (dm, J_F = 252.7 Hz), 141.2 (dm, J_F = 264.1 Hz), 144.7 (dm, J_F = 249.8 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -138.9 (d, J_F = 23.2 Hz, 2F), -153.5 (t, J_F = 23.2 Hz, 1F), -161.5 (t, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{18}H_7ClF_5N$: C, 58.80; H, 1.92; N, 3.81; Found: C, 58.61; H, 2.16; N, 3.72; HRMS (ESI) calcd for $C_{18}H_7ClF_5N$: 368.0260 (M + H^+), found: 368.0271; calcd / found : 0.999997.



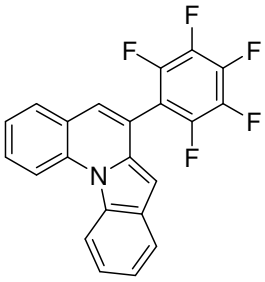
4-(Perfluorophenyl)-[1,3]dioxolo[4,5-*g*]pyrrolo[1,2-*a*]quinoline (**3j**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.06 (s, 2H), 6.18 (s, 1H), 6.78 (s, 1H), 6.89 (s, 1H), 7.02 (s, 1H), 7.34 (s, 1H), 7.70 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 95.1, 101.6, 101.8, 106.6, 111.9, 111.4-111.6 (m), 113.0, 114.9, 117.3, 121.5, 129.2 (d, J_F = 4.7 Hz), 137.7 (dm, J_F = 252.7 Hz), 140.9 (dm, J_F = 257.4 Hz), 144.7 (dm, J_F = 248.8 Hz), 144.8, 149.3; ^{19}F NMR (378 MHz, $CDCl_3$) δ -138.9 (d, J_F = 23.2 Hz, 2F), -154.4 (d, J_F = 23.2 Hz, 1F), -161.6 (s, 2F); Elem. Anal. Calcd for $C_{19}H_8F_5NO_2$: C, 60.49; H, 2.14; N, 3.71; Found: C, 60.26; H, 2.03; N, 3.92; HRMS (ESI) calcd for $C_{19}H_8F_5NO_2$: 378.0548 (M + H^+), found: 378.0565; calcd / found : 0.999995.



4-(2,3,5,6-Tetrafluoro-4-(trifluoromethyl)phenyl)-[1,3]dioxolo[4,5-*g*]pyrrolo[1,2-*a*]quinoline (**3k**)

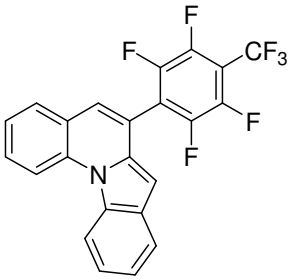
^{1}H NMR (400 MHz, $CDCl_3$) δ 6.08 (s, 2H), 6.21 (s, 1H), 6.80 (s, 1H), 6.93 (s, 1H), 7.04 (s, 1H), 7.36 (s, 1H), 7.72 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 95.1, 101.7, 101.9, 106.7, 108.9-109.7 (m), 112.1, 113.2, 114.6, 117.1, 120.9 (q, J_F = 271.7 Hz), 121.5, 122.0 (q, J_F = 18.1 Hz), 128.5, 129.5, 144.2 (dm, J_F = 256.5 Hz), 144.8 (dm, J_F = 244.1 Hz), 144.9, 149.7; ^{19}F NMR (378 MHz, $CDCl_3$) δ -56.0 (d, J_F = 23.2 Hz, 3F), -136.9 (s, 2F), 140.1 (s, 2F); Elem. Anal. Calcd for $C_{20}H_8F_7NO_2$: C, 56.22; H, 1.89; N, 3.28; Found: C, 56.28; H, 1.87; N, 3.35; HRMS (ESI) calcd for $C_{20}H_8F_7NO_2$: 428.0516 (M + H^+), found: 428.0520; calcd / found : 0.999999.



6-(Perfluorophenyl)indolo[1,2-*a*]quinoline (**3l**)

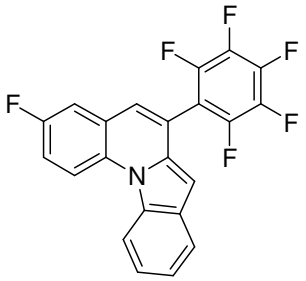
^{1}H NMR (400 MHz, $CDCl_3$) δ 6.49 (s, 1H), 7.13 (s, 1H), 7.31 (t, J = 7.8 Hz, 1H), 7.36 (t, J = 7.3 Hz, 1H), 7.43 (t, J = 7.3 Hz, 1H), 7.61-7.65 (m, 2H), 7.79 (d, J = 7.8 Hz, 1H), 8.45 (d, J = 8.3 Hz, 1H), 8.57 (d, J = 8.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 97.1, 112.1-112.6 (m), 114.3, 115.4, 117.5, 121.4, 122.2, 122.4, 123.1, 126.9, 129.4, 129.9, 133.3, 134.5, 136.6, 137.8 (dm, J_F = 246.9 Hz), 141.2 (dm, J_F = 257.4 Hz), 144.9 (dm, J_F = 248.9 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -138.8 (d, J_F = 23.2 Hz, 2F), -153.5 (t, J_F = 23.2 Hz, 1F), -161.0 (t, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{22}H_{10}F_5N$: C, 68.93; H, 2.63; N, 3.65; Found: C, 68.97; H, 2.62; N, 3.53; HRMS (ESI) calcd for $C_{22}H_{10}F_5N$: 384.0806 (M + H^+), found: 384.0809; calcd / found :

0.999999.



6-(2,3,5,6-Tetrafluoro-4-(trifluoromethyl)phenyl)indolo[1,2-*a*]quinoline (**3m**)

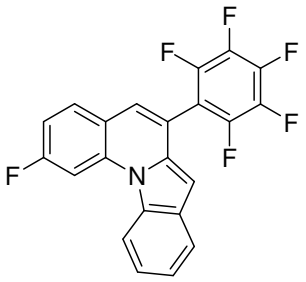
^{1}H NMR (400 MHz, $CDCl_3$) δ 6.51 (s, 1H), 7.14 (s, 1H), 7.30 (t, J = 7.3 Hz, 1H), 7.36 (t, J = 7.3 Hz, 1H), 7.43 (t, J = 7.3 Hz, 1H), 7.61-7.65 (m, 2H), 7.79 (d, J = 7.8 Hz, 1H), 8.43 (d, J = 8.3 Hz, 1H), 8.55 (d, J = 8.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 97.2, 109.5-110.0 (m), 114.3, 115.4, 117.2, 120.8 (q, J_F = 277.6 Hz), 121.4, 121.5 (q, J_F = 27.6 Hz), 122.3, 122.6, 122.9, 123.2, 126.8, 129.6, 129.8, 130.2, 133.3, 133.7, 136.8, 144.4 (dm, J_F = 257.4 Hz), 144.9 (dm, J_F = 247.9 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -56.0 (d, J_F = 23.2 Hz, 3F), -136.7 (s, 2F), -139.6 (s, 2F); Elem. Anal. Calcd for $C_{23}H_{10}F_7N$: C, 63.75; H, 2.33; N, 3.23; Found: C, 63.84; H, 2.09; N, 3.34; HRMS (ESI) calcd for $C_{23}H_{10}F_7N$: 434.0774 (M + H^+), found: 434.0774; calcd / found : 1.000000.



3-Fluoro-6-(perfluorophenyl)indolo[1,2-*a*]quinoline (**3n**)

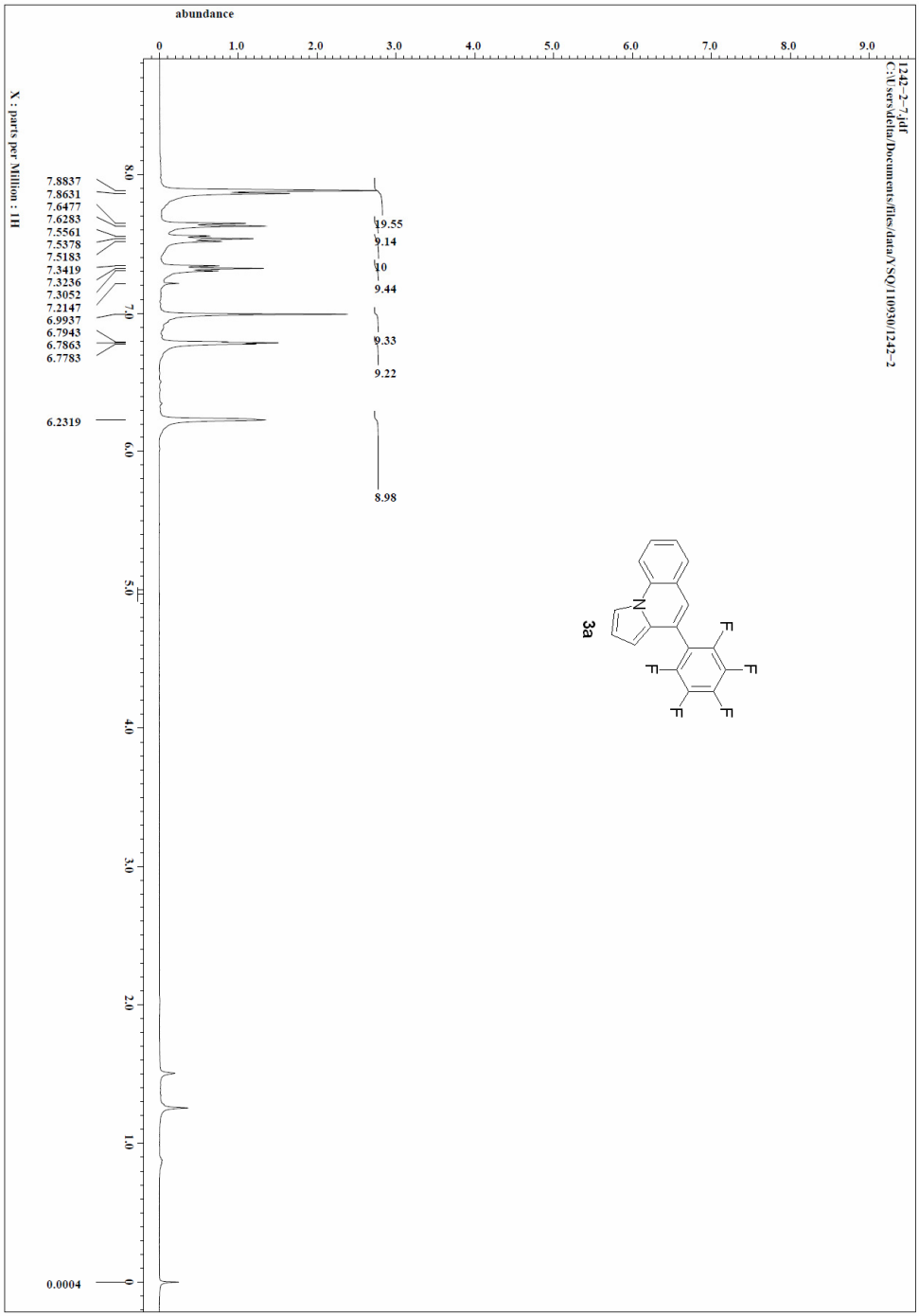
^{1}H NMR (400 MHz, $CDCl_3$) δ 6.51 (s, 1H), 7.05 (s, 1H), 7.31-7.38 (m, 3H), 7.43 (t, J = 7.3 Hz, 1H), 7.79 (d, J = 7.3 Hz, 1H), 8.35 (d, J = 8.3 Hz, 1H), 8.49-8.51 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 97.5, 112.1-112.2 (m), 113.8, 114.6 (d, J_F = 22.9 Hz), 116.6, 116.7, 116.9, 119.0, 121.6, 122.3, 122.8, 124.6 (d, J_F = 8.6 Hz), 125.7, 129.6, 133.1, 134.1, 137.8 (dm, J_F = 246.9 Hz), 141.3 (dm, J_F = 254.6 Hz), 144.8 (dm, J_F = 247.9 Hz), 158.0 (d, J_F = 242.2 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -119.2(s, 1F),

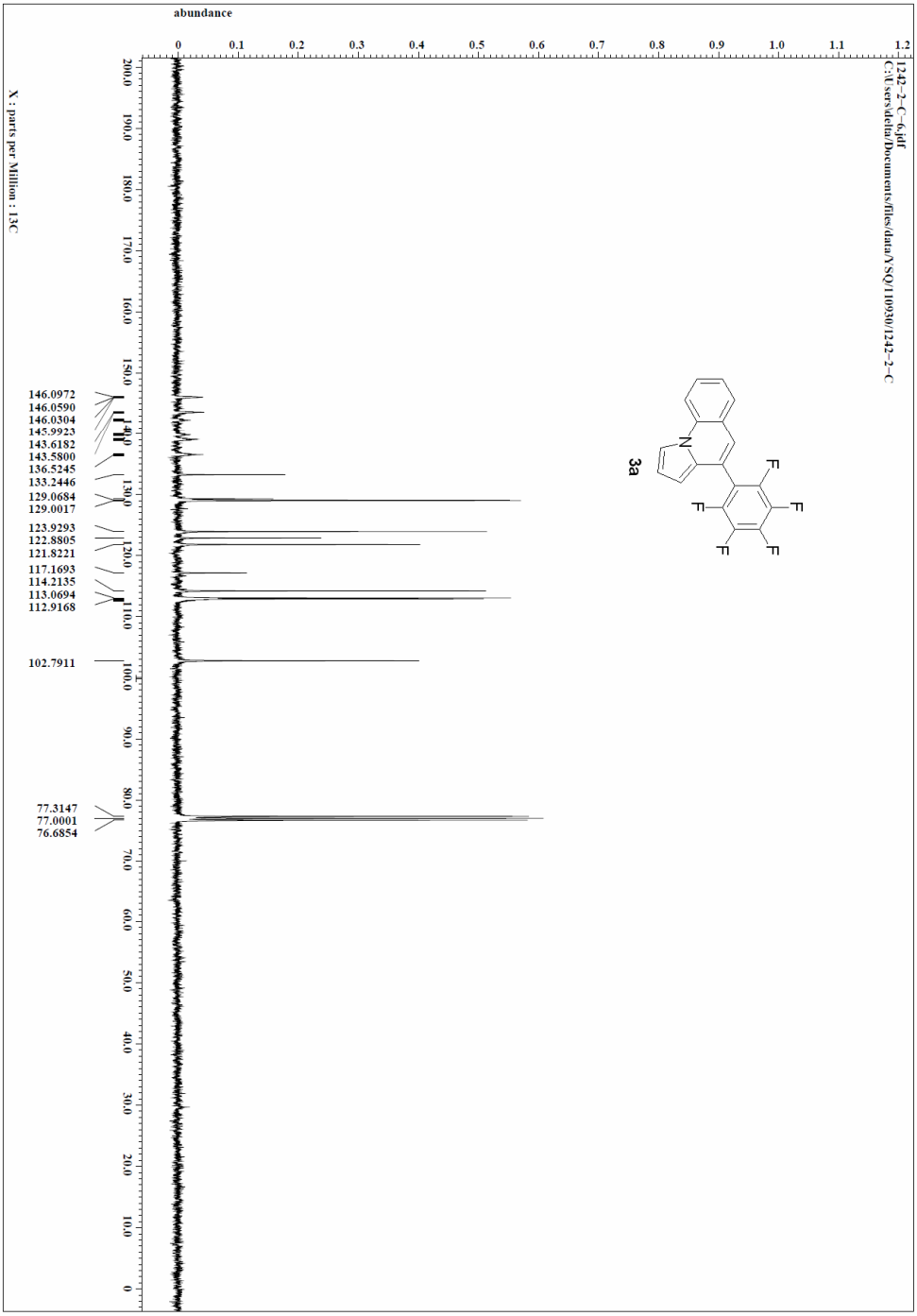
-138.7 (d, J_F = 23.2 Hz, 2F), -153.1 (d, J_F = 23.2 Hz, 1F), -160.8 (t, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{22}H_9F_6N$: C, 65.84; H, 2.26; N, 3.49; Found: C, 65.92; H, 2.17; N, 3.72; HRMS (ESI) calcd for $C_{22}H_9F_6N$: 402.0712 ($M + H^+$), found: 402.0718; calcd / found : 0.999998.



2-Fluoro-6-(perfluorophenyl)indolo[1,2-*a*]quinoline (**3o**)

^{1}H NMR (400 MHz, $CDCl_3$) δ 6.50 (s, 1H), 7.08-7.13 (m, 2H), 7.41 (t, J = 7.3 Hz, 1H), 7.48 (t, J = 7.3 Hz, 1H), 7.66 (t, J = 7.3 Hz, 1H), 7.80 (d, J = 7.8 Hz, 1H), 8.31 (d, J = 11.4 Hz, 1H), 8.39 (d, J = 8.7 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 97.5, 103.0 (d, J_F = 27.6 Hz), 110.8 (d, J_F = 22.9 Hz), 112.0-112.2 (m), 114.0, 116.7, 119.7, 121.5, 122.7 (d, J_F = 10.5 Hz), 126.1, 130.0, 131.0 (d, J_F = 10.5 Hz), 133.2, 134.3, 137.6 (d, J_F = 13.5 Hz), 138.2 (dm, J_F = 254.6 Hz), 141.3 (dm, J_F = 255.8 Hz), 144.9 (dm, JF = 249.8 Hz), 163.4 (d, J_F = 247.9 Hz); ^{19}F NMR (378 MHz, $CDCl_3$) δ -107.2 (s, 1F), -138.8 (s, 2F), -153.4 (s, 1F), -161.0 (t, J_F = 23.2 Hz, 2F); Elem. Anal. Calcd for $C_{22}H_9F_6N$: C, 65.84; H, 2.26; N, 3.49; Found: C, 65.76; H, 2.17; N, 3.35; HRMS (ESI) calcd for $C_{22}H_9F_6N$: 402.0712 ($M + H^+$), found: 402.0719; calcd / found : 0.999998.


abundance
X : parts per Million : 1H
C:\Users\delta\Documents\files\data\YSQ\110930\1242-2
1242-2-7.jdf
7.8837
7.8631
7.6477
7.6283
7.5561
7.5378
7.5183
7.3419
7.3236
7.3052
7.2147
6.9937
6.7943
6.7863
6.7783
6.2319
0.0004
19.55
9.14
10
9.44
9.33
9.22
8.98
3a
F
F
F
F
F
N


abundance
X : parts per Million : 13C
1242-2-C-6.jdf
C:\Users\delta\Documents\files\data\VSQ\110930\1242-2-C
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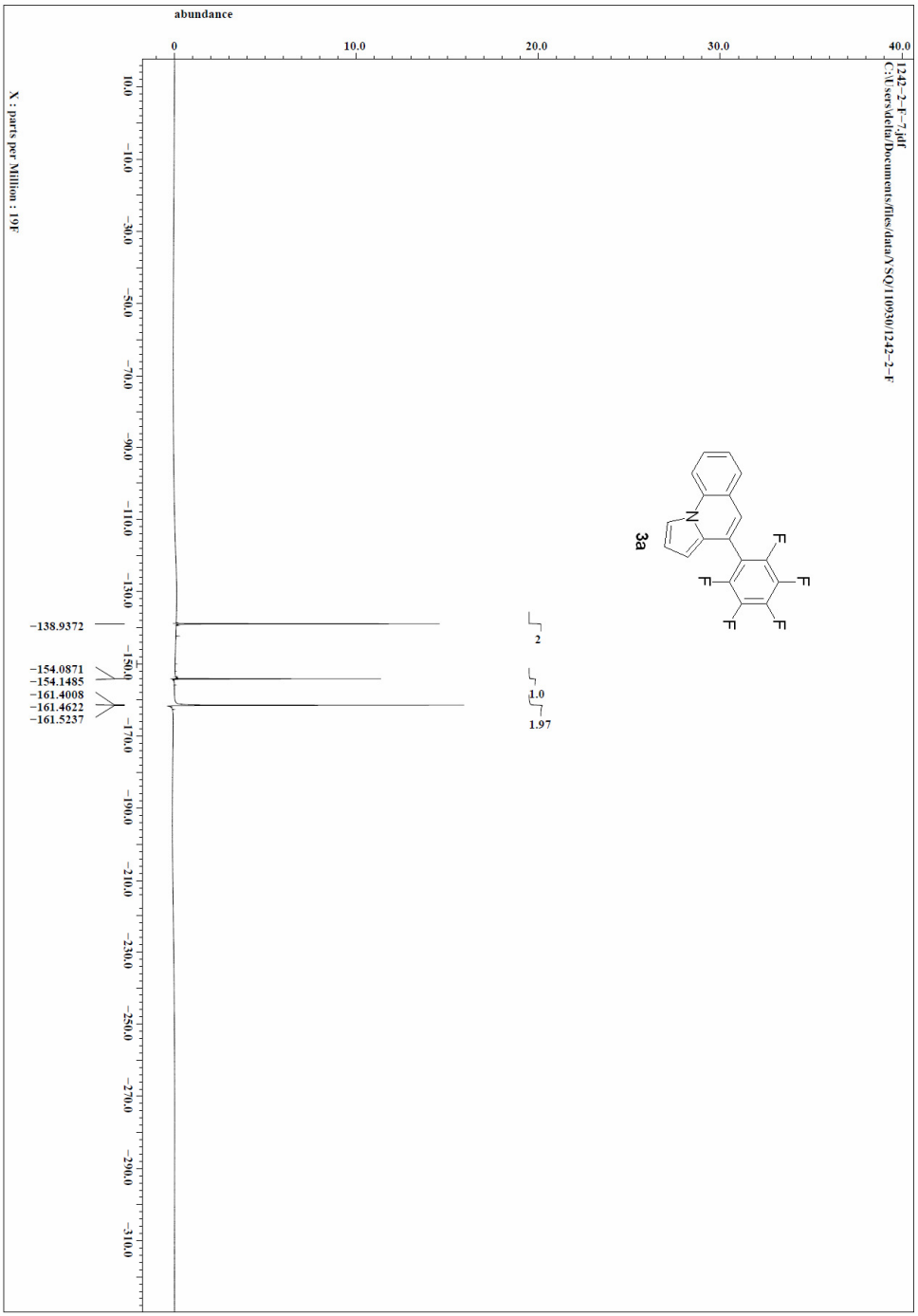
146.0590
146.0304
145.9923
143.6182
143.5800
136.5245
133.2446
129.0684
129.0017
123.9293
122.8805
121.8221
117.1693
114.2135
113.0694
112.9168
102.7911
77.3147
77.0001
76.6854
3a


abundance
0
10.0
20.0
30.0
40.0
1242-2-F-7.jdf
C:\Users\delta\Documents\files\data\YSQ\110930\1242-2-F
X : parts per Million : 19F
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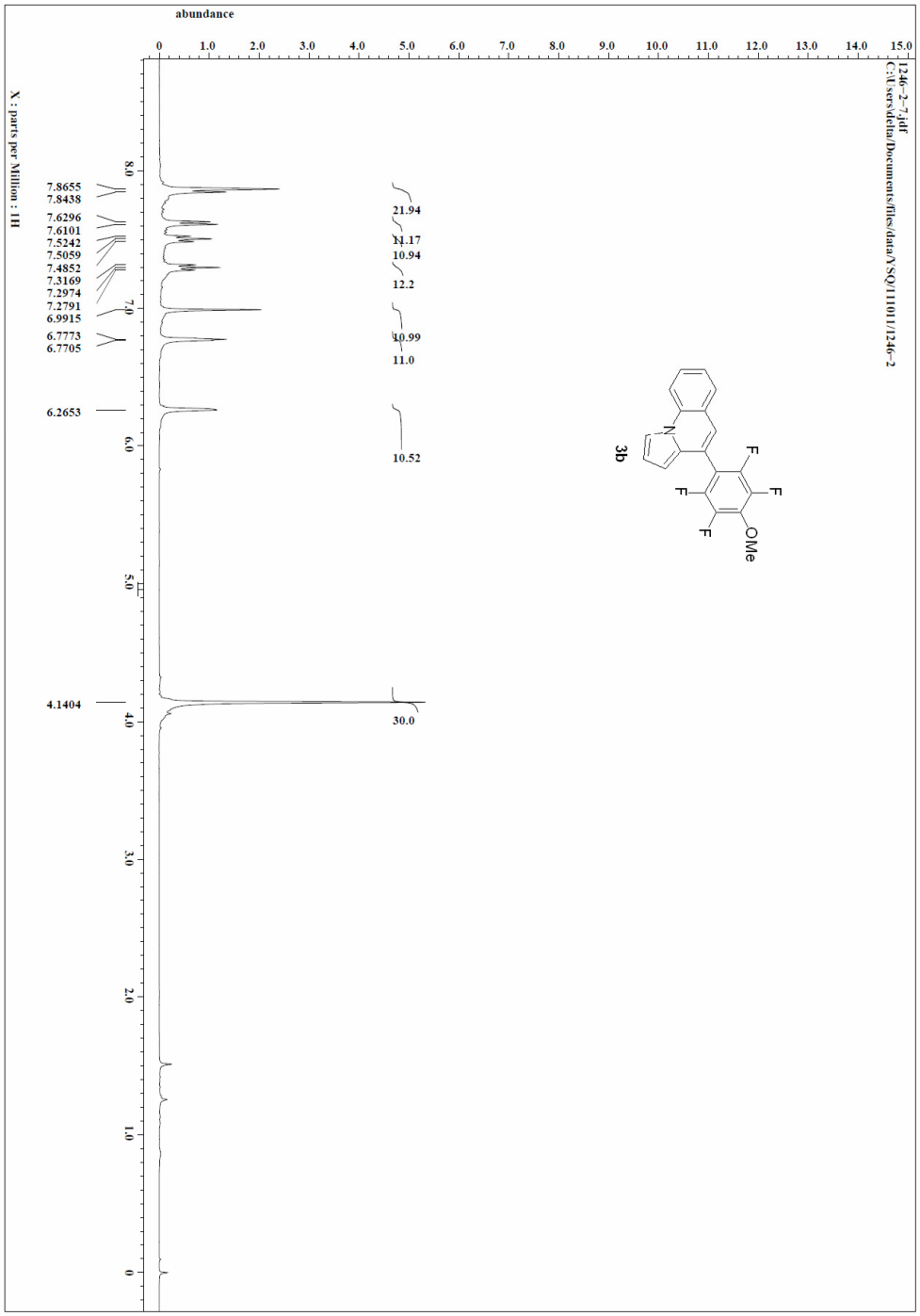
-10.0
-30.0
-50.0
-70.0
-90.0
-110.0
-130.0
-150.0
-170.0
-190.0
-210.0
-230.0
-250.0
-270.0
-290.0
-310.0
-138.9372
-154.0871
-154.1485
-161.4008
-161.4622
-161.5237
2
1.0
1.97
3a
N
F
F
F
F
F


abundance
X : parts per Million : 1H
1246-2-7.jdf
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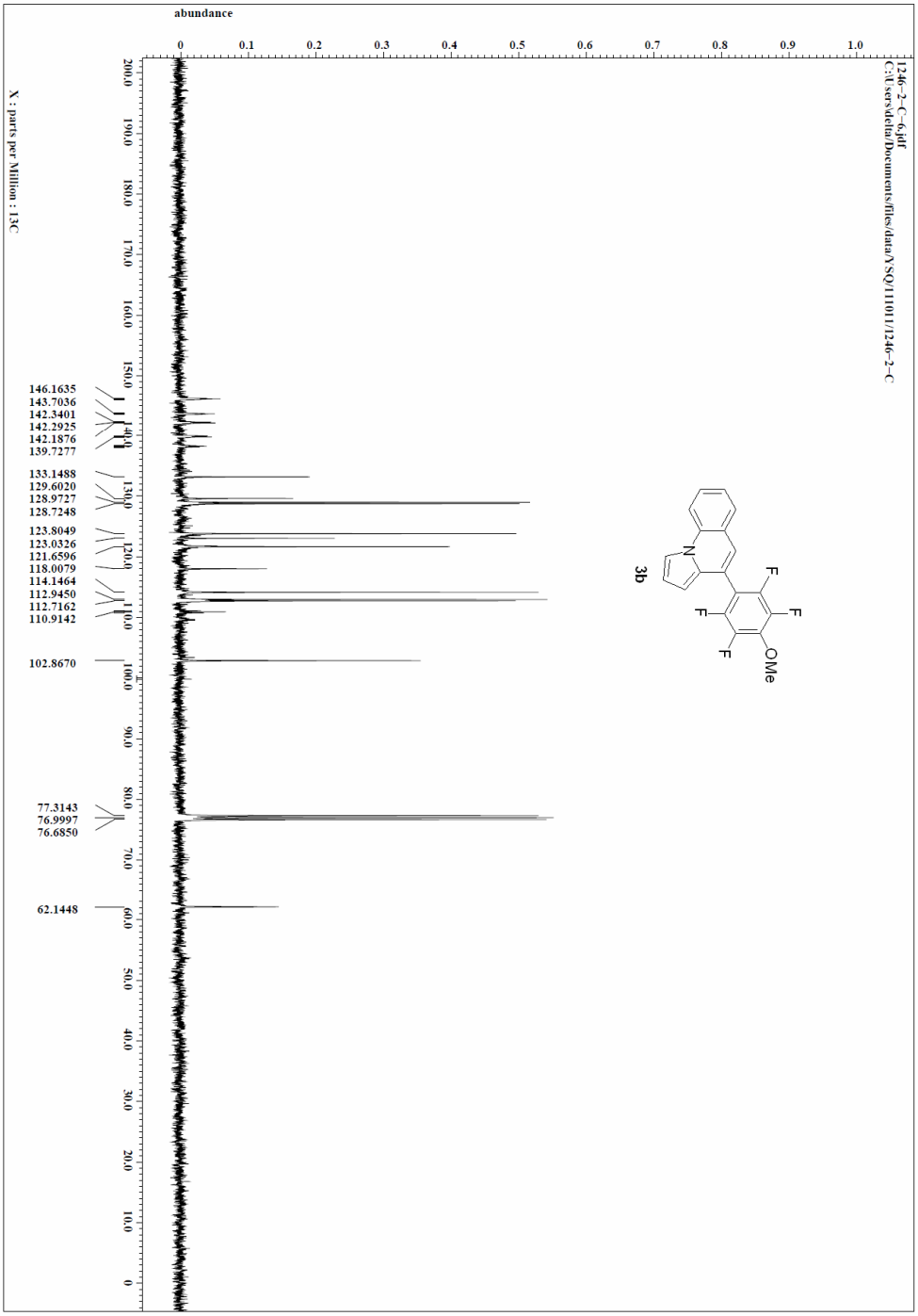
7.6101
7.5242
7.5059
7.4852
7.3169
7.2974
7.2791
6.9915
6.7773
6.7705
6.2653
4.1404
21.94
11.17
10.94
12.2
10.99
11.0
10.52
30.0
3b
F
F
F
OMe


abundance
X : parts per Million : 13C
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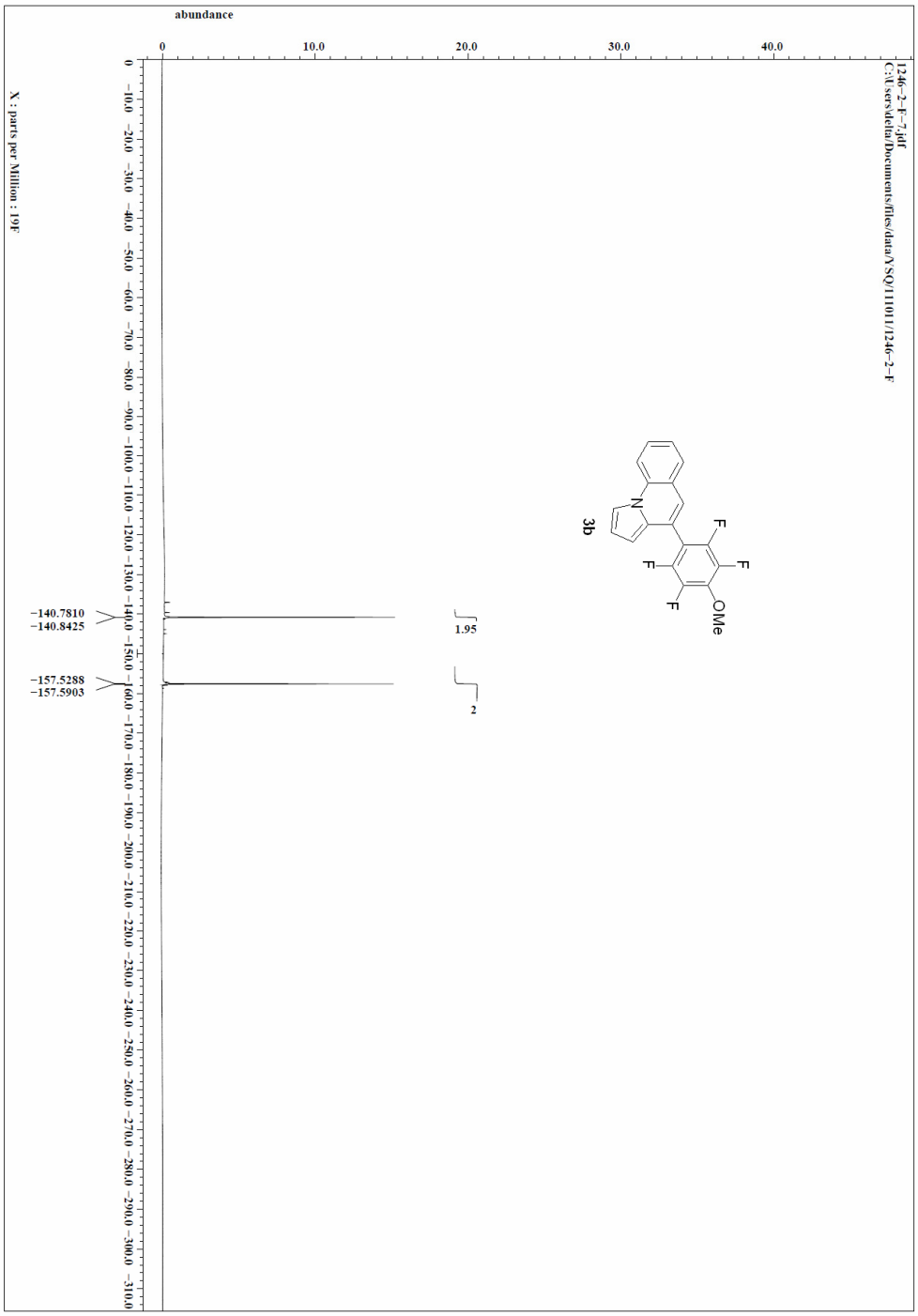
142.3401
142.2925
142.1876
139.7277
133.1488
129.6020
128.9727
128.7248
123.8049
123.0326
121.6596
118.0079
114.1464
112.9450
112.7162
110.9142
102.8670
77.3143
76.9997
76.6850
62.1448
3b
F
F
F
OMe
N


abundance
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10.0
20.0
30.0
40.0
1246-2-F-7.jdf
C:\Users\delta\Documents\fils\data\YSQ\111011\1246-2-F
X : parts per Million : 19F
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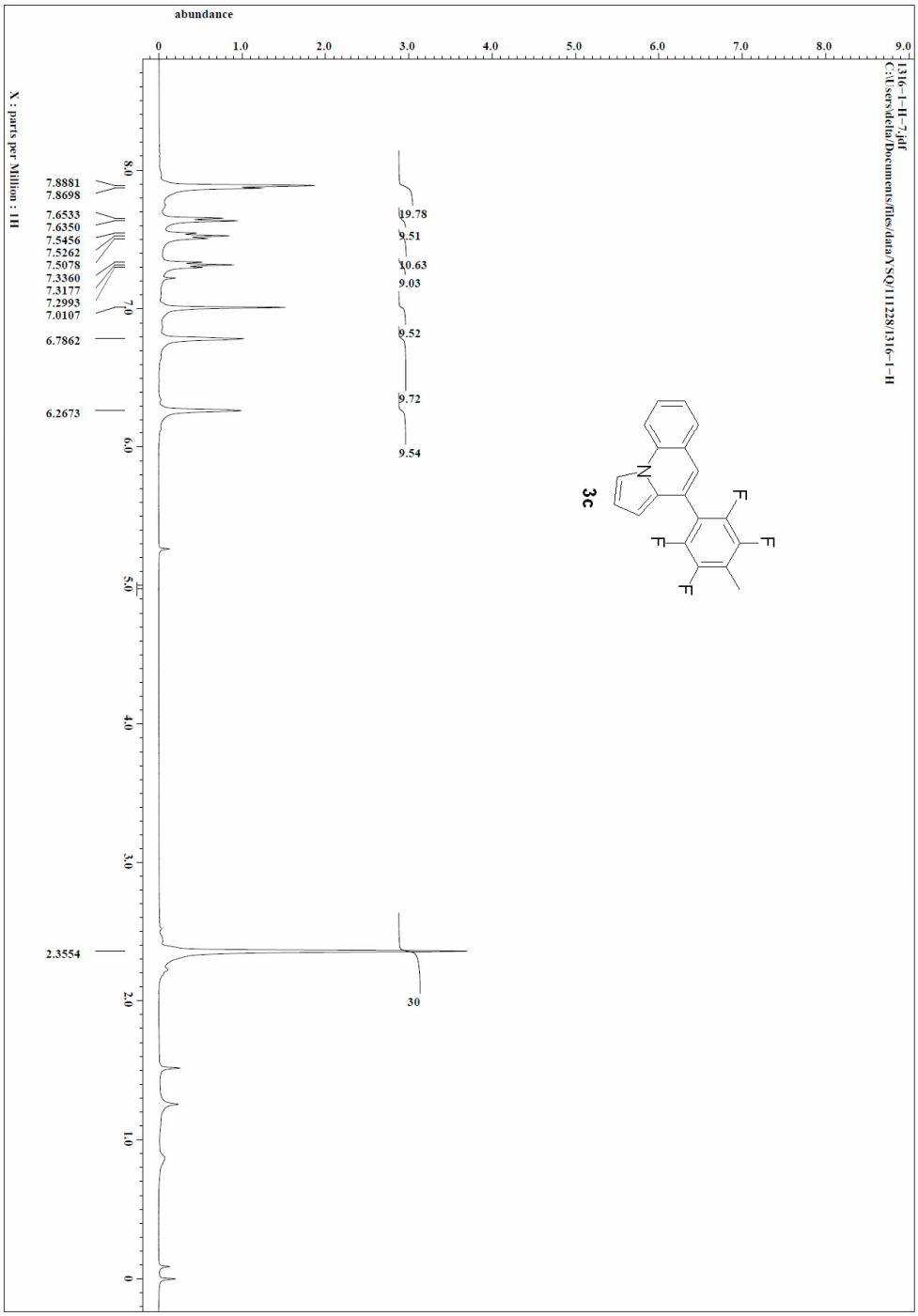
−140.8425
−157.5288
−157.5903
1.95
2
3b
N
F
F
F
F
OMe


abundance
X : parts per Million : 1H
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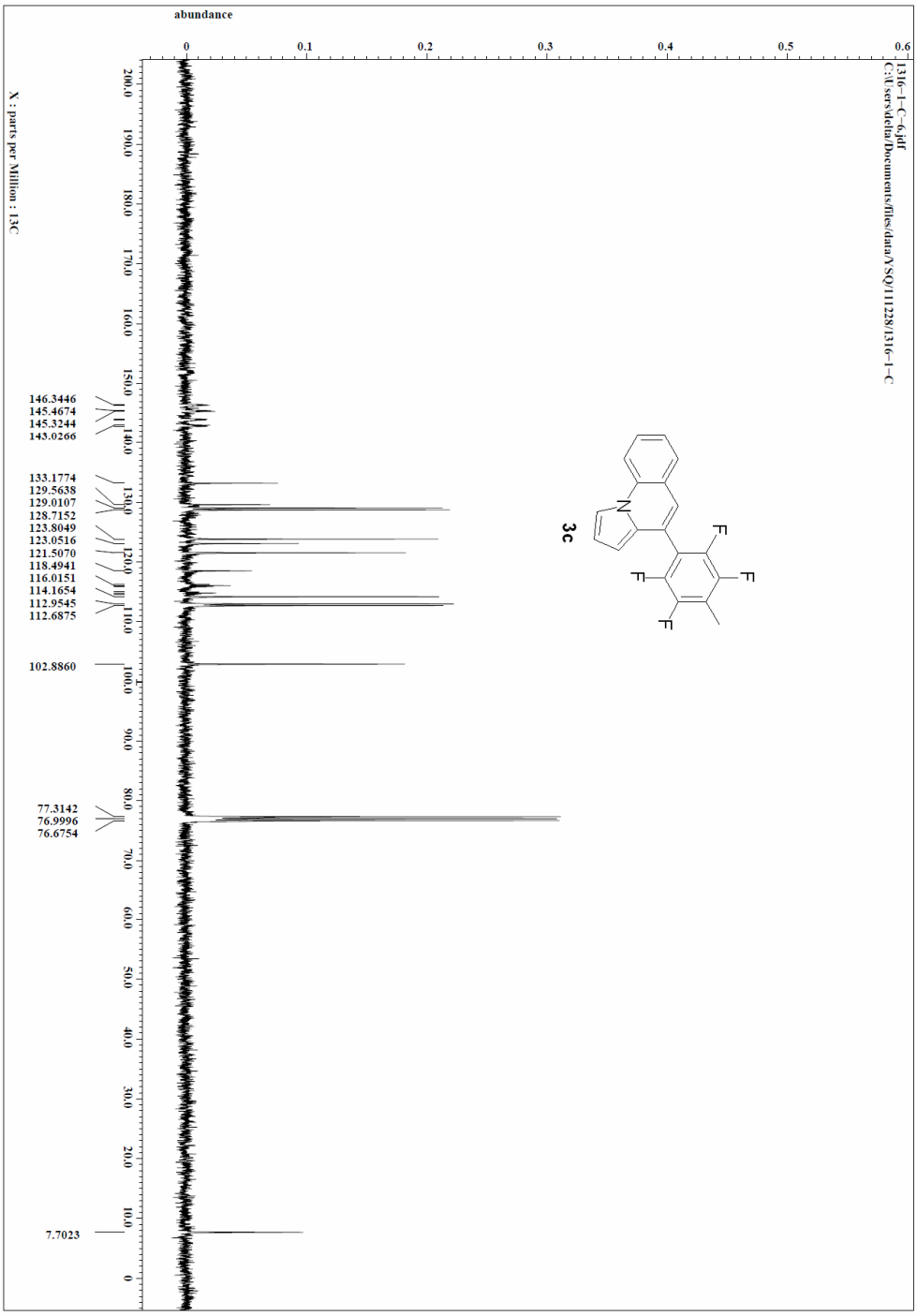
7.6350
7.5456
7.5262
7.5078
7.3360
7.3177
7.2993
7.0107
6.7862
6.2673
2.3554
19.78
9.51
10.63
9.03
9.52
9.72
9.54
30
3c
F
F
F
F


abundance
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0.1
0.2
0.3
0.4
0.5
0.6
1316-1-C-6.jdf
C:\Users\delta\Documents\files\data\YSQ\111228\1316-1-C
X : parts per Million : 13C
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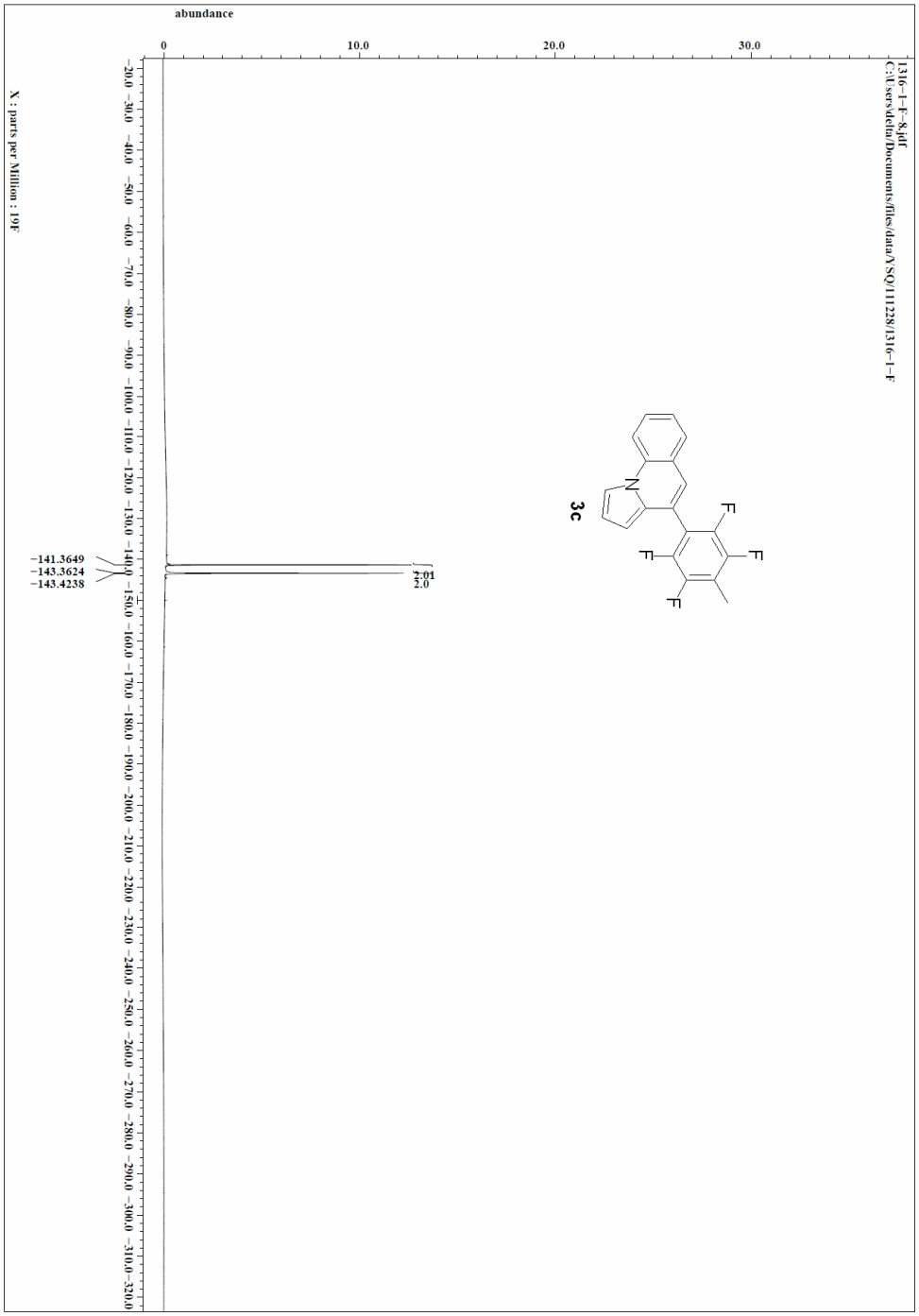
145.4674
145.3244
143.0266
133.1774
129.5638
129.0107
128.7152
123.8049
123.0516
121.5070
118.4941
116.0151
114.1654
112.9545
112.6875
102.8860
77.3142
76.9996
76.6754
7.7023
3c
N
F
F
F
F


abundance
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20.0
30.0
1316-1-F-8.jdf
C:\Users\delta\Documents\files\data\YSQ\111228\1316-1-F
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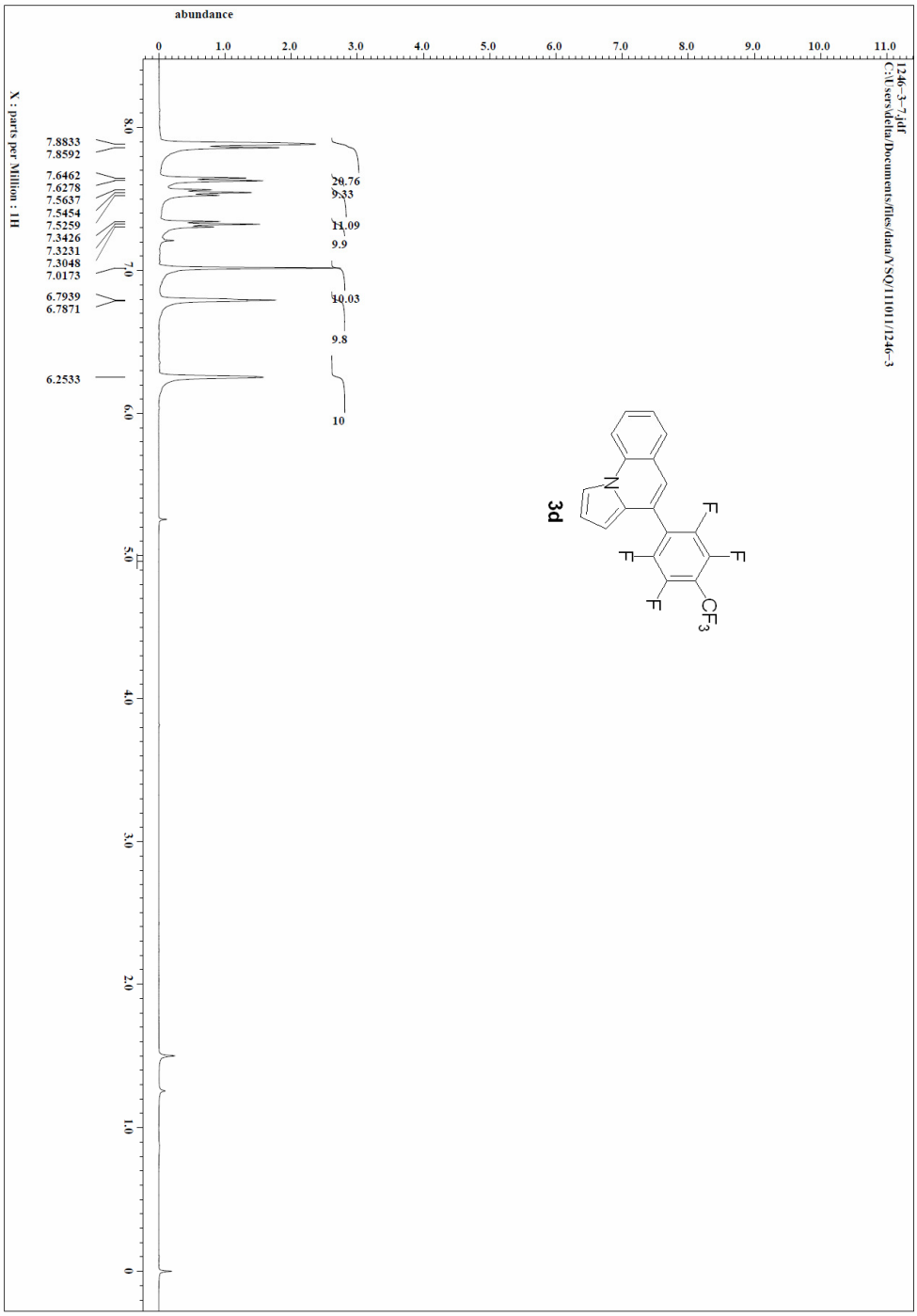
-143.3624
-143.4238
2.01
2.0
3c
F
F
F
F


abundance
X : parts per Million : 1H
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1246-3-7.jdf
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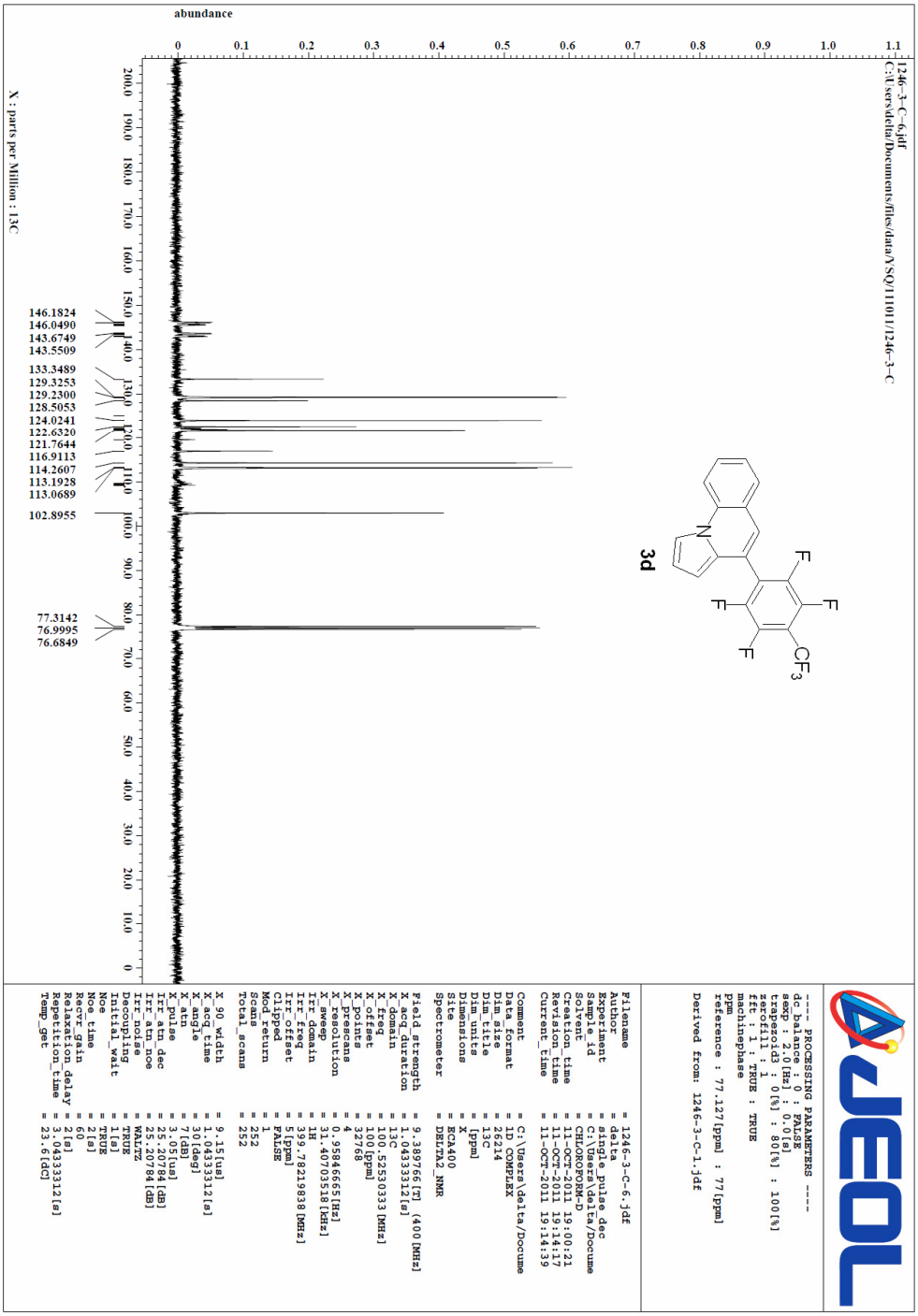
7.8592
7.6462
7.6278
7.5637
7.5454
7.5259
7.3426
7.3231
7.3048
7.0173
6.7939
6.7871
6.2533
20.76
9.33
13.09
9.9
10.03
9.8
10
3d
N
F
F
F
F
CF3


1246-3-C-6.jdf
C:\Users\delta\Documents\files\data\YSQ\11011\1246-3-C
abundance
X : parts per Million : 13C
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146.0490
143.6749
143.5509
133.3489
129.3253
129.2300
128.5053
124.0241
122.6320
121.7644
116.9113
114.2607
113.1928
113.0689
102.8955
77.3142
76.9995
76.6849
3d
F
F
F
F
CF3
N
---- PROCESSING PARAMETERS ----
dc_balance : 0 : FALSE
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trapezoid : 0[%] : 80[%] : 100[%]
zerofill : 1
fft : 1 : TRUE : TRUE
machinephase
ppm
reference : 77.127[ppm] : 77[ppm]
Derived from: 1246-3-C-1.jdf
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Author = delta
Experiment = single_pulse_dec
Solvent_id = CHLOROFORM-D
Creation_time = 11-OCT-2011 19:00:21
Revision_time = 11-OCT-2011 19:14:17
Current_time = 11-OCT-2011 19:14:39
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Data_format = 1D COMPLEX
Dim_size = 32214
Dim_title = 13C
Dim_units = [ppm]
Dimensions = X
Site = ECA400
Spectrometer = DELTA2_NMR
Field_strength = 9.389766[T] (400[MHz])
X_acq_duration = 1.043333[s]
X_domain = 13C
X_freq = 100.52530333[MHz]
X_offset = 100[ppm]
X_points = 32768
X_prescans = 4
X_resolution = 0.958466665[Hz]
X_sweep = 31.40703518[kHz]
Irr_domain = 1H
Irr_freq = 399.78219838[MHz]
Irr_offset = 5[ppm]
Clipped = FALSE
Mod_return = 1
Scans = 252
Total_scans = 252
X_90_width = 9.15[us]
X_acq_time = 1.043333[s]
X_angle = 70[deg]
X_pulse = 3.05[us]
Irr_atn_dec = 25.20784[dB]
Irr_atn_noe = 25.20784[dB]
Irr_noise = WALTZ
Decoupling = TRUE
Initial_wait = 1[s]
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Recycle_time = 2[s]
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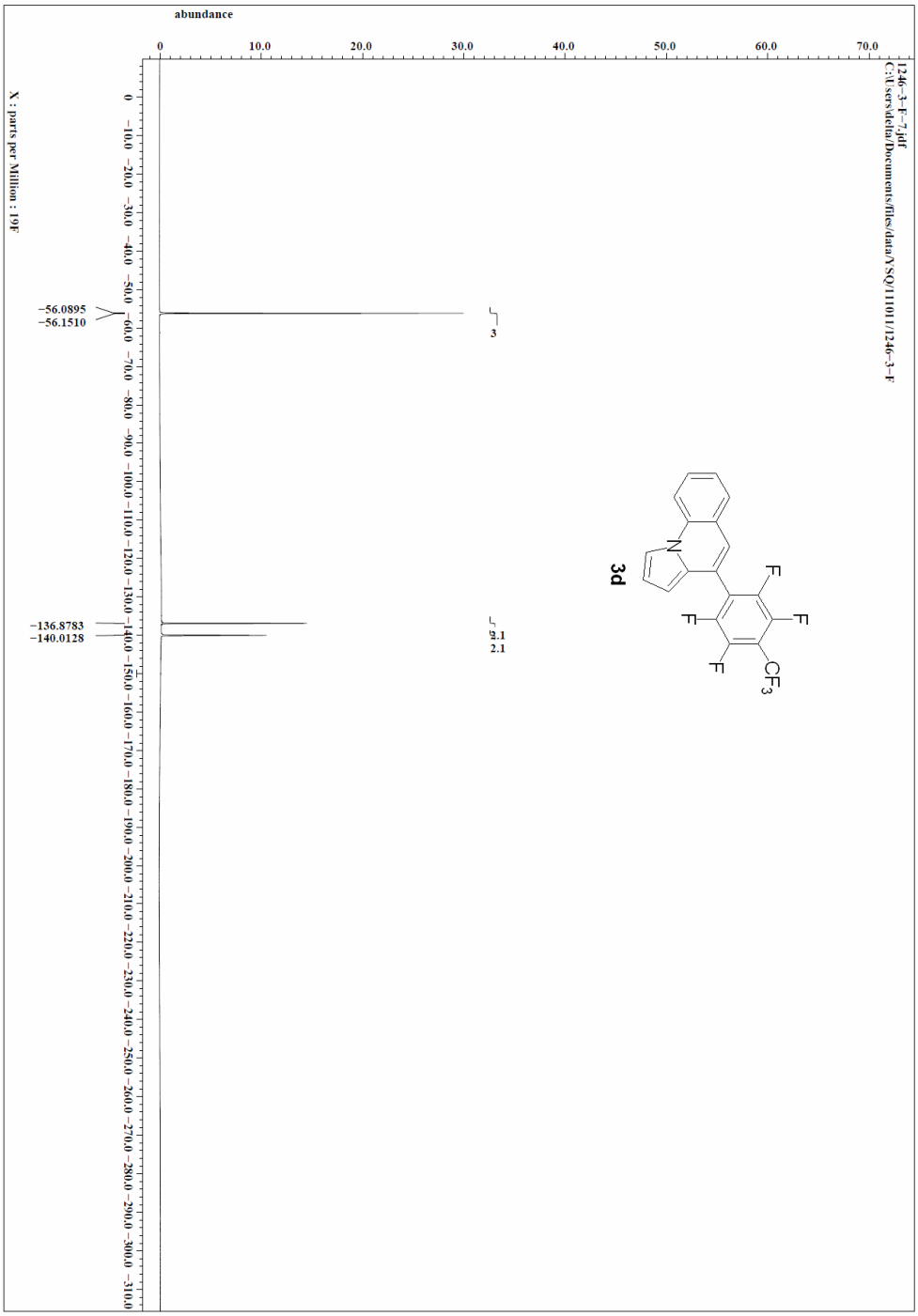
Repetition_time = 23.6[dC]
Temp_get


abundance
1246-3-F-7.jdf
C:\Users\delta\Documents\files\data\YSQ\111011\1246-3-F
X : parts per Million : 19F
-56.0895
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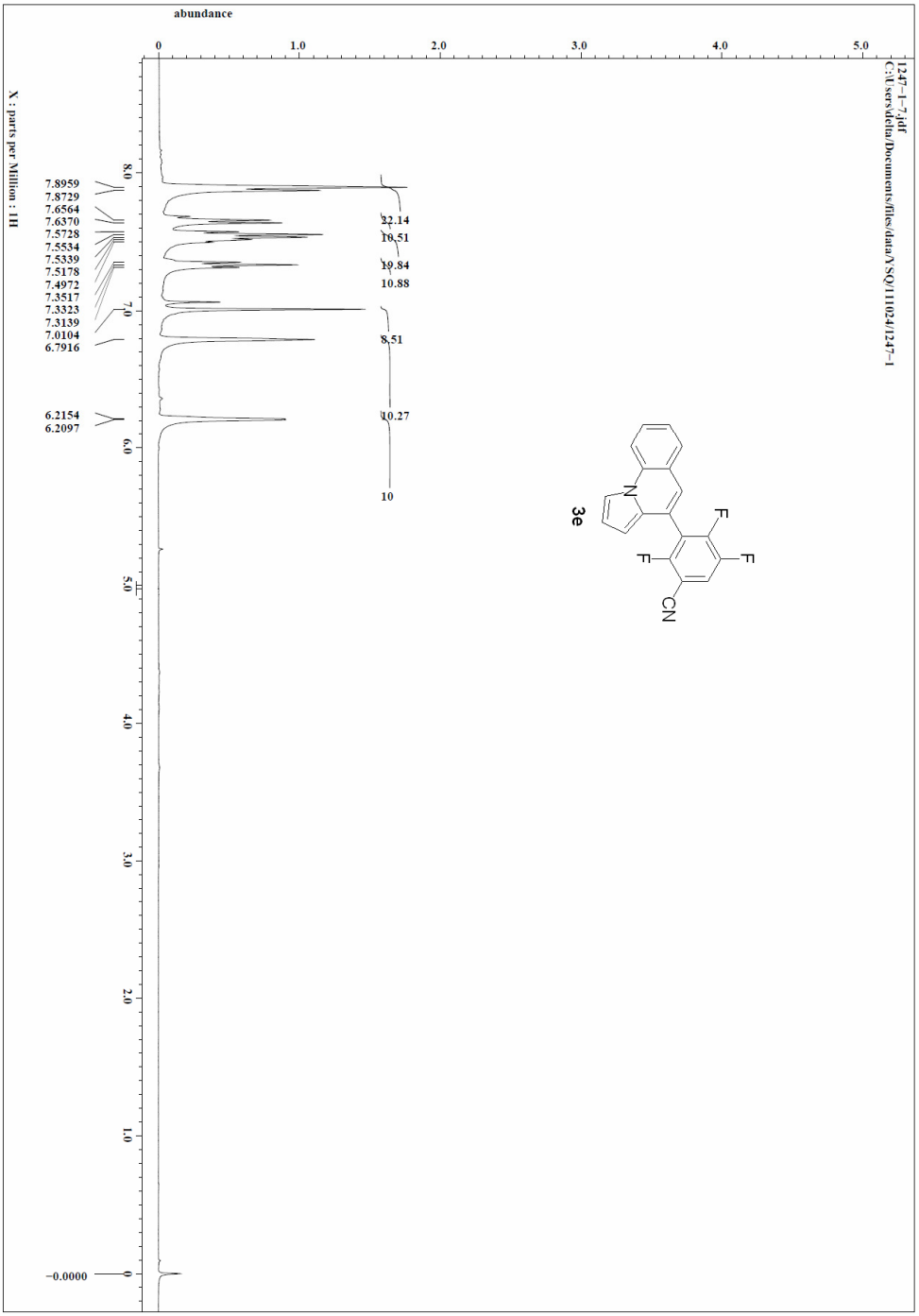
-136.8783
-140.0128
3
2.1
2.1
3d
F
F
F
F
CF3
N


abundance
X : parts per Million : 1H
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1247-1-7.jdf
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7.3517
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7.3139
7.0104
6.7916
6.2154
6.2097
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10
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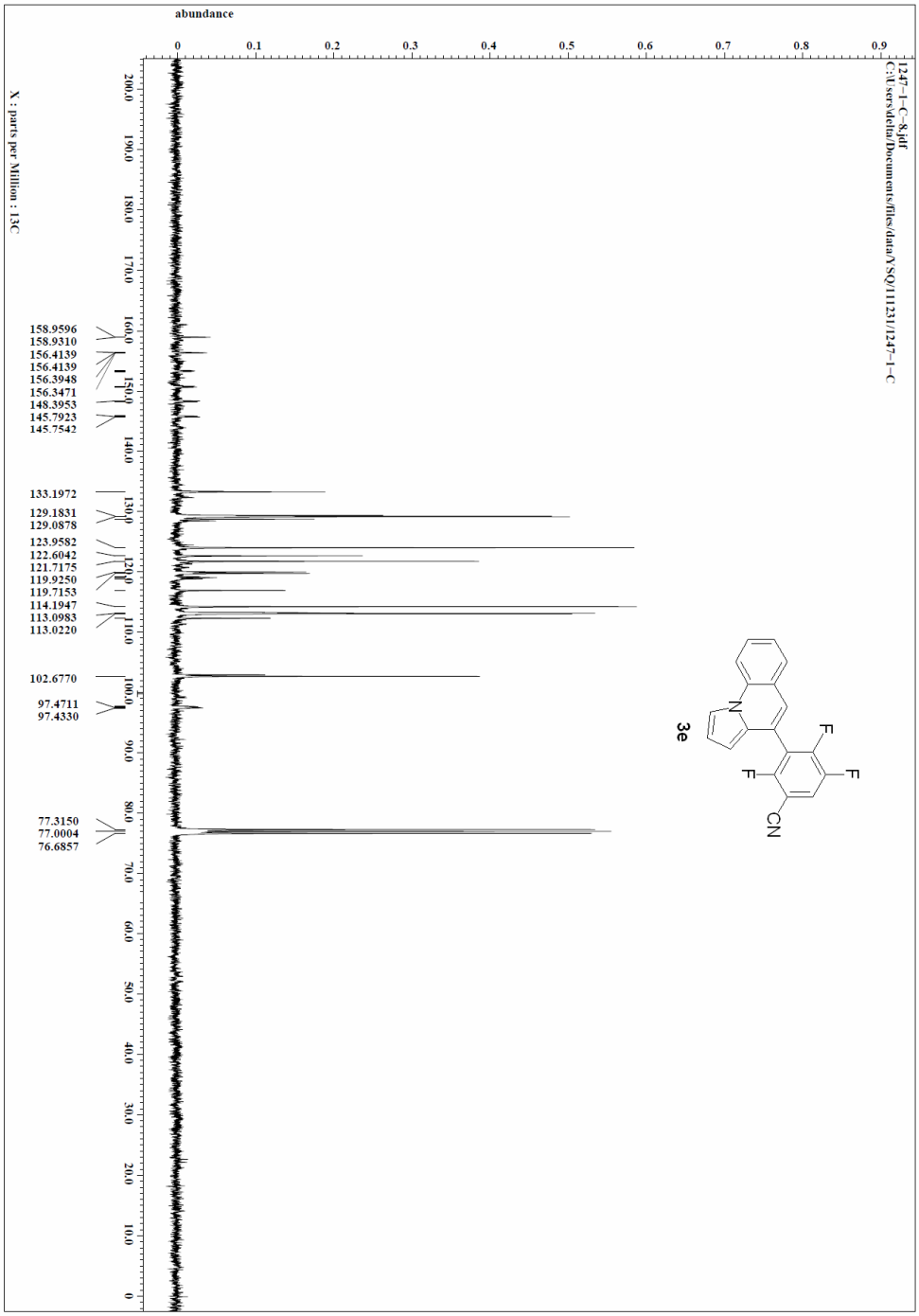
3e
F
F
F
CN
N


abundance
X : parts per Million : 13C
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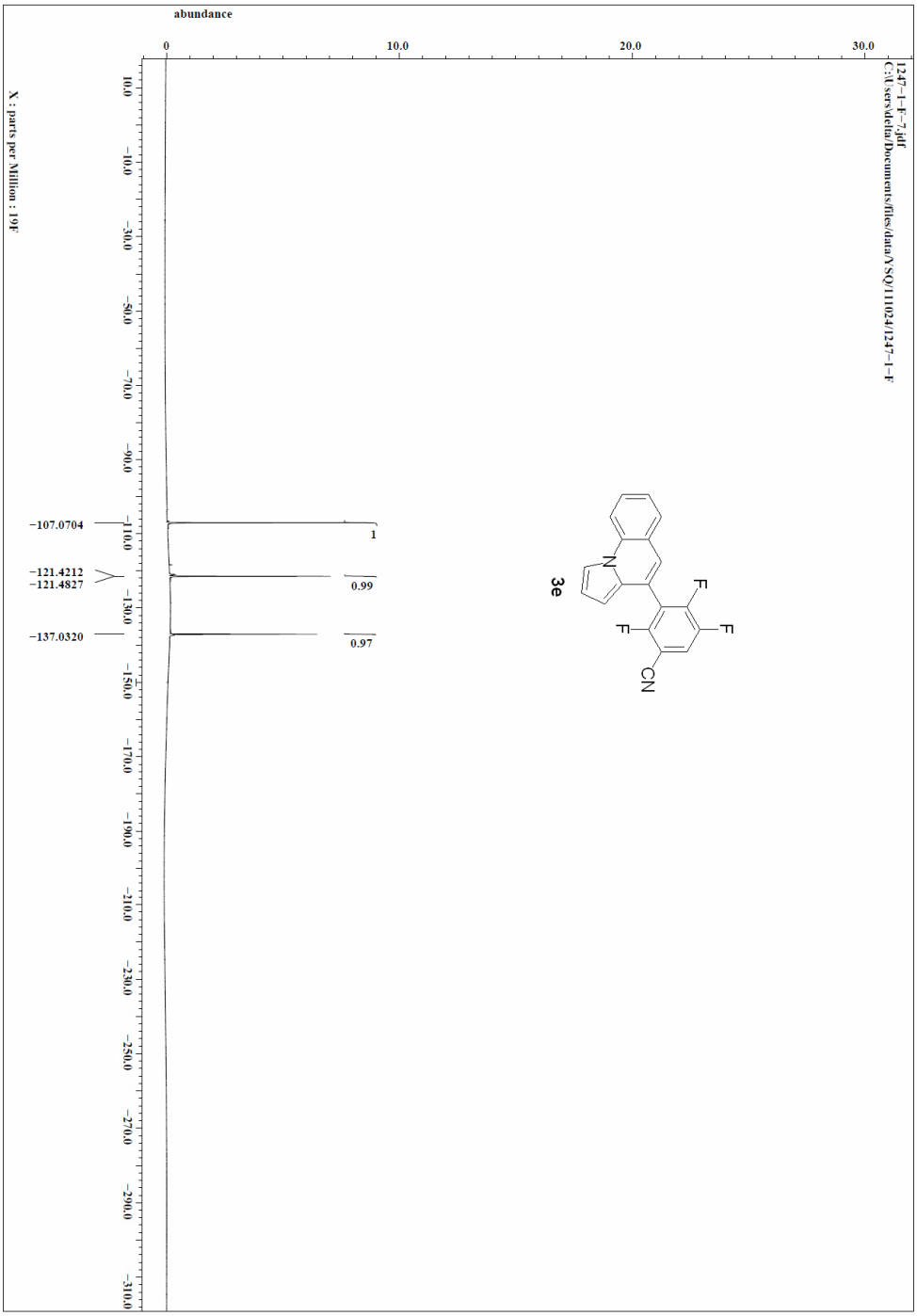
F
CN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20.0
30.0
1247-1-F-7.jdf
C:\Users\delia\Documents\files\data\YSQ\111024\1247-1-F
X : parts per Million : 19F
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-50.0
-70.0
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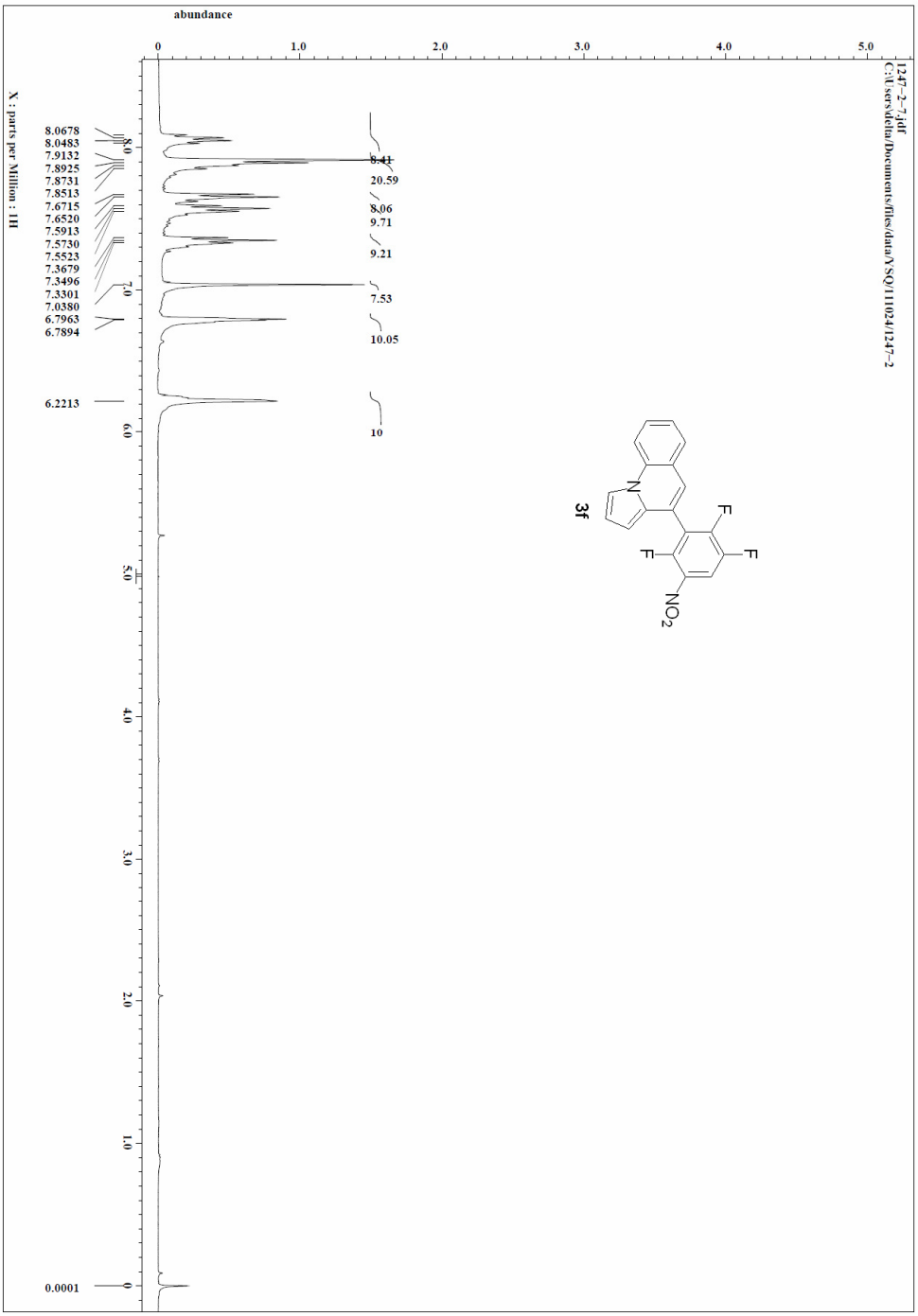
F
F
F
CN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1.0
2.0
3.0
4.0
5.0
1247-2-7.jdf
C:\Users\delia\Documents\files\data\YSQ\111024\1247-2
X : parts per Million : 1H
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7.9132
7.8925
7.8731
7.8513
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7.5913
7.5730
7.5523
7.3679
7.3496
7.3301
7.0380
6.7963
6.7894
6.2213
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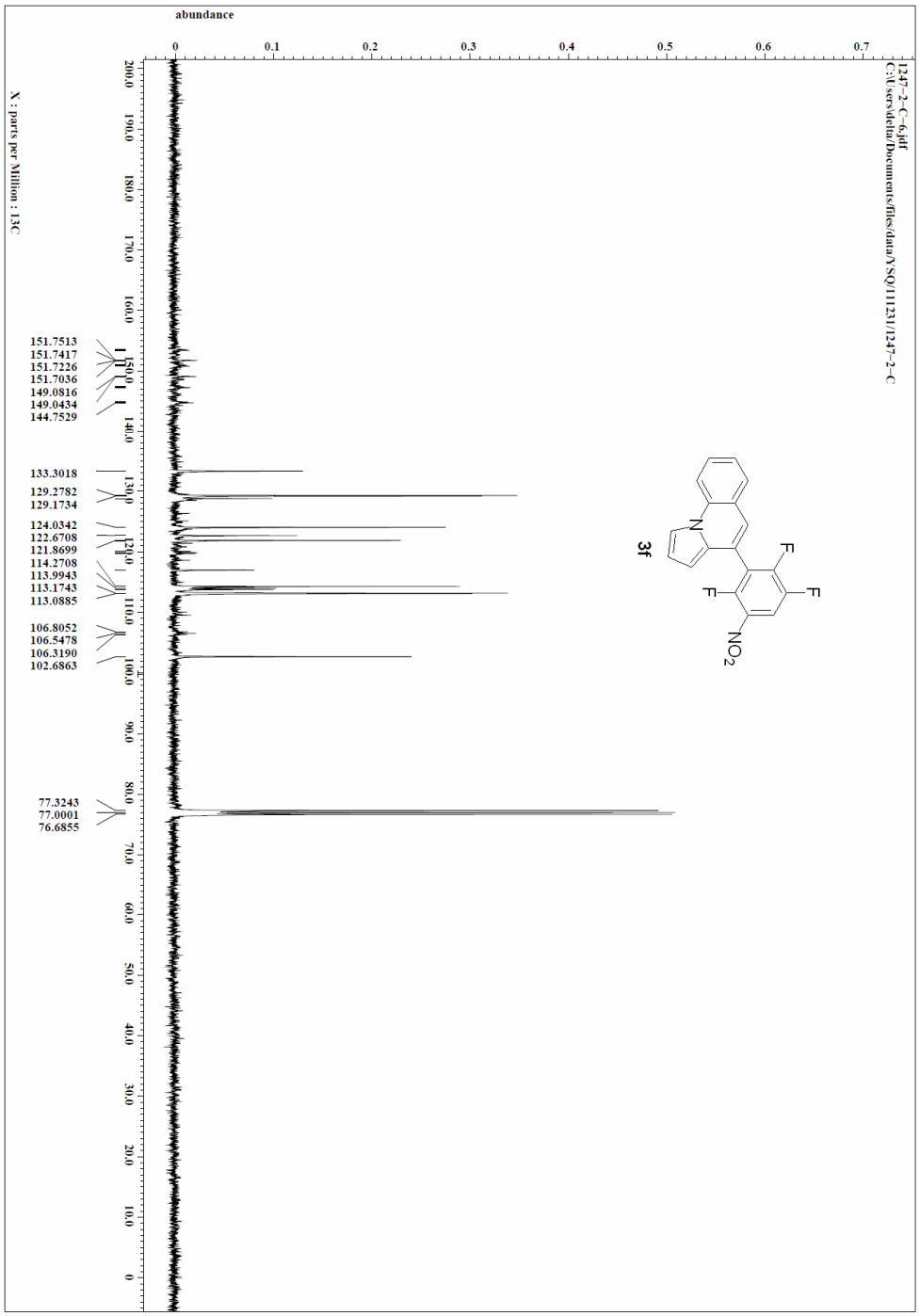
8.06
9.71
9.21
7.53
10.05
10
3f
F
F
F
NO2
N


abundance
X : parts per Million : 13C
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129.2782
129.1734
124.0342
122.6708
121.8699
114.2708
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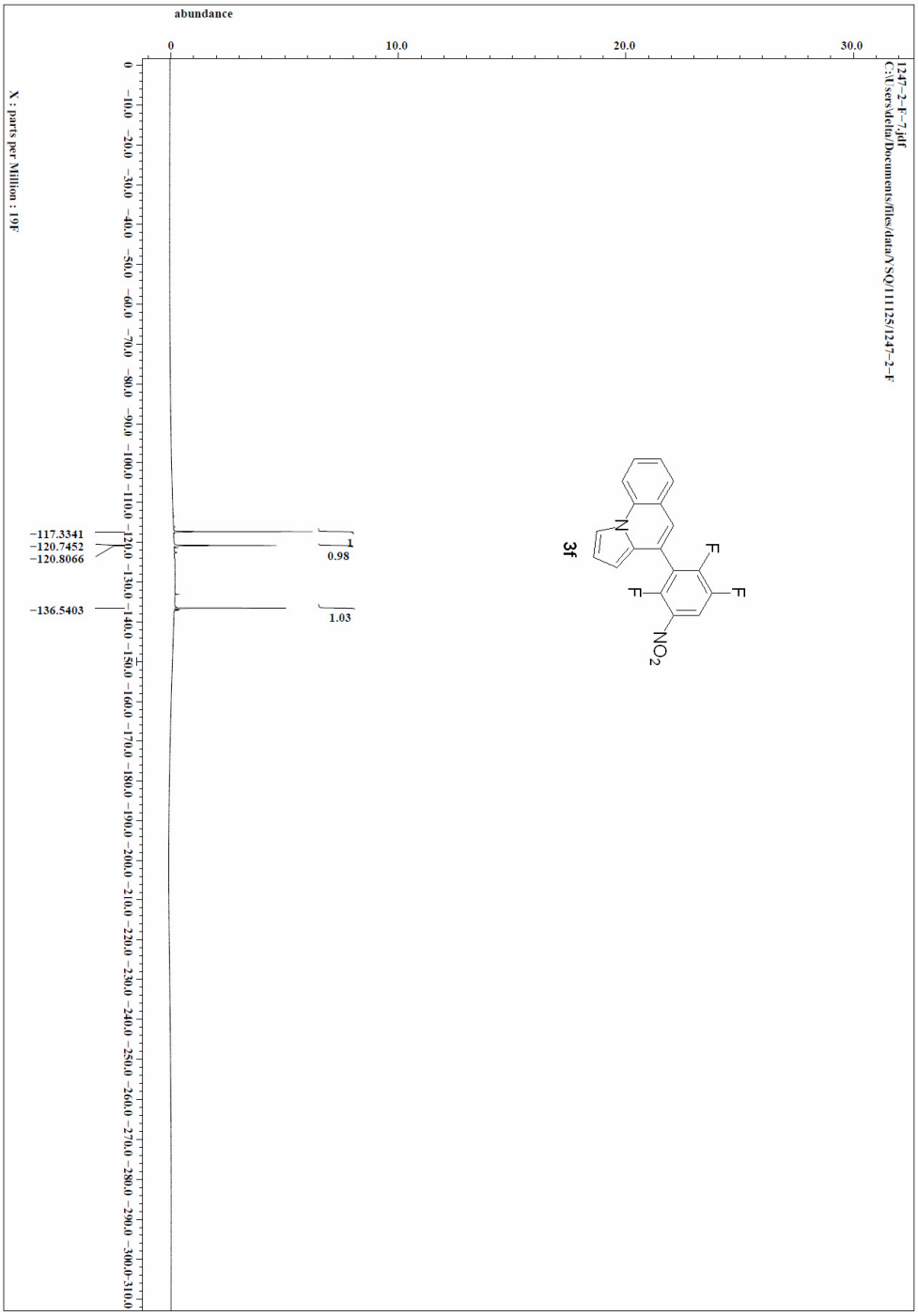
3f
F
F
F
NO2


abundance
0
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20.0
30.0
1247-2-F-7.jdf
C:\Users\dell\Documents\files\data\NSQ\111125\1247-2-F
X : parts per Million : 19F
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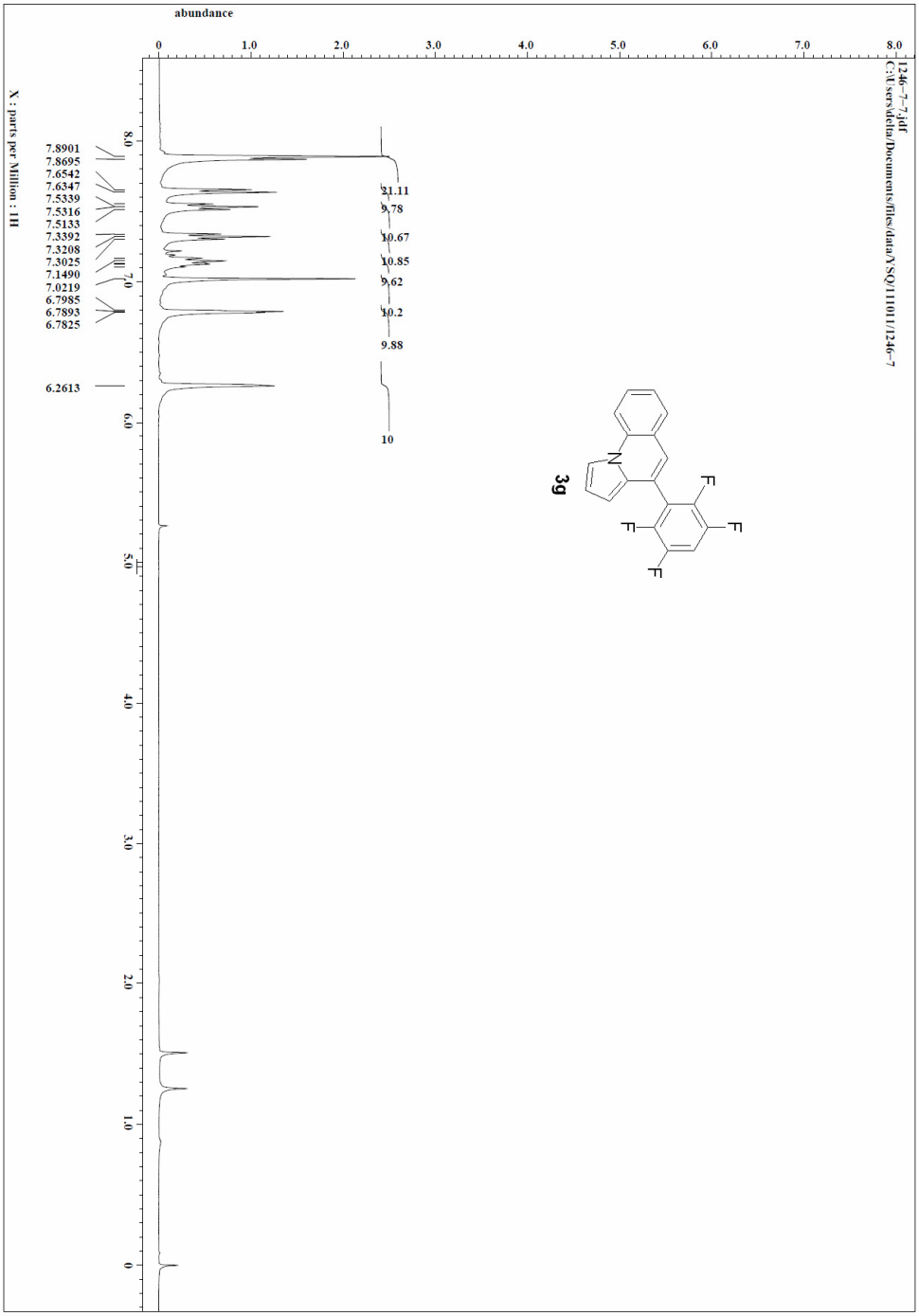
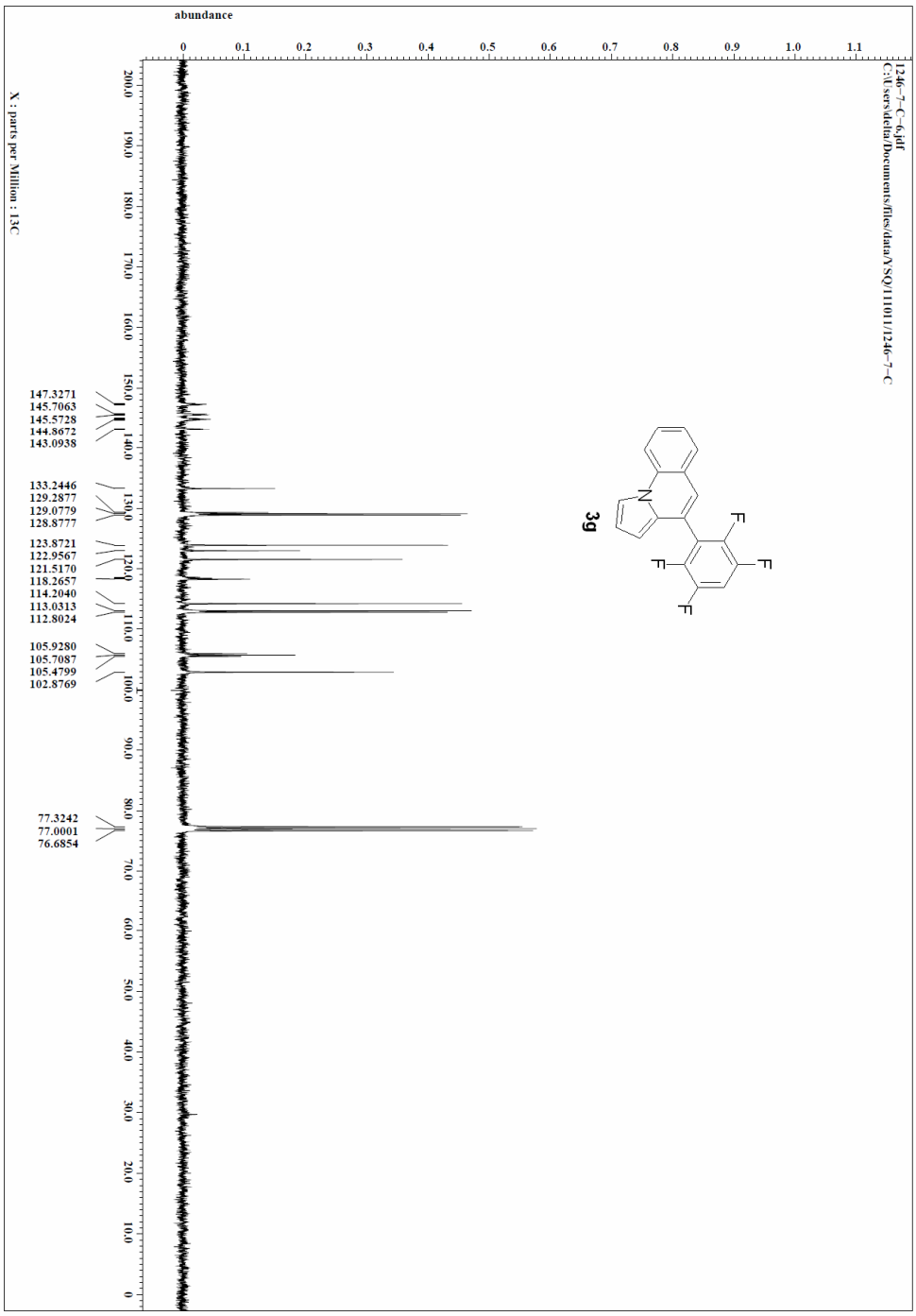
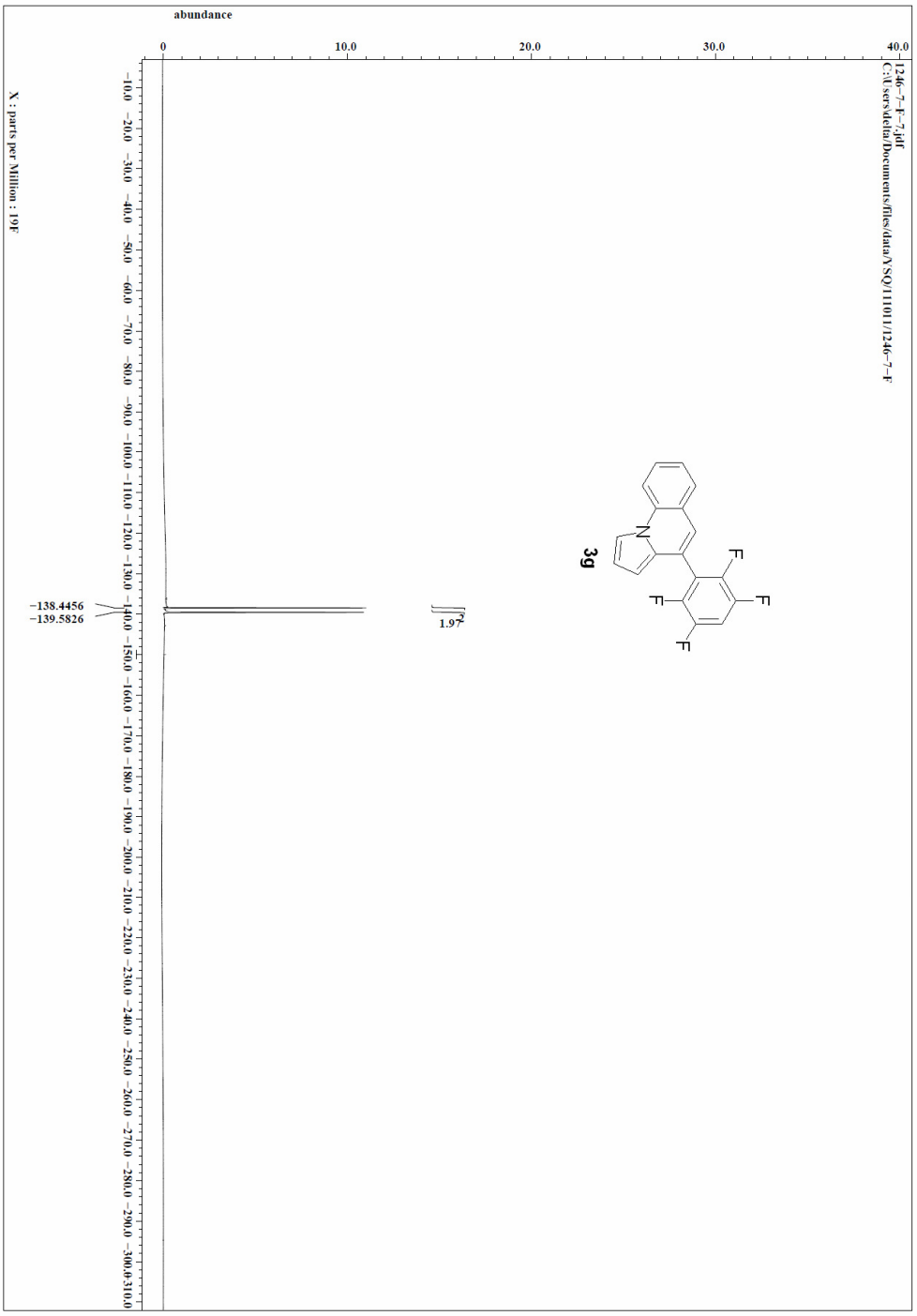
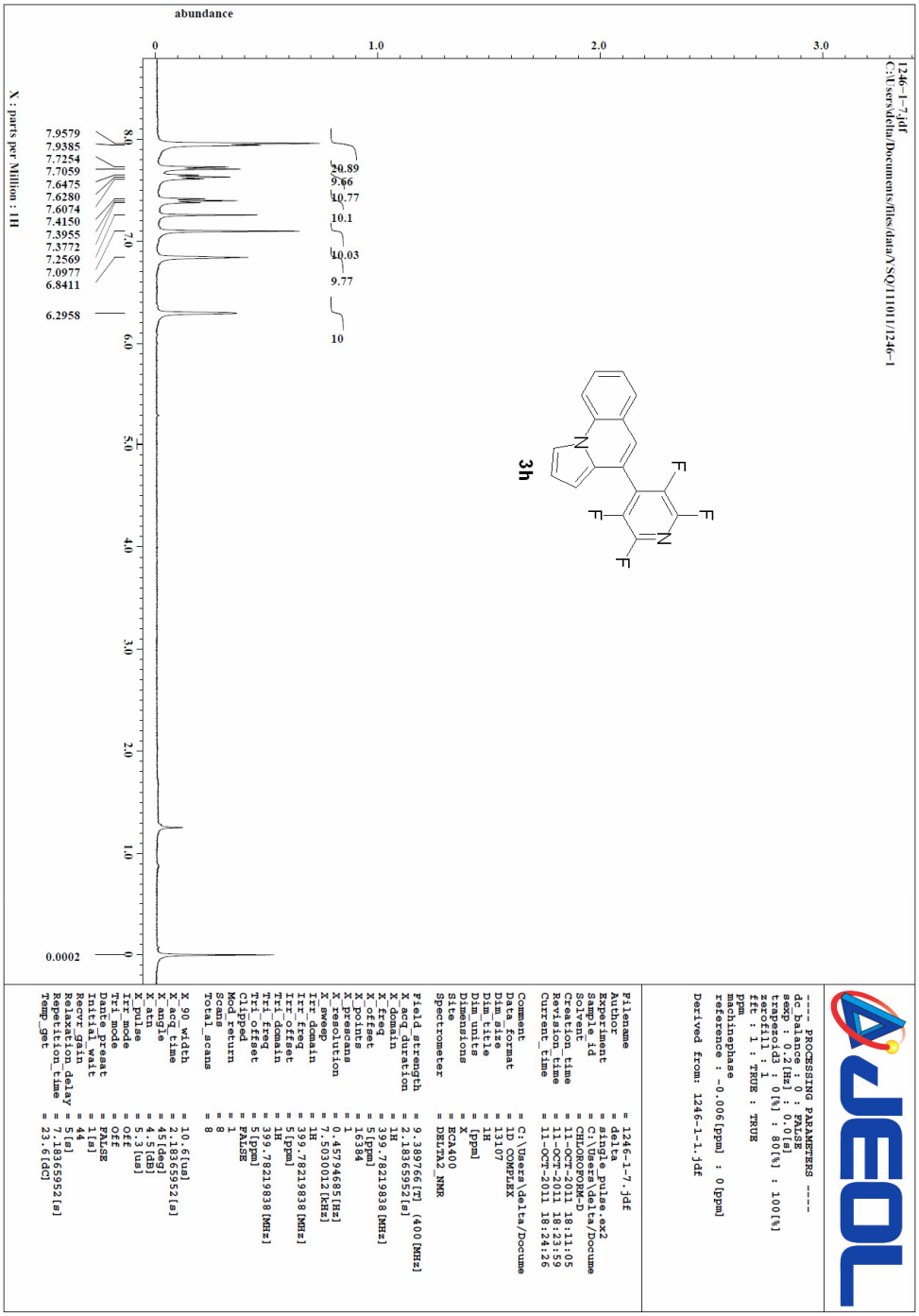
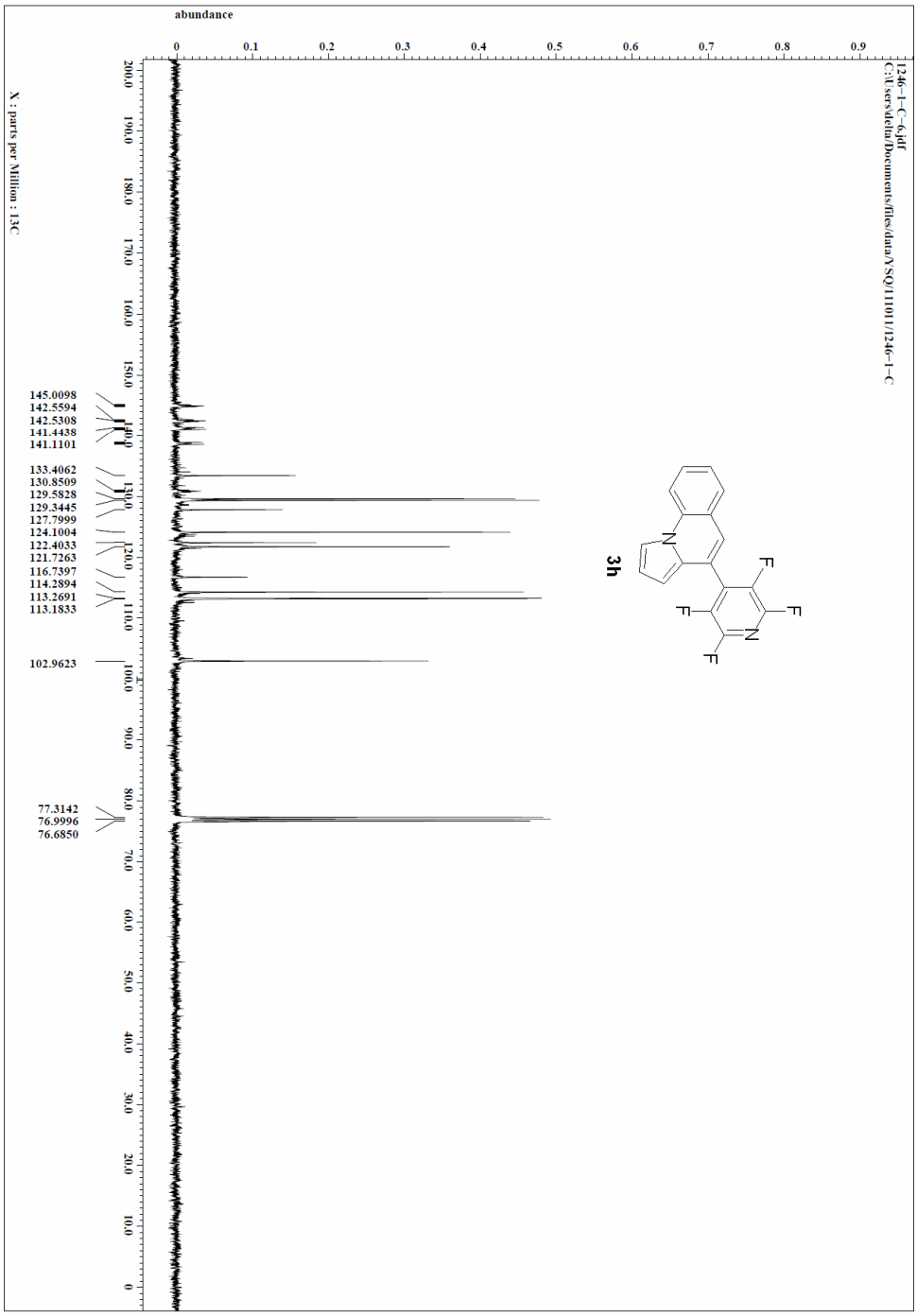
−120.7452
−120.8066
−136.5403
1
0.98
1.03
3f
F
F
F
NO2
N

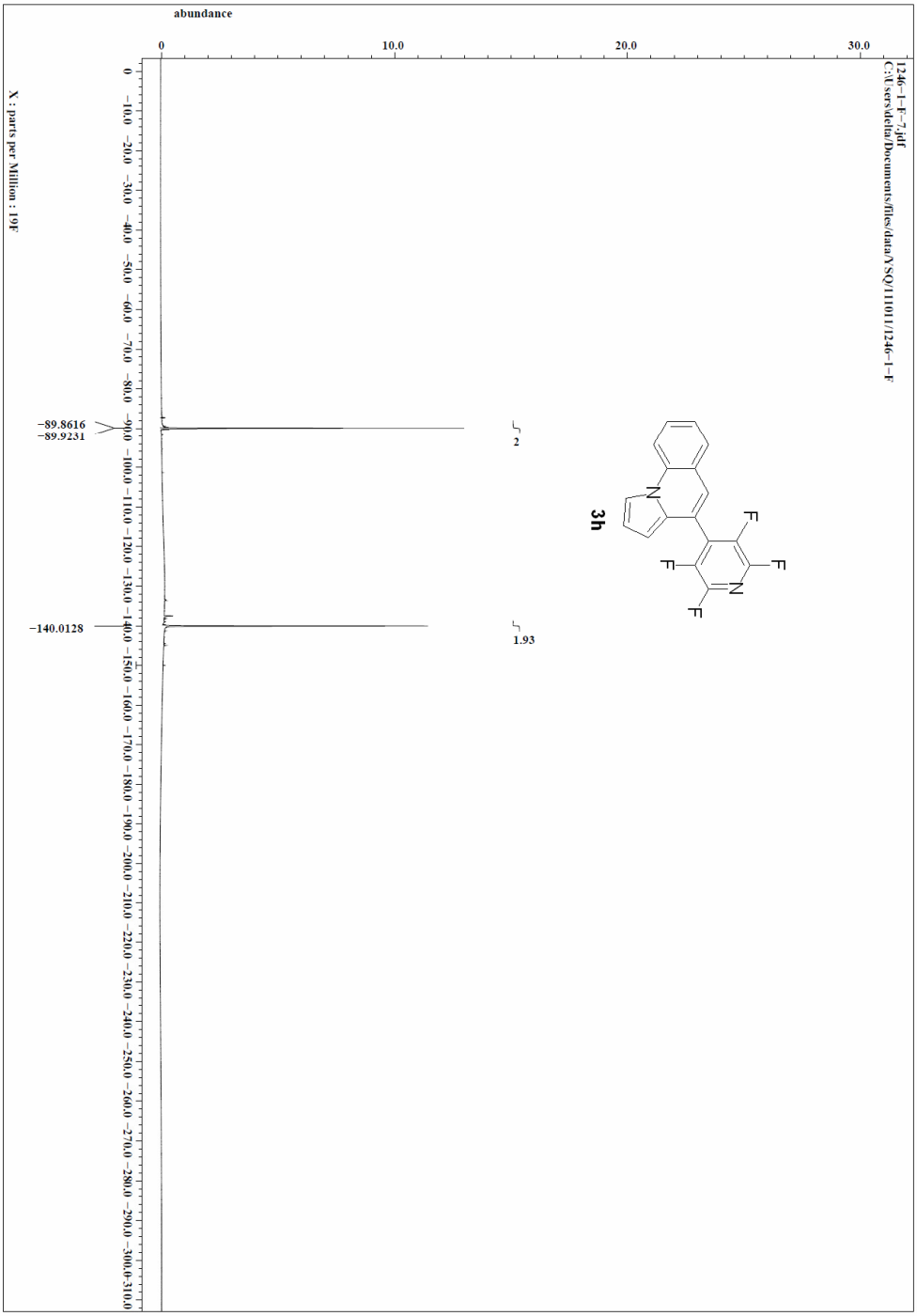

abundance
0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
1246-7-7.jdf
C:\Users\delia\Documents\files\data\YSQ\111011\1246-7
X : parts per Million : 1H
7.8901
7.8695
7.6542
7.6347
7.5339
7.5316
7.5133
7.3392
7.3208
7.3025
7.1490
7.0219
6.7985
6.7893
6.7825
6.2613
21.11
9.78
10.67
10.85
9.62
10.2
9.88
10
3g
F
F
F
F

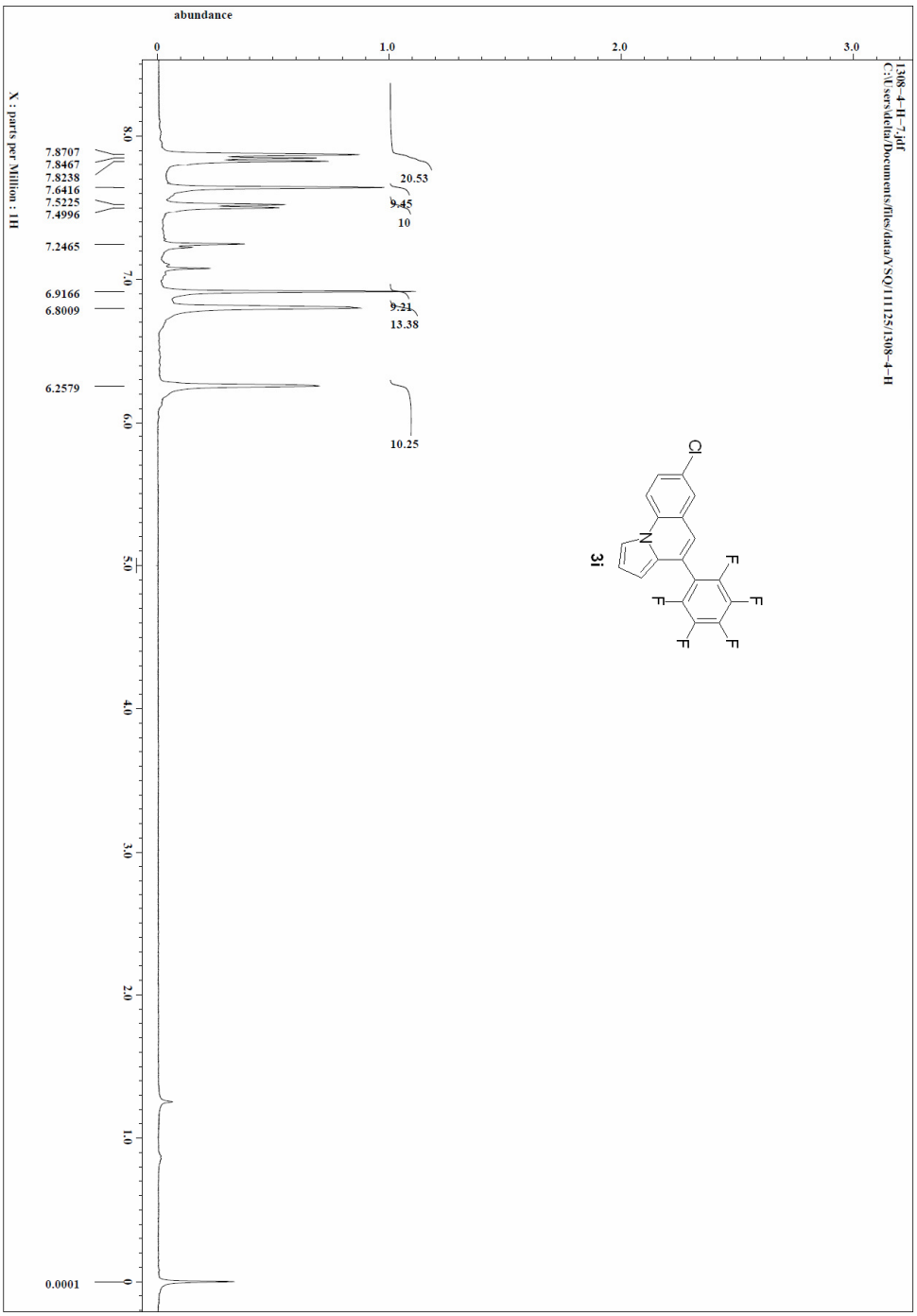

abundance
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1
1246--7--C--6.jdf
C:\Users\delia\Documents\files\data\YSQ\111011\1246--7--C
X : parts per Million : 13C
200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0
147.3271
145.7063
145.5728
144.8672
143.0938
133.2446
129.2877
129.0779
128.8777
123.8721
122.9567
121.5170
118.2657
114.2040
113.0313
112.8024
105.9280
105.7087
105.4799
102.8769
77.3242
77.0001
76.6854
3g
N
F
F
F
F

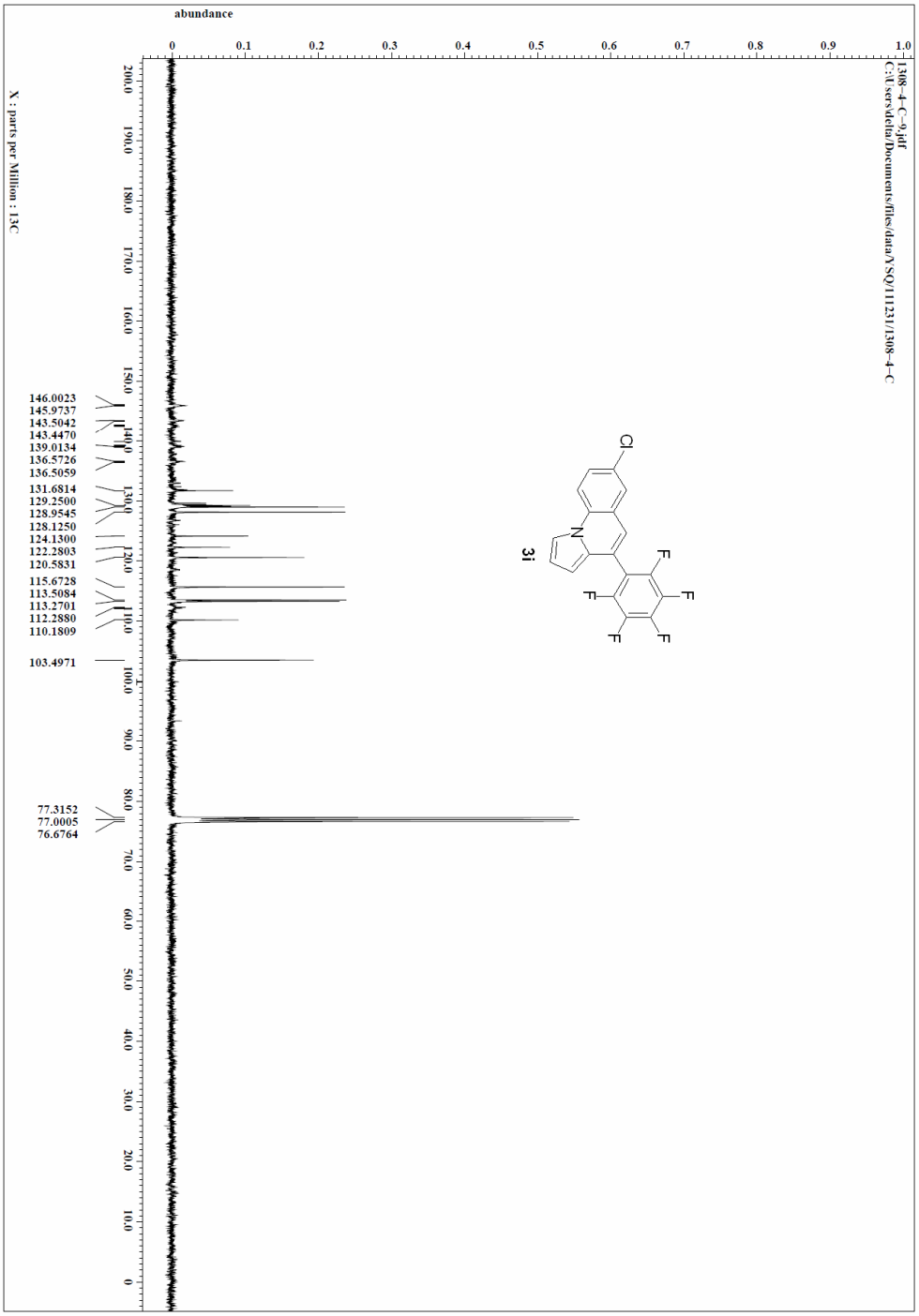

abundance
0
10.0
20.0
30.0
40.0
C:\Users\delia\Documents\files\data\YSQ\11101\1246-7-F_7.jdf
1246-7-F--7.jdf
X : parts per Million : 19F
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
-110.0
-120.0
-130.0
-140.0
-150.0
-160.0
-170.0
-180.0
-190.0
-200.0
-210.0
-220.0
-230.0
-240.0
-250.0
-260.0
-270.0
-280.0
-290.0
-300.0
-310.0
-138.4456
-139.5826
1.97
3g
N
F
F
F
F

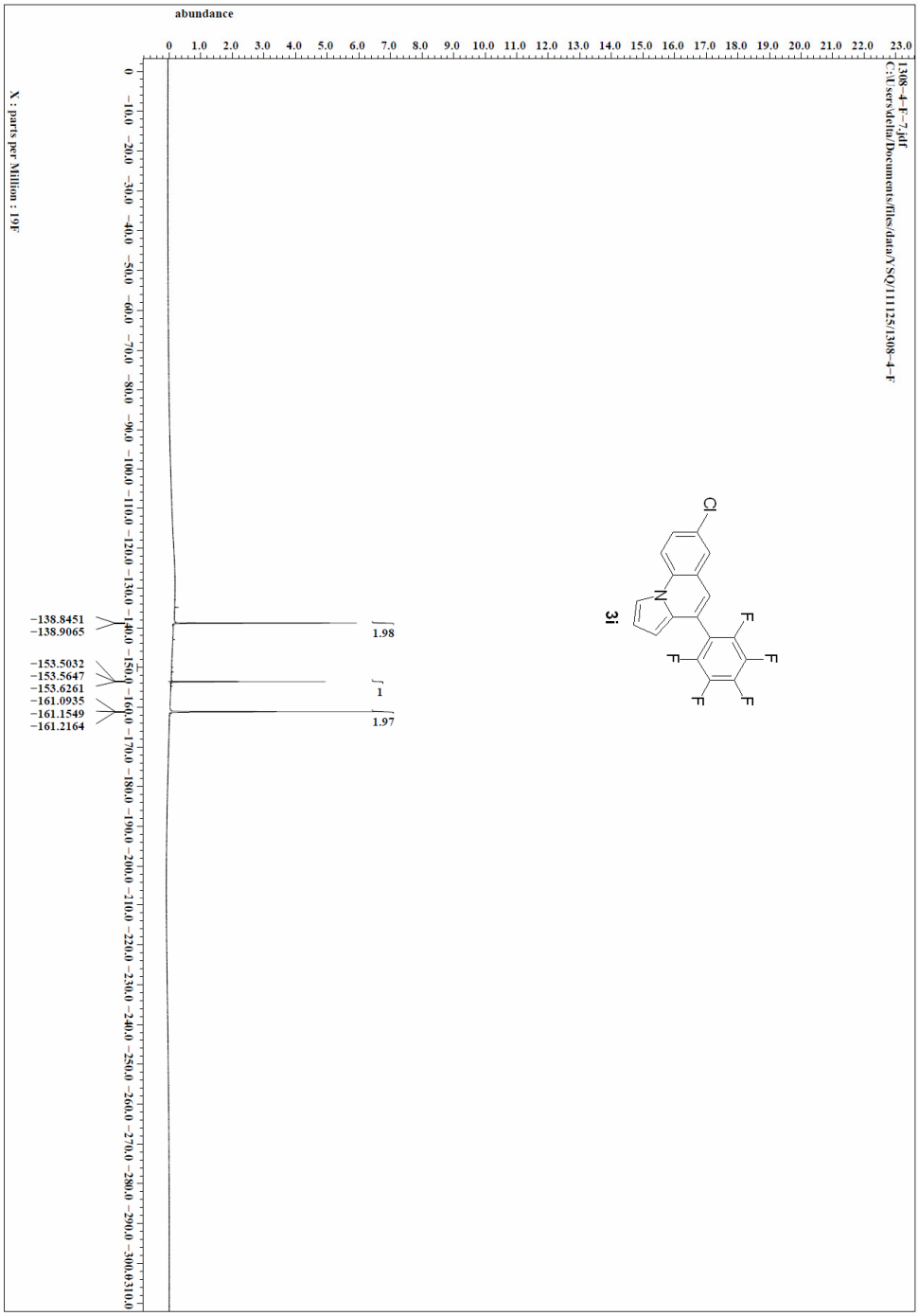

abundance
X : parts per Million : 1H
7.9579
7.9385
7.7254
7.7059
7.6475
7.6280
7.6074
7.4150
7.3955
7.3772
7.2569
7.0977
6.8411
6.2958
0.0002
20.89
9.66
10.77
10.1
10.03
9.77
10
3h
1246-1-7.jdf
C:\Users\delta\Documents\files\data\YSQ\11001\1246-1
JEOL
---- PROCESSING PARAMETERS ----
dc_balance : 0 : FALSE
expo : 0 : 0.0[s]
gaussian : 0 [%] : 80[%] : 100[%]
zerofill : 1
fft : 1 : TRUE : TRUE
ppm
machinephase
reference : -0.006[ppm] : 0[ppm]
Derived from: 1246-1-1.jdf
Filename = 1246-1-7.jdf
Author = delta
Experiment = single_pulse_ex2
Sample_id = C:\Users\delta\Docume
Solvent = CHLOROFORM-D
Creation_time = 11-OCT-2011 18:11:05
Revision_time = 11-OCT-2011 18:23:59
Current_time = 11-OCT-2011 18:24:26
Comment = C:\Users\delta\Docume
Data_format = JEOL_COMPLEX
Dim_size = 13107
Dim_title = 1H
Dim_units = [ppm]
Dimensions = X
Site = RCA400
Spectrometer = DELTA2_NMR
Field_strength = 9.389766[T] (400[MHz]
X_acq_duration = 2.18365952[s]
X_domain = 1H
X_freq = 399.78219838[MHz]
X_offset = 5[ppm]
X_points = 16384
X_prescans = 1
X_resolution = 0.45794685[Hz]
X_sweep = 7.5030012[kHz]
Irr_domain = 1H
Irr_freq = 399.78219838[MHz]
Irr_offset = 5[ppm]
Tri_domain = 1H
Tri_freq = 399.78219838[MHz]
Tri_offset = 5[ppm]
Clipped = FALSE
Mod_return = 0
Scans = 8
Total_scans = 8
X_90_width = 10.6[us]
X_acq_time = 2.183659552[s]
X_angle = 45[deg]
X_atn = 4.5[dB]
X_pulse = 5.3[us]
Tri_mode = off
Tri_power = off
Dante_preset = FALSE
Initial_wait = 1[s]
Recvr_gain = 44
Relaxation_delay = 5[s]
Repetition_time = 7.183659552[s]
Temp_get = 23.6[dC]

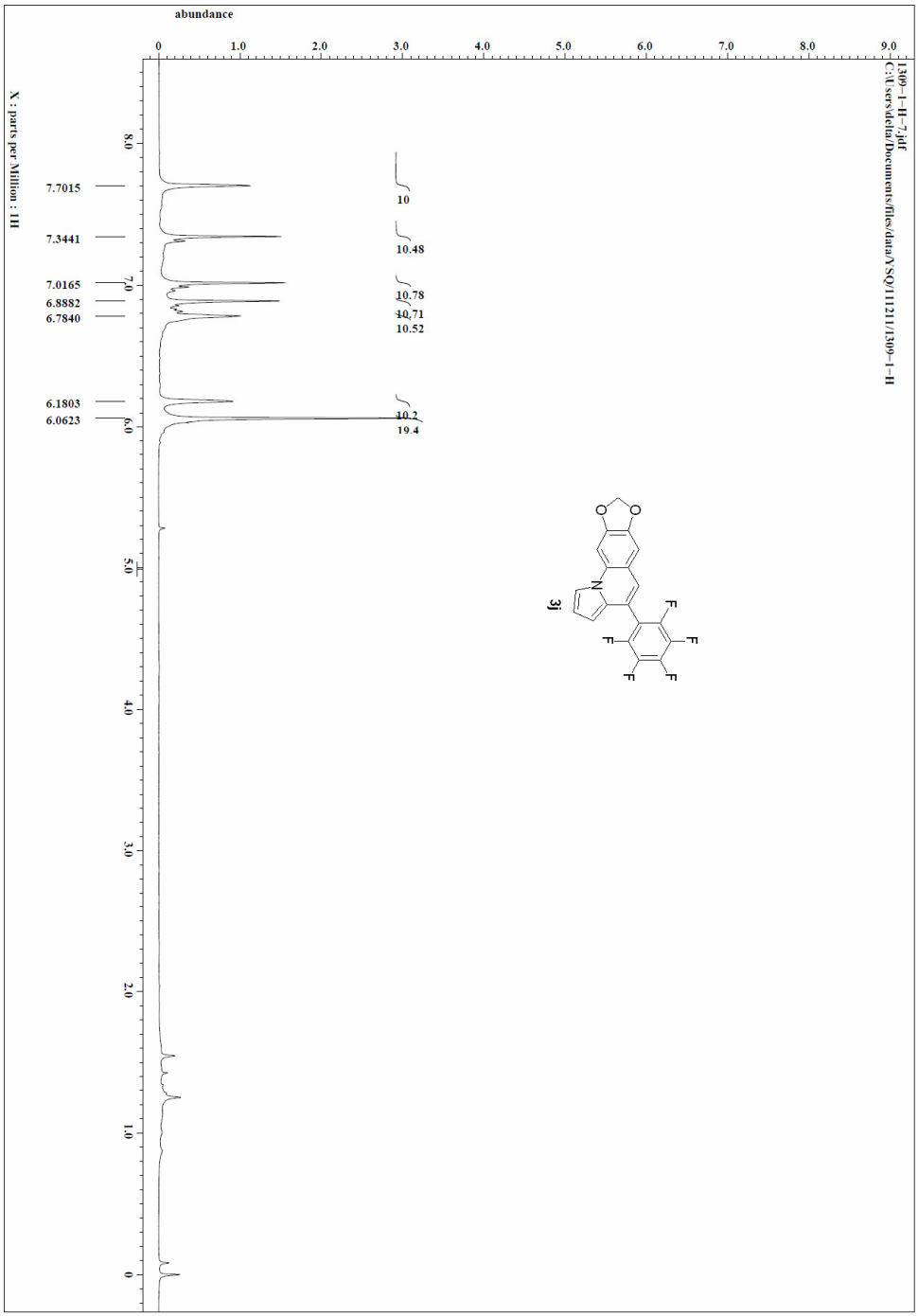

abundance
X : parts per Million : 13C
C:\Users\delia\Documents\files\data\YSQ\111011\1246-1-C
145.0098
142.5594
142.5308
141.4438
141.1101
133.4062
130.8509
129.5828
129.3445
127.7999
124.1004
122.4033
121.7263
116.7397
114.2894
113.2691
113.1833
102.9623
77.3142
76.9996
76.6850
3h

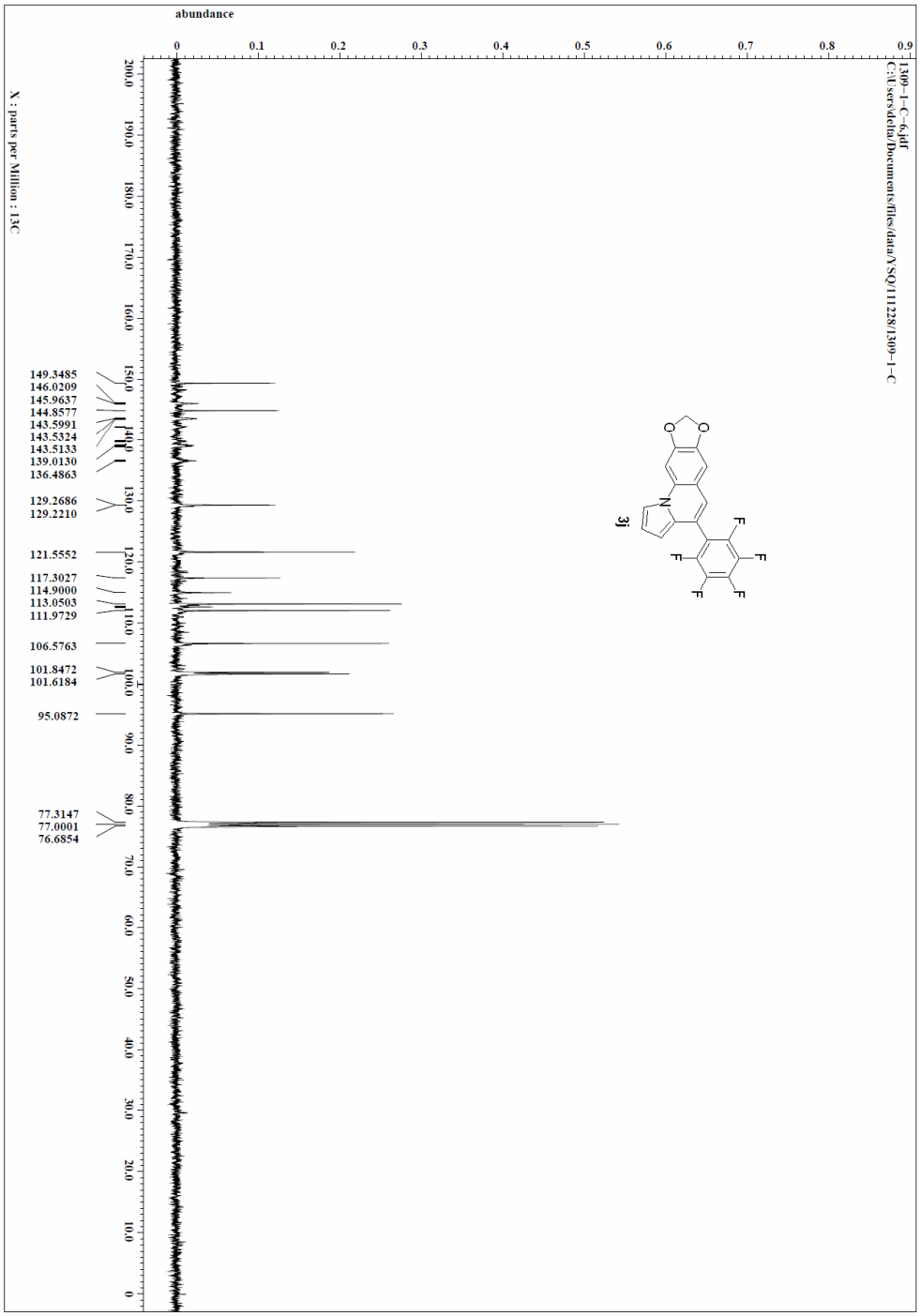

abundance
0
10.0
20.0
30.0
1246-1-F-7.jdf
C:\Users\dela\Documents\files\data\YSQ\11011\1246-1-F
X : parts per Million : 19F
−89.8616
−89.9231
2
−140.0128
1.93
3h
F
F
F
N
N

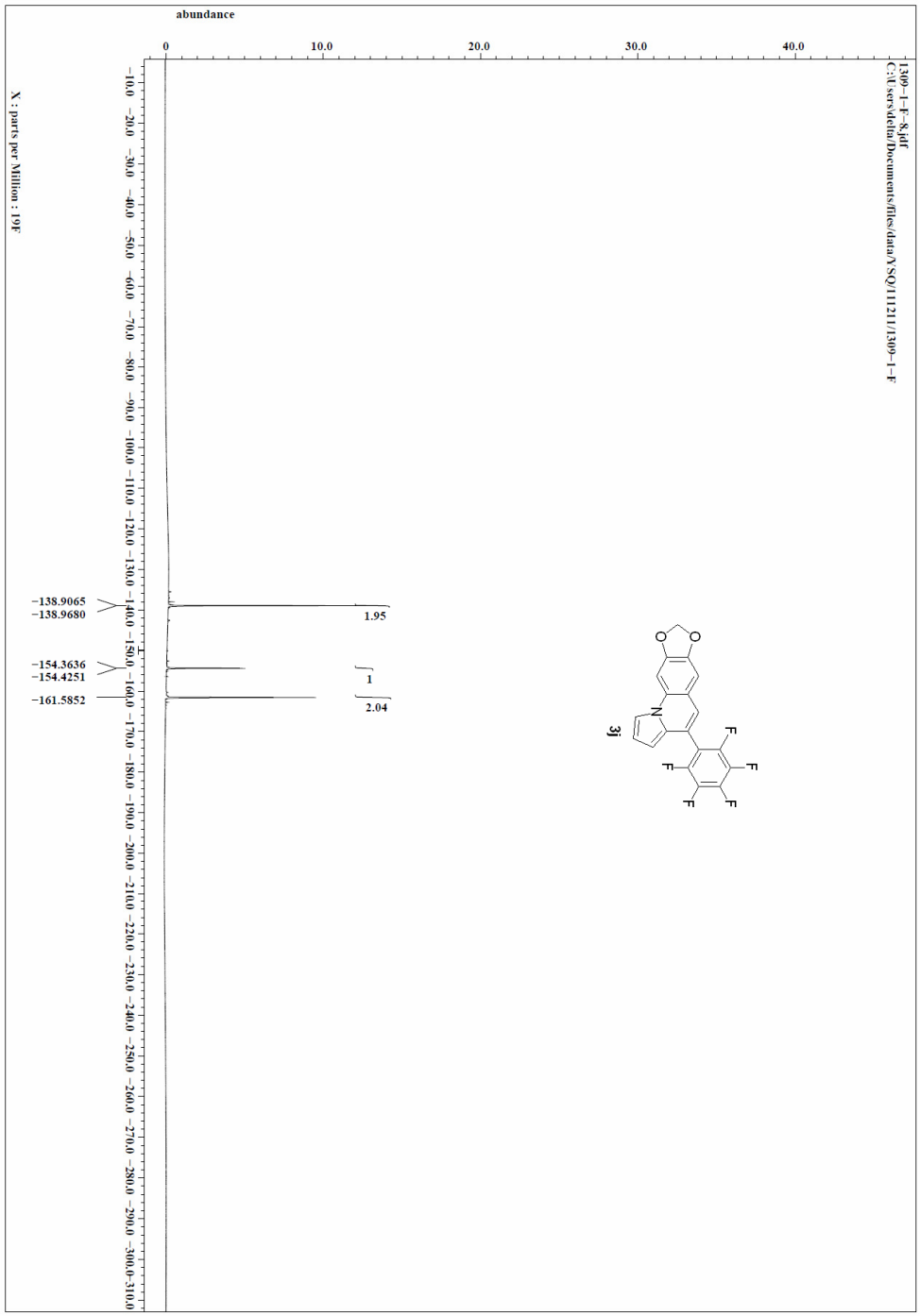

abundance
0
1.0
2.0
3.0
X : parts per Million : 1H
7.8707
7.8467
7.8238
7.6416
7.5225
7.4996
7.2465
6.9166
6.8009
6.2579
0.0001
20.53
9.45
10
9.21
13.38
10.25
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
1308-4-H-7.jdf
C:\Users\delta\Documents\files\data\YSQ\111125\1308-4-H
31
Cl
N
F
F
F
F
F

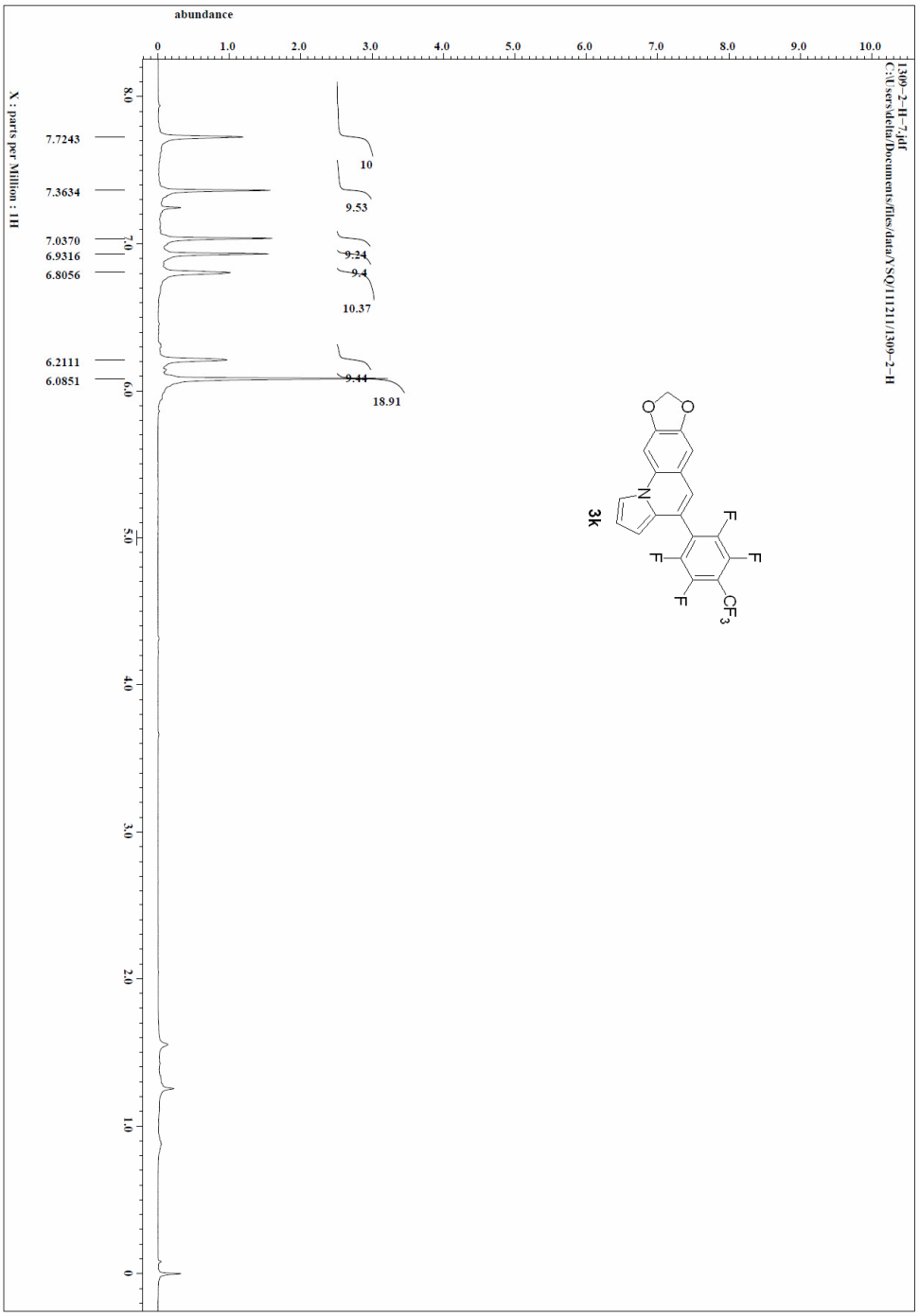

abundance
X : parts per Million : 13C
1308-4-C--9.jdf
C:\Users\delta\Documents\files\data\YSQ\111231\1308-4-C
146.0023
145.9737
143.5042
143.4470
139.0134
136.5726
136.5059
131.6814
129.2500
128.9545
128.1250
124.1300
122.2803
120.5831
115.6728
113.5084
113.2701
112.2880
110.1809
103.4971
77.3152
77.0005
76.6764
3i

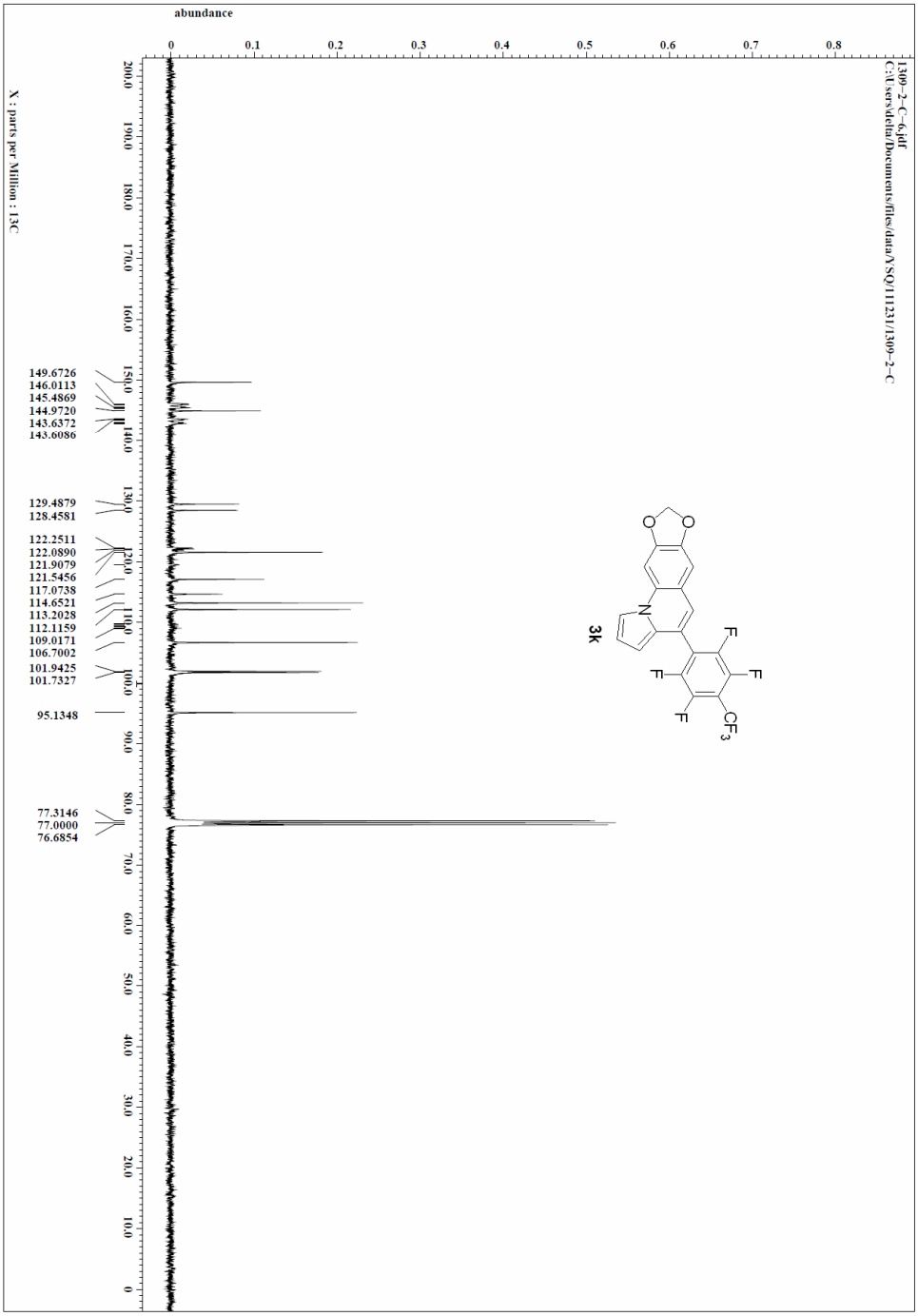

abundance
X : parts per Million : 19F
C:\Users\delia\Documents\files\data\YSQ\111125\1308-4-F_7.jdf
1308-4-F_7.jdf
-138.8451
-138.9065
-153.5032
-153.5647
-153.6261
-161.0935
-161.1549
-161.2164
1.98
1
1.97
3i
Cl
N
F
F
F
F
F

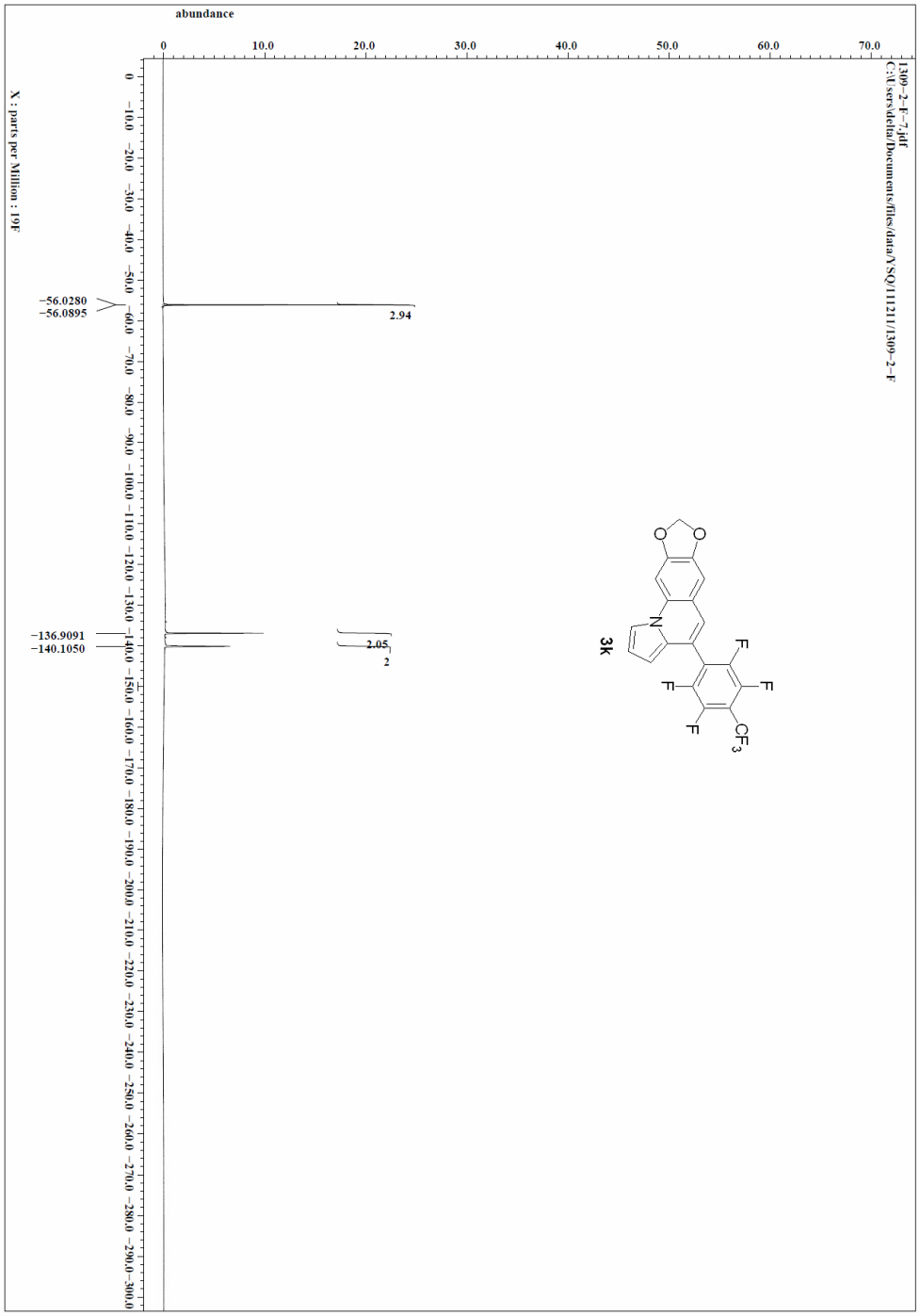

abundance
X : parts per Million : 1H
C:\Users\delia\Documents\files\data\SQ\111211\1309-1-H
1309-1-H-7.jdf
7.7015
7.3441
7.0165
6.8882
6.7840
6.1803
6.0623
10
10.48
10.78
10.71
10.52
10.2
19.4
3j

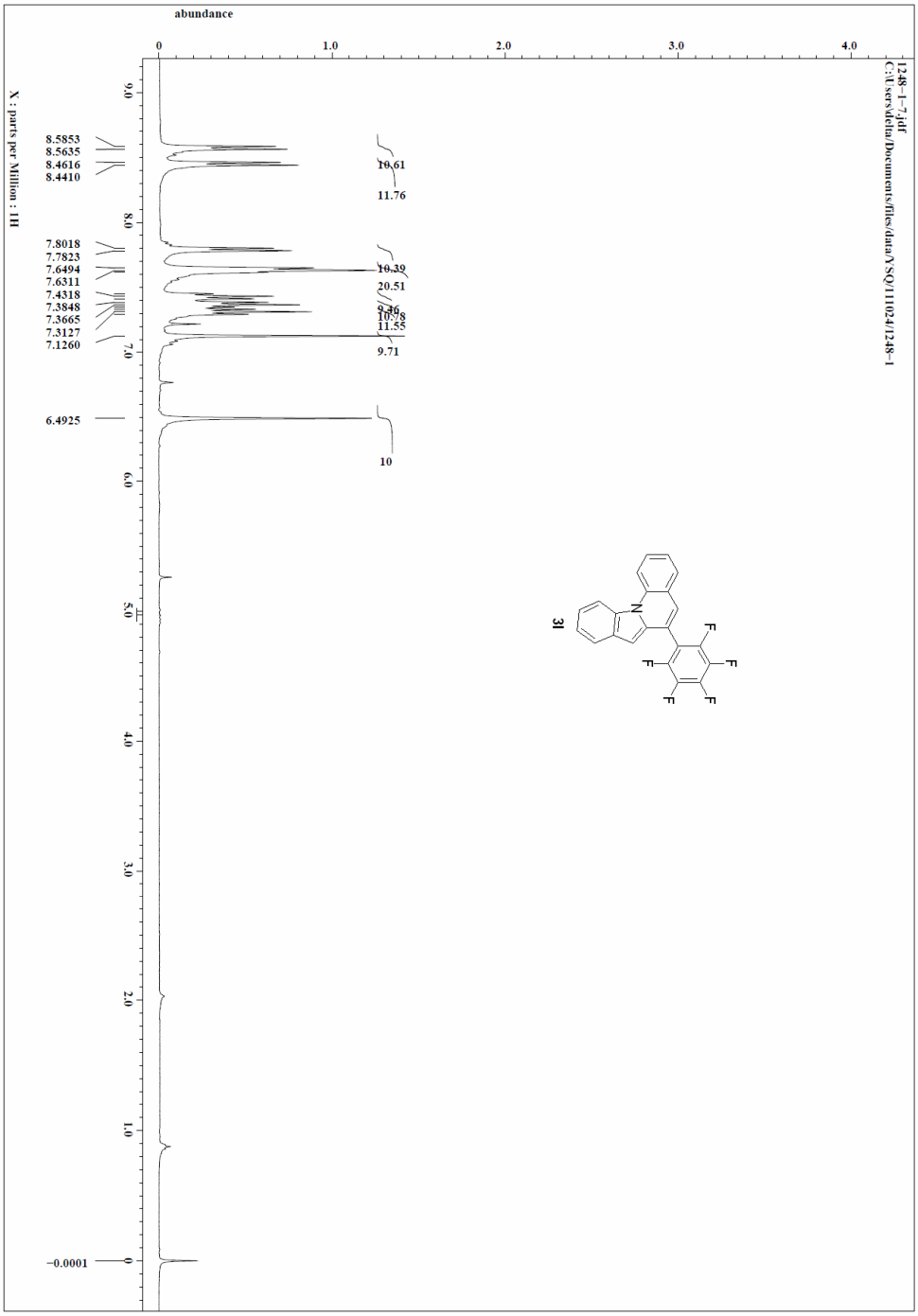

abundance
X : parts per Million : 13C
1309-1-C--6.jdf
C:\Users\delta\Documents\files\data\YSQ\111228\1309-1-C
149.3485
146.0209
145.9637
144.8577
143.5991
143.5324
143.5133
139.0130
136.4863
129.2686
129.2210
121.5552
117.3027
114.9000
113.0503
111.9729
106.5763
101.8472
101.6184
95.0872
77.3147
77.0001
76.6854
3j

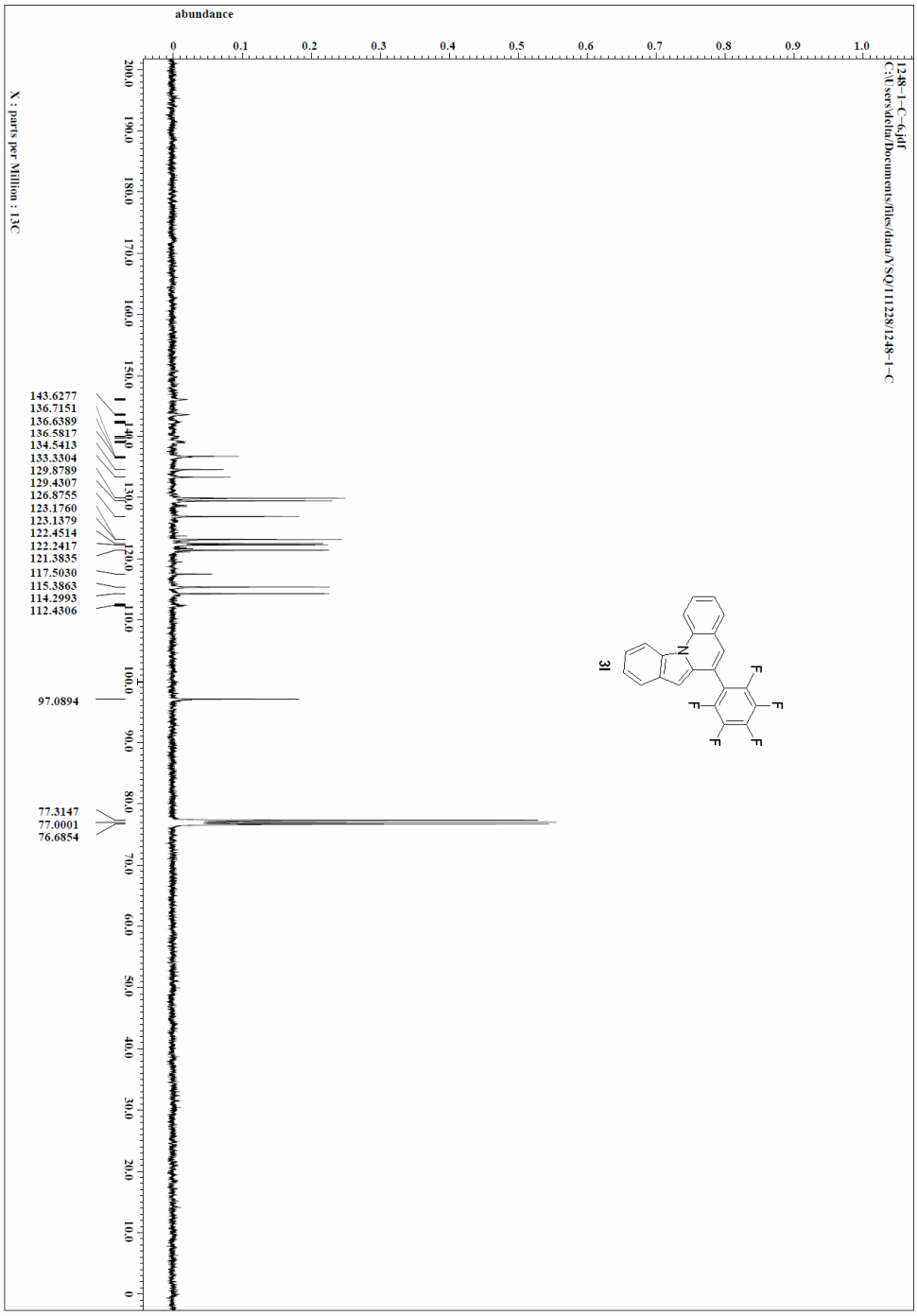

abundance
0
10.0
20.0
30.0
40.0
C:\Users\delta\Documents\files\data\YSQ\11121\1309-1-F
1309-1-F-8.jdf
X : parts per Million : 19F
-138.9065
-138.9680
1.95
-154.3636
-154.4251
1
-161.5852
2.04
3j
F
F
F
F
F
O
O
N

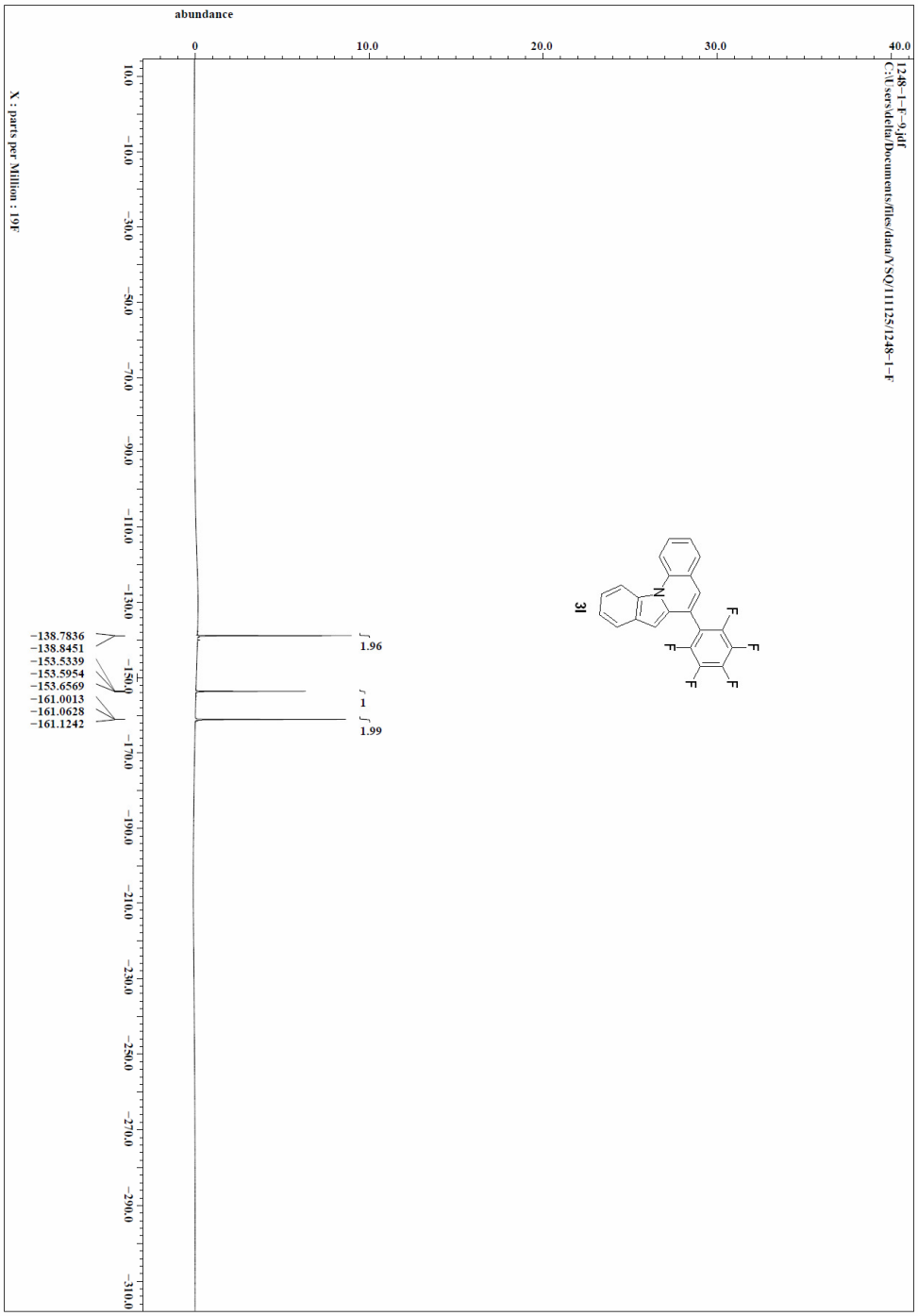

abundance
X : parts per Million : 1H
7.7243
7.3634
7.0370
6.9316
6.8056
6.2111
6.0851
10
9.53
9.24
9.4
10.37
9.44
18.91
3k
F
F
F
F
CF3
C:\Users\delia\Documents\files\data\YSQ\111211\1309-2-H
1309-2-H-7.jdf

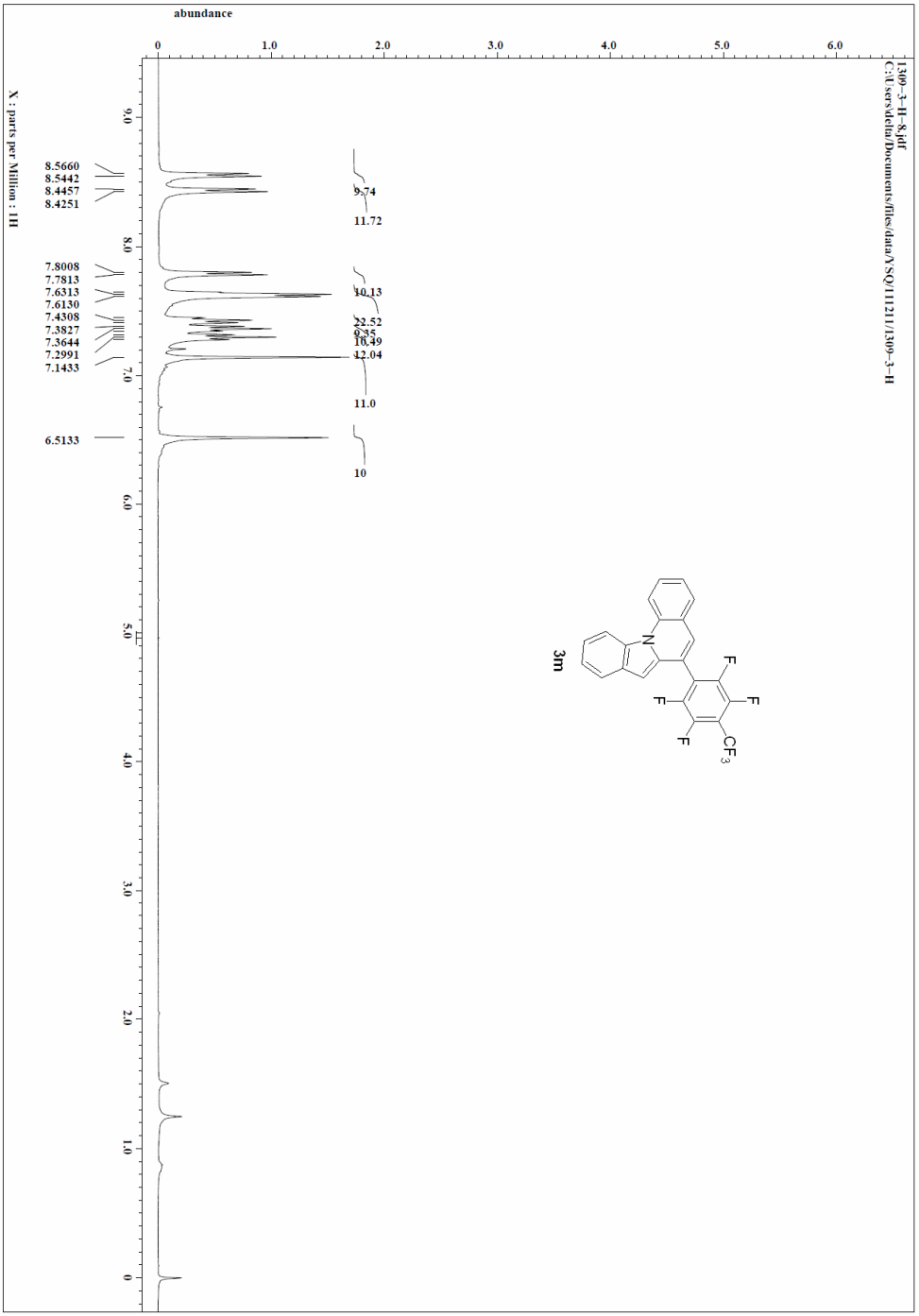

abundance
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
1309-2-C-6.jdf
C:\Users\delta\Documents\files\data\YSQ\111231\1309-2-C
X : parts per Million : 13C
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
149.6726
146.0113
145.4869
144.9720
143.6372
143.6086
129.4879
128.4581
122.2511
122.0890
121.9079
121.5456
117.0738
114.6521
113.2028
112.1159
109.0171
106.7002
101.9425
101.7327
95.1348
77.3146
77.0000
76.6854
3k
O
O
N
F
F
F
F
CF3

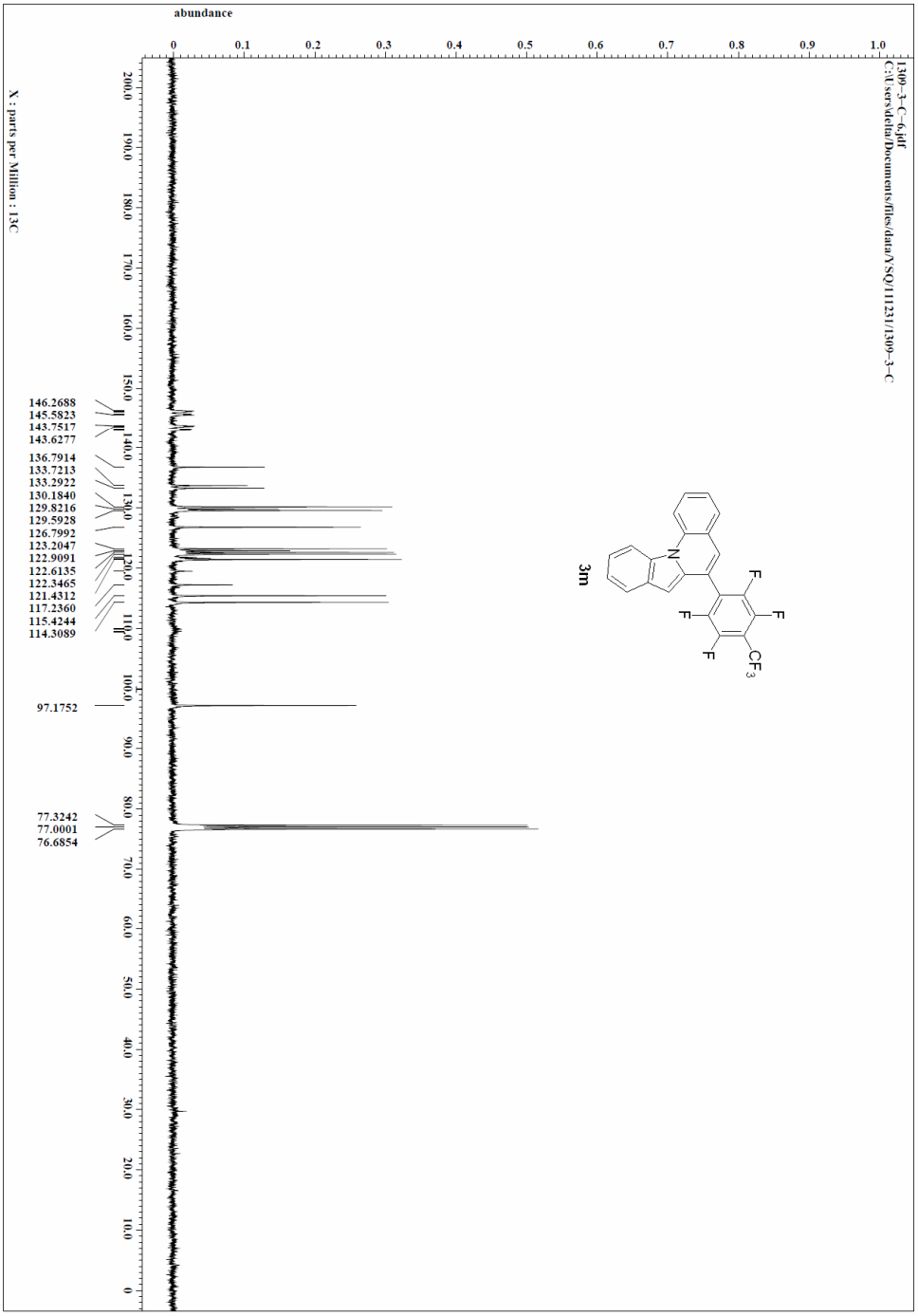

abundance
0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
1309-2-F-7.pdf
C:\Users\delta\Documents\files\data\YSQ\11121\1309-2-F
X : parts per Million : 19F
−56.0280
−56.0895
2.94
−136.9091
−140.1050
2.05
2
3k
F
F
F
F
CF3
N
O
O

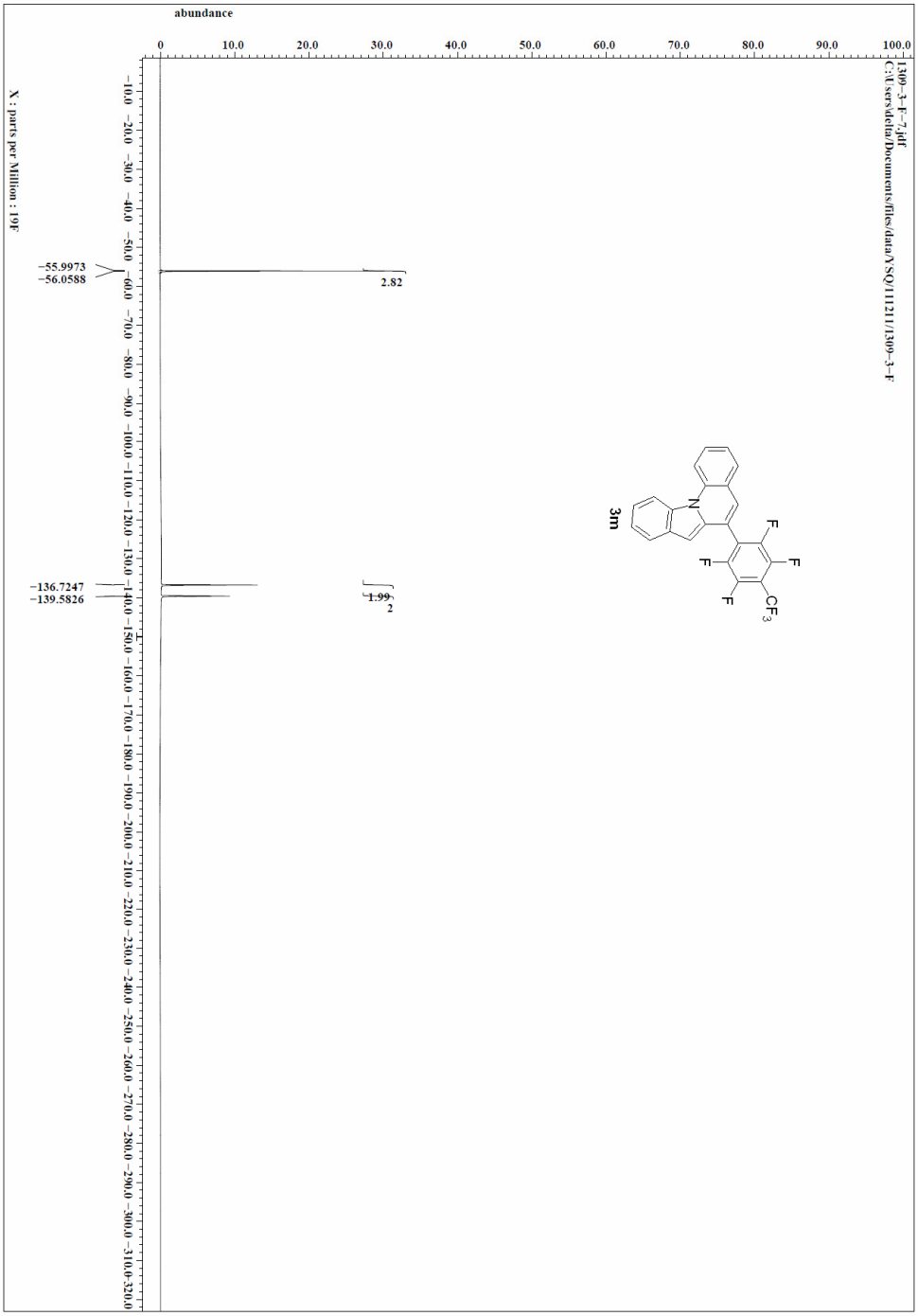

abundance
X : parts per Million : 1H
C:\Users\delta\Documents\files\data\YSQ\11024\1248-1
1248-1-7.jdf
8.5853
8.5635
8.4616
8.4410
7.8018
7.7823
7.6494
7.6311
7.4318
7.3848
7.3665
7.3127
7.1260
6.4925
−0.0001
10.61
11.76
10.39
20.51
9.46
10.78
11.55
9.71
10
3l
F
F
F
F
F

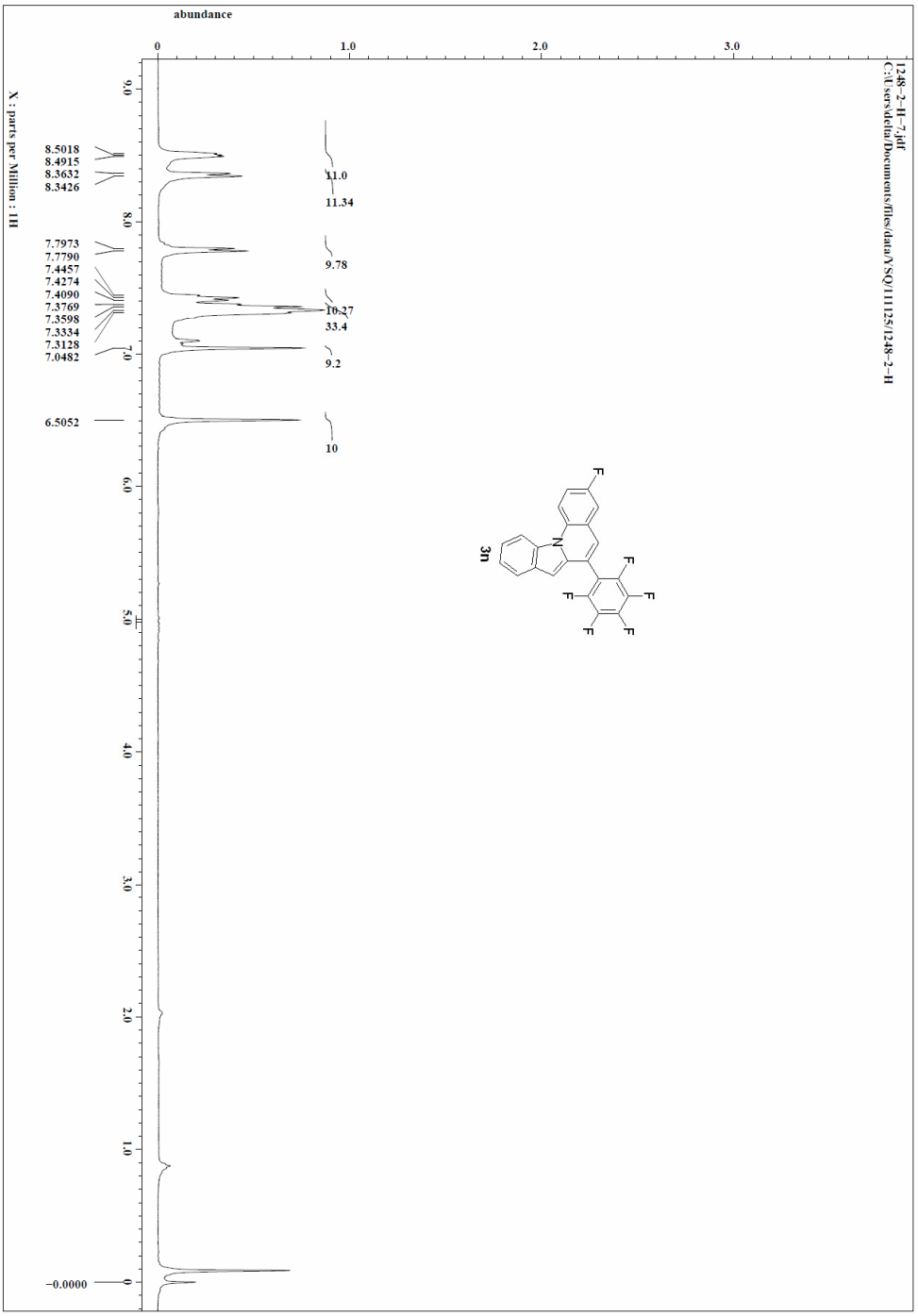

abundance
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1248-1-C-6.jdf
C:\Users\defia\Documents\flits\data\NSQ\111228\1248-1-C
X : parts per Million : 13C
143.6277
136.7151
136.6389
136.5817
134.5413
133.3304
129.8789
129.4307
126.8755
123.1760
123.1379
122.4514
122.2417
121.3835
117.5030
115.3863
114.2993
112.4306
97.0894
77.3147
77.0001
76.6854
31
N
F
F
F
F
F

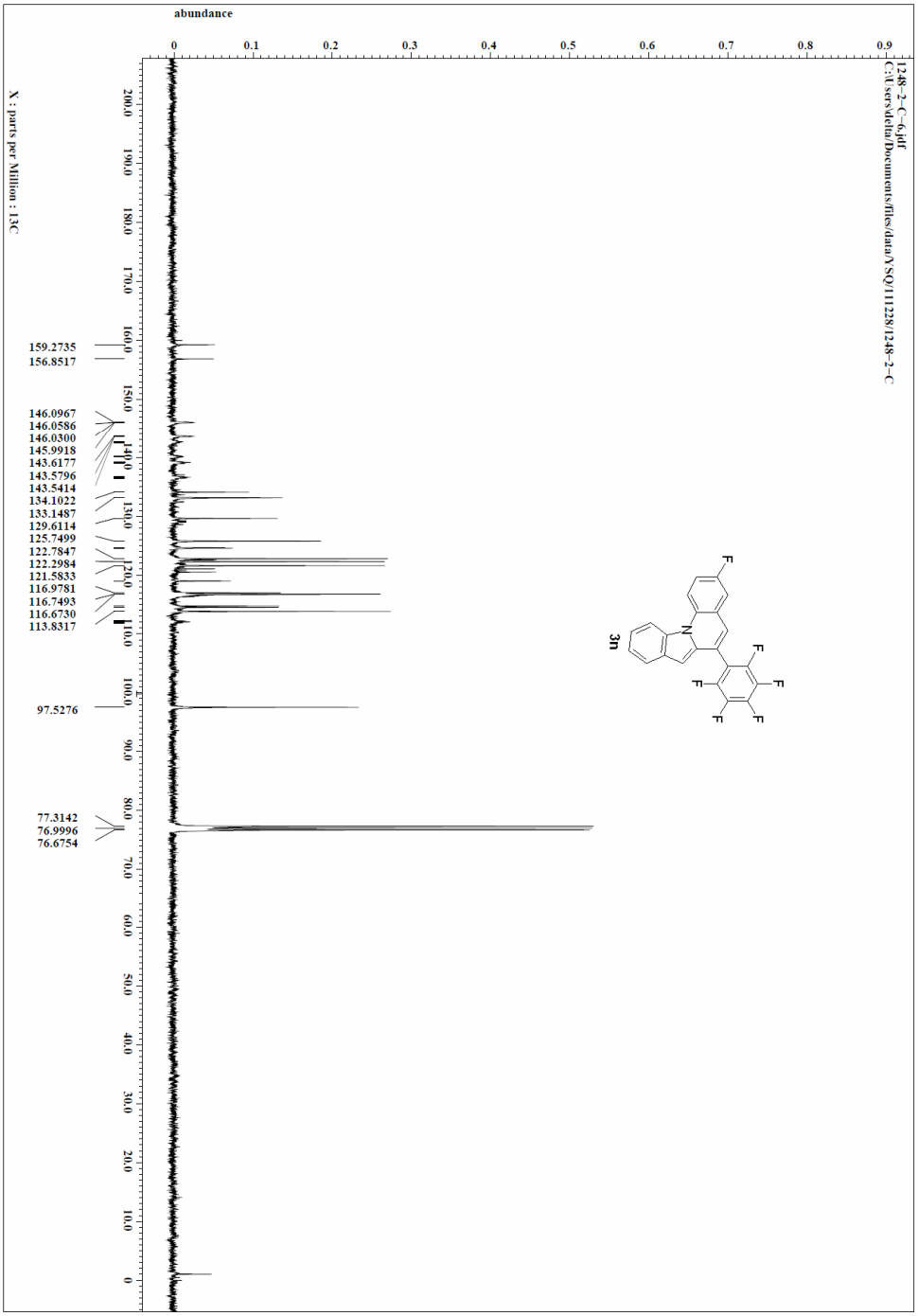

abundance
0
10.0
20.0
30.0
40.0
X : parts per Million : 19F
10.0
-10.0
-30.0
-50.0
-70.0
-90.0
-110.0
-130.0
-150.0
-170.0
-190.0
-210.0
-230.0
-250.0
-270.0
-290.0
-310.0
-138.7836
-138.8451
-153.5339
-153.5954
-153.6569
-161.0013
-161.0628
-161.1242
1.96
1
1.99
1248-1-F-9.jdf
C:\Users\delta\Documents\files\data\YSQ\111125\1248-1-F
31
N
F
F
F
F
F

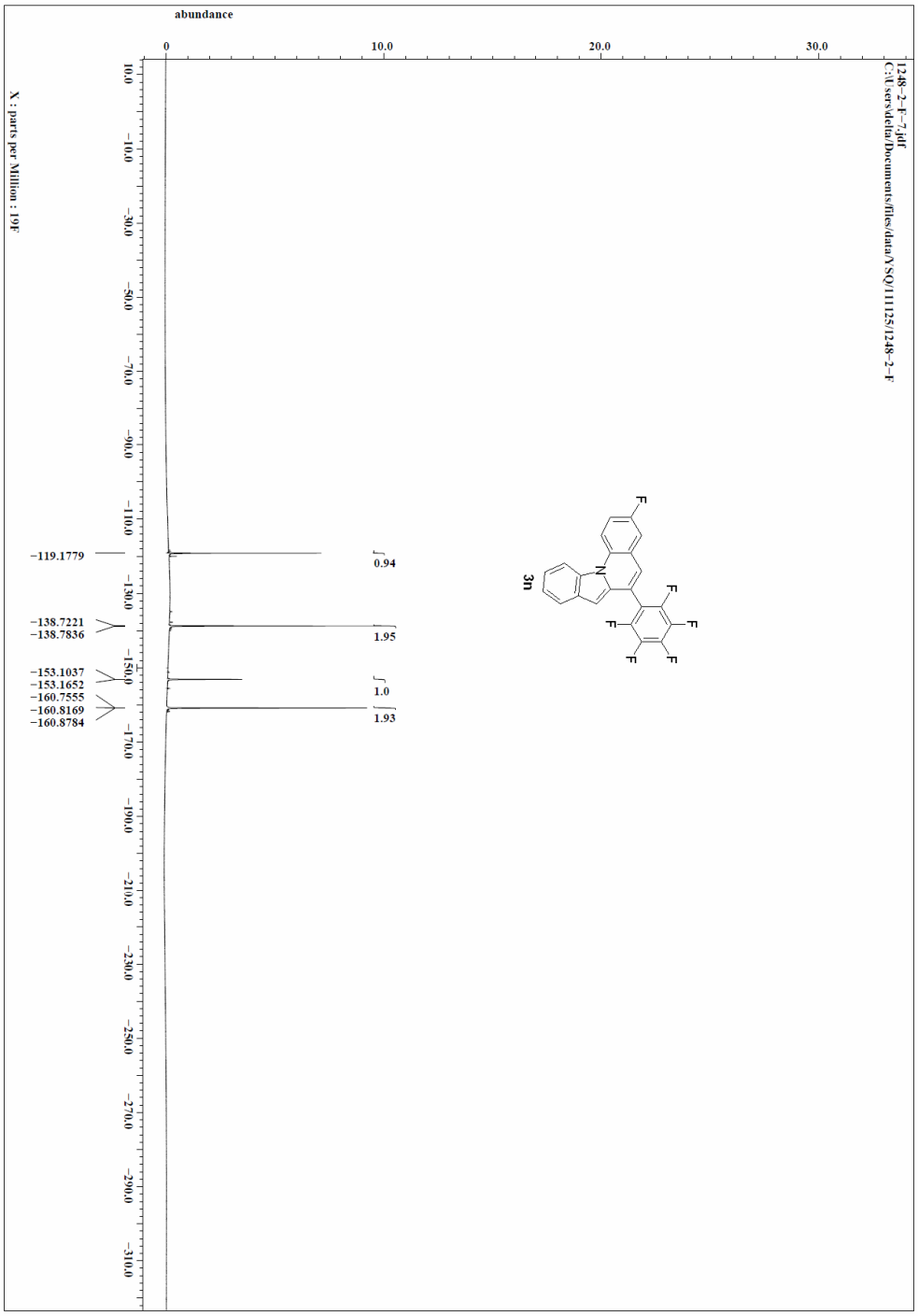

abundance
X : parts per Million : 1H
1309-3-H-8.jdf
C:\Users\delta\Documents\fils\data\SQ\11211\1309-3-H
8.5660
8.5442
8.4457
8.4251
7.8008
7.7813
7.6313
7.6130
7.4308
7.3827
7.3644
7.2991
7.1433
6.5133
9.74
11.72
10.13
22.52
9.35
10.49
12.04
11.0
10
3m
F
F
F
F
CF3
N

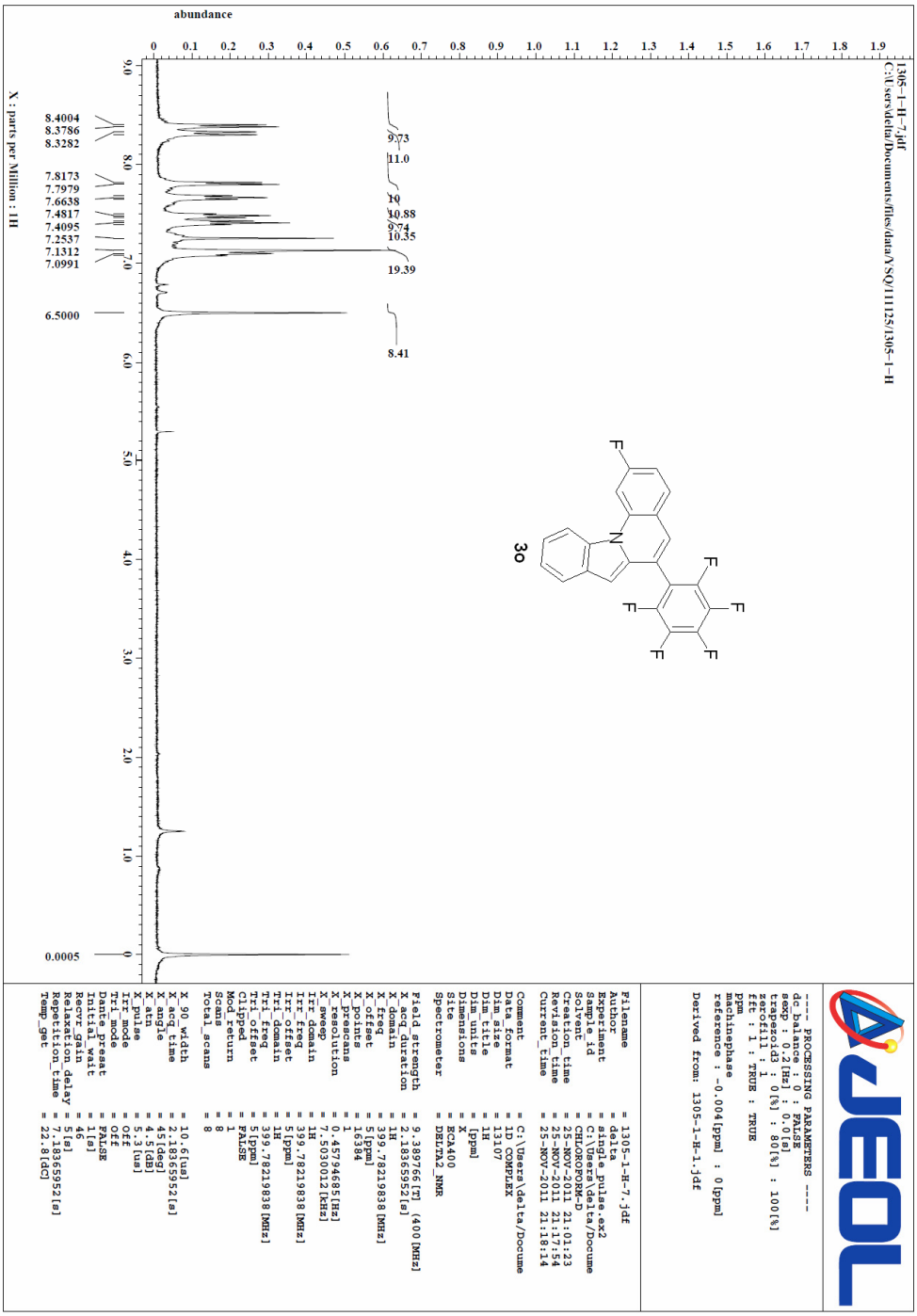

abundance
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1309-3-C-6.jdf
C:\Users\delta\Documents\flies\data\YSQ\111231\1309-3-C
X : parts per Million : 13C
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
146.2688
145.5823
143.7517
143.6277
136.7914
133.7213
133.2922
130.1840
129.8216
129.5928
126.7992
123.2047
122.9091
122.6135
122.3465
121.4312
117.2360
115.4244
114.3089
97.1752
77.3242
77.0001
76.6854
3m
N
F
F
F
F
CF3

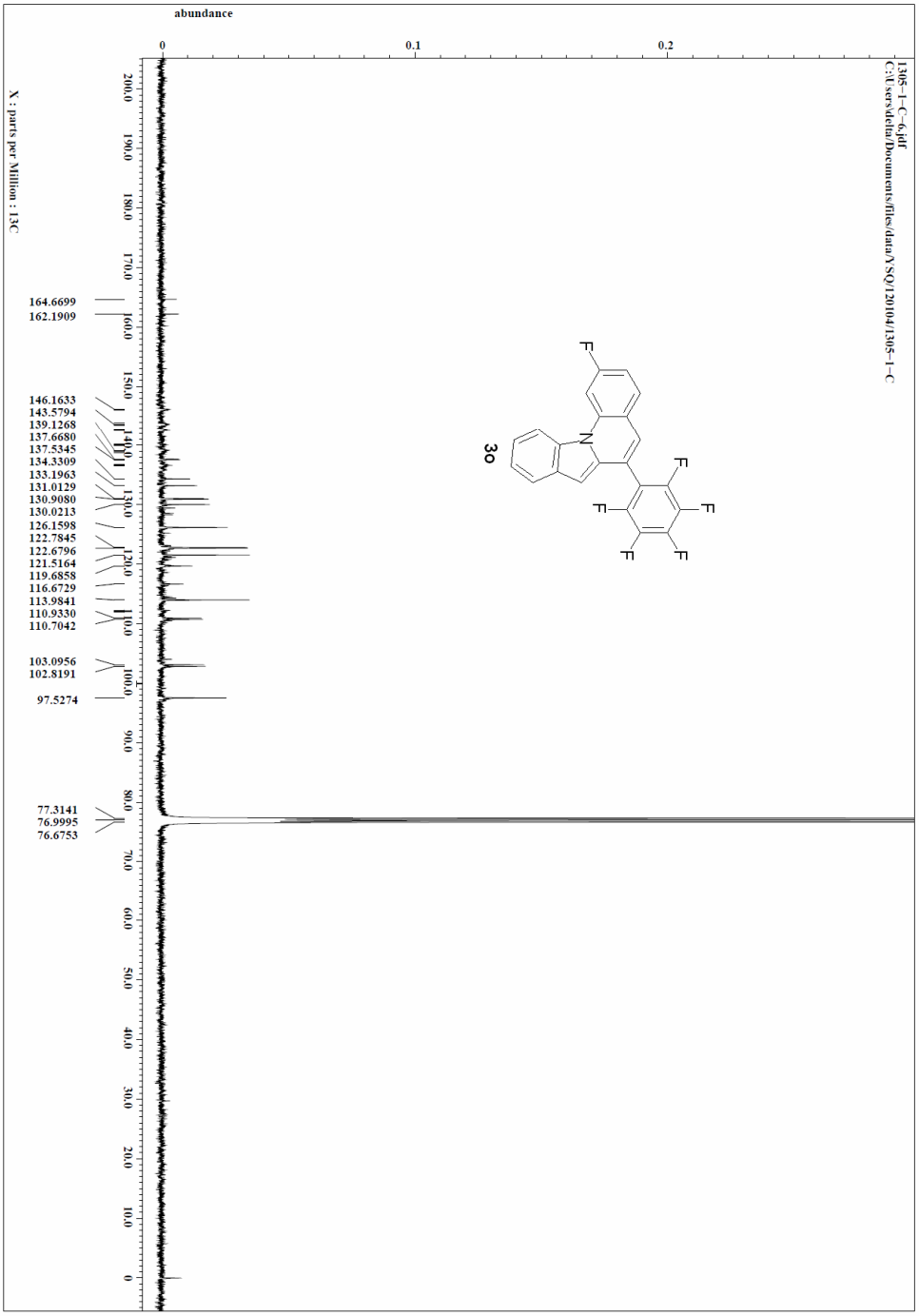

abundance
X : parts per Million : 19F
C:\Users\defia\Documents\files\data\YSQ\11121\1309-3-F
1309-3-F-7.jdf
-55.9973
-56.0588
2.82
-136.7247
-139.5826
1.99
2
3m
F
F
F
F
CF3
N

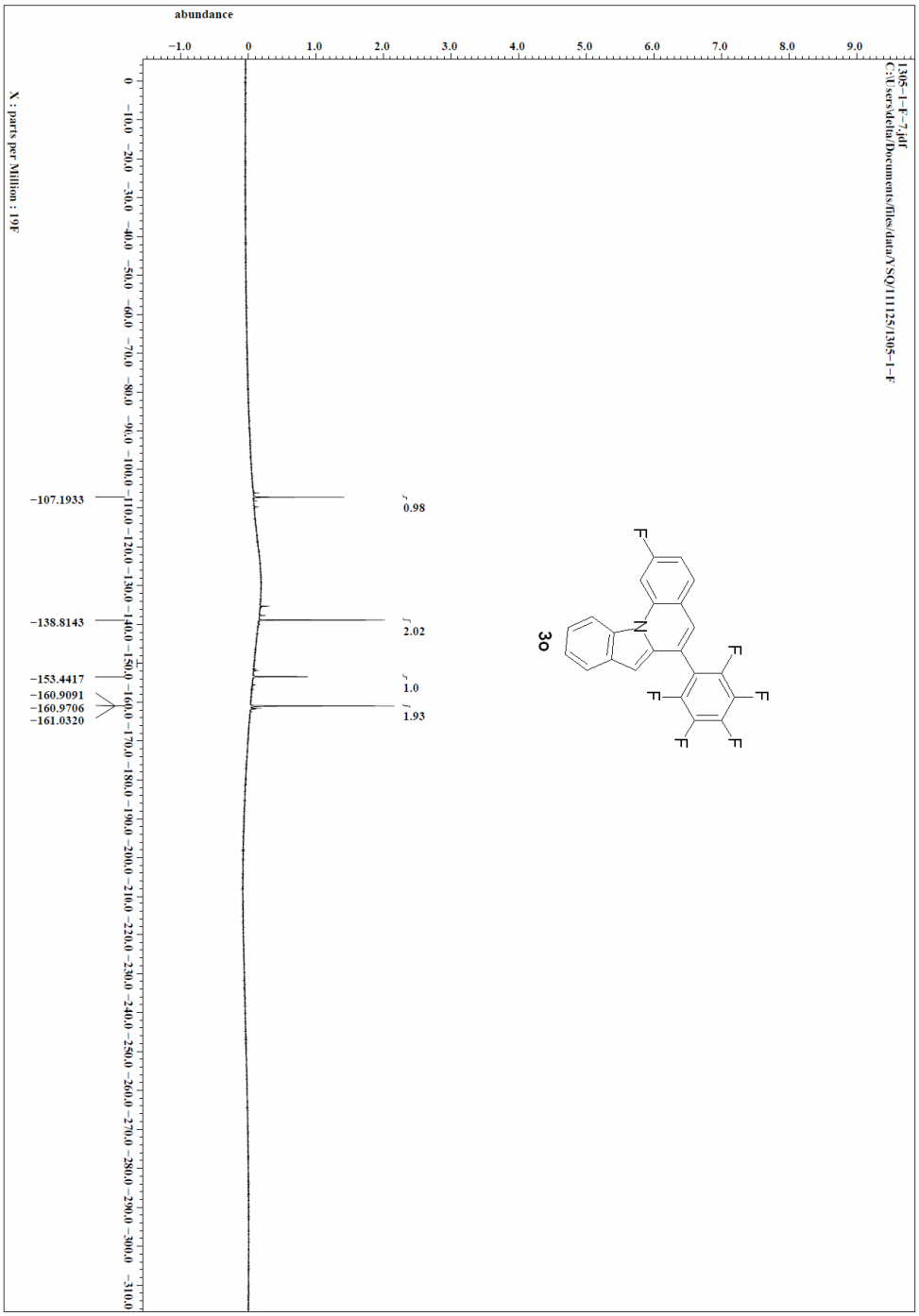

abundance
X : parts per Million : 1H
1248--2--H--7.jdf
C:\Users\delta\Documents\files\data\VSQ\111125\1248--2--H
8.5018
8.4915
8.3632
8.3426
7.7973
7.7790
7.4457
7.4274
7.4090
7.3769
7.3598
7.3334
7.3128
7.0482
6.5052
-0.0000
11.0
11.34
9.78
10.27
33.4
9.2
10
3n


abundance
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
12-48-2-C-6.jdf
C:\Users\delta\Documents\files\data\YSQ\111228\12-48-2-C
X : parts per Million : 13C
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
159.2735
156.8517
146.0967
146.0586
146.0300
145.9918
143.6177
143.5796
143.5414
134.1022
133.1487
129.6114
125.7499
122.7847
122.2984
121.5833
116.9781
116.7493
116.6730
113.8317
97.5276
77.3142
76.9996
76.6754
3n
F
N
F
F
F
F


abundance
0
10.0
20.0
30.0
1248-2-F-7.jdf
C:\Users\delta\Documents\files\data\SQ\111125\1248-2-F
X : parts per Million : 19F
10.0
-10.0
-30.0
-50.0
-70.0
-90.0
-110.0
-130.0
-150.0
-170.0
-190.0
-210.0
-230.0
-250.0
-270.0
-290.0
-310.0
-119.1779
-138.7221
-138.7836
-153.1037
-153.1652
-160.7555
-160.8169
-160.8784
0.94
1.95
1.0
1.93
3n
F
N
F
F
F
F
F


1305-1-H-7.jdf
C:\Users\delta\Documents\files\data\YSQ\111125\1305-1-H
abundance
X : parts per Million : 1H
8.4004
8.3786
8.3282
7.8173
7.7979
7.6638
7.4817
7.4095
7.2537
7.1312
7.0991
6.5000
0.0005
9.73
11.0
10
10.88
9.74
10.35
19.39
8.41
30
F
N
F
F
F
F
F
JEOL
---- PROCESSING PARAMETERS ----
dc_balance : 0 : FALSE
sine_bell : 0 [Hz] : 0 [%] : 80[%] : 100[%]
trapezoid : 0 [%] : 80[%] : 100[%]
zerofill : 1
fft : 1 : TRUE : TRUE
ppm
machinephase
reference : -0.004[ppm] : 0 [ppm]
Derived from: 1305-1-H-1.jdf
Filename = 1305-1-H-7.jdf
Author = delta
Experiment = single_pulse_ex2
Sample_id = C:\Users\delta/Docume
Solvent = CHLOROFORM-D
Creation_time = 25-NOV-2011 21:01:23
Revision_time = 25-NOV-2011 21:17:54
Current_time = 25-NOV-2011 21:18:14
Comment = C:\Users\delta/Docume
Data_format = 1D COMPLEX
Dim_size = 13107
Dim_title = 1H
Dim_units = [ppm]
Dimensions = X
Site = RCA400
Spectrometer = DELTA2_NMR
Field_strength = 9.389766[T] (400 [MHz]
X_acq_duration = 2.183659552[s]
X_domain = 1H
X_freq = 399.78219838 [MHz]
X_offset = 5[ppm]
X_points = 16384
X_prescans = 1
X_resolution = 0.457946851[Hz]
X_sweep = 7.5030012[kHz]
Irr_domain = 1H
Irr_freq = 399.78219838 [MHz]
Irr_offset = 5[ppm]
Tri_domain = 1H
Tri_freq = 399.78219838 [MHz]
Tri_offset = 5[ppm]
Clipped = FALSE
Mod_return = 0
Scans = 8
Total_scans = 8
X_90_width = 10.6[us]
X_acq_time = 2.183659552[s]
X_angle = 45[deg]
X_atn = 4.5[dB]
X_pulse = 5.3 [us]
Irr_mode = Off
Tri_mode = Off
Dante_preset = FALSE
Initial_wait = 1[s]
Recyc_delay = 46
Relaxation_delay = 5[s]
Repetition_time = 7.183659552[s]
Temp_get = 22.8[dC]


abundance
0
0.1
0.2
1305-1--C--6.jdf
C:\Users\delta\Documents\files\data\VSQ\120104\1305-1--C
X : parts per Million : 13C
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
164.6699
162.1909
146.1633
143.5794
139.1268
137.6680
137.5345
134.3309
133.1963
131.0129
130.9080
130.0213
126.1598
122.7845
122.6796
121.5164
119.6858
116.6729
113.9841
110.9330
110.7042
103.0956
102.8191
97.5274
77.3141
76.9995
76.6753
3o
F
N
F
F
F
F


abundance
1305-1-F-7.jdf
C:\Users\delta\Documents\files\data\YSQ\111125\1305-1-F
X : parts per Million : 19F
-107.1933
-138.8143
-153.4417
-160.9091
-160.9706
-161.0320
0.98
2.02
1.0
1.93
3o