

Copper-catalyzed C-H ethoxycarbonyldifluoromethylation of imidazoheterocycles

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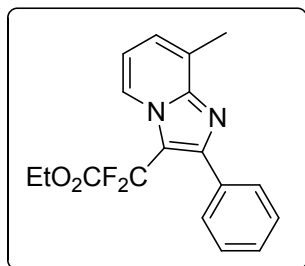
1. General Information:

¹H NMR spectra were determined on a 400 MHz (Bruker Avance) spectrometer using solutions in CDCl₃. Chemical shifts (δ) are expressed in parts per million and are referenced to tetramethylsilane (TMS) as an internal standard. The multiplicities of the signals are reported as s (singlet), d (doublet), t (triplet), dd (doublet of doublets), or m (multiplet), and coupling constants (J) are given in hertz. Proton-decoupled ¹³C{¹H} NMR spectra were recorded at 100 MHz (Bruker Avance). Proton-decoupled ¹⁹F NMR spectra were recorded at 376.5 MHz (Bruker Avance). HRMS analysis was performed on a Q-TOF mass analyzer (Agilent Accurate-Mass Q-TOF LC/MS-6520) using the ESI ionization method. Elemental analyses were performed by a PerkinElmer, Series II, CHNS/O analyser-2400. TLC was done on silica gel 60 F₂₅₄ coated on aluminum sheets (Merck). Silica gel (60-120 mesh) was used for column chromatography. Petroleum ether refers to the fraction boiling in the range of 60-80 °C unless otherwise mentioned. All of the solvents were dried and distilled before use. All of the reactions involving moisture-sensitive reactants were executed using oven-dried glassware.

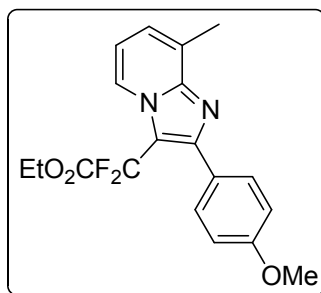
2. Typical experimental procedure for the compound (3a):

The mixture of 8-methyl-2-phenylimidazo[1,2-*a*]pyridine (**1a**, 41 mg, 0.20 mmol), ethyl-2-bromo-2,2-difluoroacetate (**2**, 51 μL, 2 equiv), Cu₂O (3 mg, 10 mol%), 1,10-phenanthroline (4.4 mg, 12mol%) and K₂CO₃ (55 mg, 2 equiv) in CH₃CN (1 mL) was stirred at 80 °C under air in the sealed tube for 10 h. After completion of the reaction (TLC), the reaction mixture was cooled to room temperature and extracted with ethylacetate/water. The organic phase was dried over anhydrous Na₂SO₄. The crude residue was obtained after evaporation of the solvent in vacuum and purified by column chromatography on silica gel (60-120 mesh) using *n*-hexane/EtOAc (9:1) as the eluent to afford pure **3a** as colorless oil (55 mg, 84% yield).

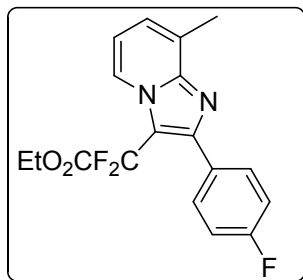
3. Characterization data for the synthesized products:



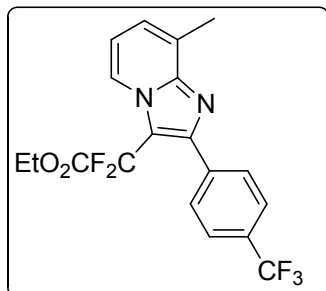
Ethyl-2,2-difluoro-2-(8-methyl-2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3a): Colourless oil (84%, 55 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.31 (d, $J = 7.2$ Hz, 1H), 7.55 (d, $J = 9.2$ Hz, 2H), 7.37-7.32 (m, 3H), 7.07 (d, $J = 6.8$ Hz, 1H), 6.78 (t, $J = 7.2$ Hz, 1H), 3.86 (q, $J = 7.2$ Hz, 2H), 2.58 (s, 3H), 1.06 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.5 (t, $J_{\text{C-F}} = 32$ Hz), 147.6, 146.7, 133.7, 129.9, 128.8, 128.2, 128.0, 125.5, 124.4 (t, $J_{\text{C-F}} = 16$ Hz), 113.6, 112.0, 111.6 (t, $J_{\text{C-F}} = 242$ Hz), 63.6, 17.3, 13.7; ^{19}F NMR (376.5 MHz, CDCl_3): δ -98.3; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{18}\text{H}_{16}\text{F}_2\text{N}_2\text{O}_2$: 331.1258; found: 331.1264.



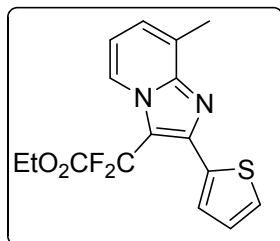
Ethyl-2,2-difluoro-2-(2-(4-methoxyphenyl)-8-methylimidazo[1,2-*a*]pyridin-3-yl)acetate (3b): Colourless oil (85%, 61 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.36 (d, $J = 7.2$ Hz, 1H), 7.57 (d, $J = 8.4$ Hz, 2H), 7.12 (d, $J = 7.2$ Hz, 1H), 6.96 (d, $J = 8.4$ Hz, 2H), 6.83 (t, $J = 6.8$ Hz, 1H), 3.99 (q, $J = 7.2$ Hz, 2H), 3.84 (s, 3H), 2.64 (s, 3H), 1.15 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.6 (t, $J_{\text{C-F}} = 35$ Hz), 160.1, 147.5, 147.5, 146.6, 131.1, 127.8, 126.1, 125.4, 124.3 (t, $J_{\text{C-F}} = 6$ Hz), 113.7, 113.4, 111.9, 111.7 (t, $J_{\text{C-F}} = 246$ Hz), 111.6, 63.6, 55.4, 17.3, 13.7; ^{19}F NMR (376.5 MHz, CDCl_3): δ -98.6; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{19}\text{H}_{18}\text{F}_2\text{N}_2\text{O}_3$: 361.1364; found: 361.1384.



Ethyl-2,2-difluoro-2-(2-(4-fluorophenyl)-8-methylimidazo[1,2-*a*]pyridin-3-yl)acetate (3c): Colourless oil (83%, 57 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.37 (d, $J = 6.8$ Hz, 1H), 7.65-7.62 (m, 2H), 7.15-7.10 (m, 3H), 6.86 (t, $J = 7.2$ Hz, 1H), 4.05 (q, $J = 7.2$ Hz, 2H), 2.64 (s, 3H), 1.19 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 163.2 (d, $J_{\text{C-F}} = 247$ Hz), 162.6 (t, $J_{\text{C-F}} = 36$ Hz), 146.7, 146.6, 131.7 (d, $J_{\text{C-F}} = 9$ Hz), 129.8 (d, $J_{\text{C-F}} = 3$ Hz), 128.0, 125.6, 124.3 (t, $J_{\text{C-F}} = 6$ Hz), 115.2 (d, $J_{\text{C-F}} = 21$ Hz), 113.7, 111.9, 111.5 (t, $J_{\text{C-F}} = 247$ Hz), 63.8, 17.3, 13.8; ^{19}F NMR (376.5 MHz, CDCl_3): δ -99.1, -113.0; Anal. Calcd for $\text{C}_{18}\text{H}_{15}\text{F}_3\text{N}_2\text{O}_2$: C, 62.07; H, 4.34; N, 8.04%; Found: C, 61.92; H, 4.20; N, 7.92%.

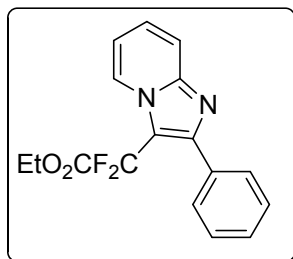


Ethyl-2,2-difluoro-2-(8-methyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3d): Colourless oil (75%, 59 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.38 (d, $J = 6.8$ Hz, 1H), 7.81 (d, $J = 8.0$ Hz, 2H), 7.70 (d, $J = 8.0$ Hz, 2H), 7.17 (d, $J = 6.8$ Hz, 1H), 6.88 (t, $J = 7.2$ Hz, 1H), 4.10 (q, $J = 7.2$ Hz, 2H), 2.65 (s, 3H), 1.21 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.6 (t, $J_{\text{C-F}} = 35$ Hz), 146.9, 145.9, 137.5, 130.7 (q, $J_{\text{C-F}} = 32$ Hz), 130.3, 128.2, 125.8, 125.1 (q, $J_{\text{C-F}} = 4$ Hz), 124.3 (t, $J_{\text{C-F}} = 5$ Hz), 124.2 (q, $J_{\text{C-F}} = 270$ Hz), 113.9, 112.3 (t, $J_{\text{C-F}} = 33$ Hz), 111.3 (t, $J_{\text{C-F}} = 249$ Hz), 63.9, 17.2, 13.8; ^{19}F NMR (376.5 MHz, CDCl_3): δ -62.6, -99.7; Anal. Calcd for $\text{C}_{19}\text{H}_{15}\text{F}_5\text{N}_2\text{O}_2$: C, 57.29; H, 3.80; N, 7.03%; Found: C, 57.04; H, 3.91; N, 6.94%.



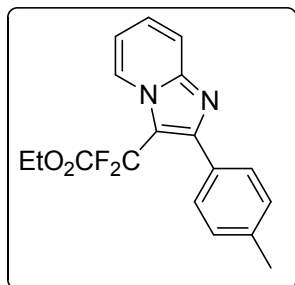
Ethyl-2,2-difluoro-2-(8-methyl-2-(thiophen-2-yl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3e):

Brown oil (78%, 52 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.35 (d, $J = 6.8$ Hz, 1H), 7.43-7.40 (m, 2H), 7.12-7.07 (m, 2H), 6.82 (t, $J = 7.2$ Hz, 1H), 4.13 (q, $J = 7.2$ Hz, 2H), 2.64 (s, 3H), 1.20 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.5 (t, $J_{\text{C-F}} = 35$ Hz), 146.6, 140.9, 135.3, 128.5 (t, $J_{\text{C-F}} = 4$ Hz), 127.9, 127.6, 127.4, 125.6, 124.3 (t, $J_{\text{C-F}} = 7$ Hz), 113.7, 111.5 (t, $J_{\text{C-F}} = 248$ Hz), 109.0, 63.8, 17.2, 13.8; ^{19}F NMR (376.5 MHz, CDCl_3): δ -99.8; Anal. Calcd for $\text{C}_{16}\text{H}_{14}\text{F}_2\text{N}_2\text{O}_2\text{S}$: C, 57.13; H, 4.20; N, 8.33%; Found: C, 56.97; H, 4.12; N, 8.21%.

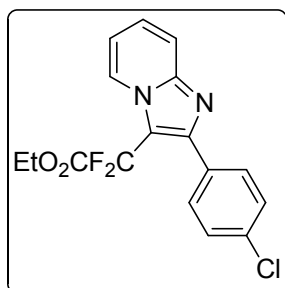


Ethyl-2,2-difluoro-2-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)acetate (3f): Colourless oil (75%,

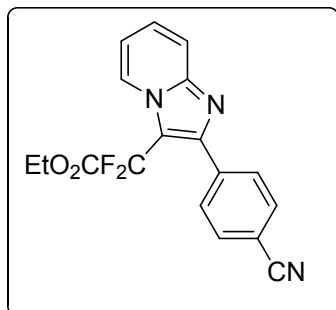
47 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.53 (d, $J = 6.8$ Hz, 1H), 7.70 (d, $J = 9.2$ Hz, 1H), 7.63 (d, $J = 7.2$ Hz, 2H), 7.45-7.41 (m, 3H), 7.36 (t, $J = 8.0$ Hz, 1H), 6.95 (t, $J = 6.8$ Hz, 1H), 3.97 (q, $J = 7.2$ Hz, 2H), 1.14 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.5, 159.1, 148.3, 146.3, 133.5, 129.7, 128.9, 128.2, 126.8, 126.7 (t, $J_{\text{C-F}} = 6$ Hz), 118.0, 113.6, 111.7 (t, $J_{\text{C-F}} = 258$ Hz), 63.7, 13.7; ^{19}F NMR (376.5 MHz, CDCl_3): δ -98.5. Anal. Calcd for $\text{C}_{17}\text{H}_{14}\text{F}_2\text{N}_2\text{O}_2$: C, 64.55; H, 4.46; N, 8.86%; Found: C, 64.32; H, 4.32; N, 8.78%.



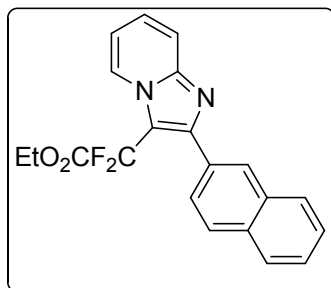
Ethyl-2,2-difluoro-2-(2-(*p*-tolyl)imidazo[1,2-*a*]pyridin-3-yl)acetate (3g): Colourless oil (80%, 52 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.45 (d, $J = 7.2$ Hz, 1H), 7.63 (d, $J = 9.2$ Hz, 1H), 7.46 (d, $J = 8.0$ Hz, 2H), 7.30-7.26 (m, 1H), 7.19-7.16 (m, 2H), 6.89-6.87 (m, 1H), 3.92 (q, $J = 7.2$ Hz, 2H), 2.33 (s, 3H), 1.08 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.5, 148.3, 146.2, 138.8, 130.4, 129.6, 128.9, 126.7 (t, $J_{\text{C-F}} = 6$ Hz), 126.3, 117.9, 113.5, 111.6 (t, $J_{\text{C-F}} = 246$ Hz), 111.4, 63.7, 21.4, 13.7; ^{19}F NMR (376.5 MHz, CDCl_3): δ -98.6; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{18}\text{H}_{16}\text{F}_2\text{N}_2\text{O}_2$: 331.1258; found: 331.1269.



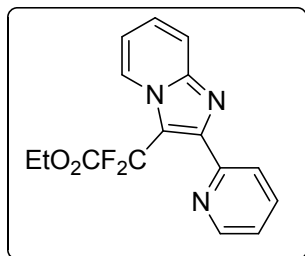
Ethyl-2-(2-(4-chlorophenyl)imidazo[1,2-*a*]pyridin-3-yl)-2,2-difluoroacetate (3h): Colourless oil (67%, 47 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.52 (d, $J = 7.2$ Hz, 1H), 7.70 (d, $J = 9.2$ Hz, 1H), 7.62 (d, $J = 8.4$ Hz, 2H), 7.43-7.40 (m, 2H), 7.39-7.34 (m, 1H), 6.96 (t, $J = 7.2$ Hz, 1H), 4.12 (q, $J = 7.2$ Hz, 2H), 1.21 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.6 (t, $J_{\text{C-F}} = 39$ Hz), 146.9, 146.4, 135.0, 132.0, 131.1, 128.4, 127.6, 127.0, 126.7 (t, $J_{\text{C-F}} = 5$ Hz), 118.0, 113.7, 111.4 (t, $J_{\text{C-F}} = 248$ Hz), 63.9, 13.8; ^{19}F NMR (376.5 MHz, CDCl_3): δ -99.5; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{17}\text{H}_{13}\text{ClF}_2\text{N}_2\text{O}_2$: 351.0712; found: 351.0740.



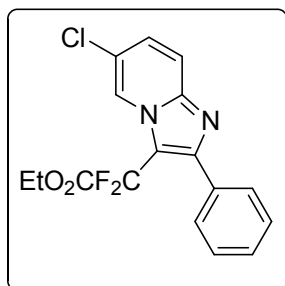
Ethyl-2-(2-(4-cyanophenyl)imidazo[1,2-a]pyridin-3-yl)-2,2-difluoroacetate (3i): Yellow oil (58%, 39 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.53 (d, $J = 7.2$ Hz, 1H), 7.84 (d, $J = 8.8$ Hz, 2H), 7.75-7.70 (m, 2H), 7.42-7.38 (m, 1H), 7.01-6.98 (m, 1H), 4.22 (q, $J = 7.2$ Hz, 2H), 1.27 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.6, 146.6, 145.9, 138.2, 132.0, 130.5, 127.4, 126.7 (t, $J_{\text{C-F}} = 6$ Hz), 125.9, 118.8, 118.2, 114.1, 112.5, 111.2 (t, $J_{\text{C-F}} = 249$ Hz), 64.1, 13.9; ^{19}F NMR (376.5 MHz, CDCl_3): δ -100.3; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{18}\text{H}_{13}\text{F}_2\text{N}_3\text{O}_2$: 342.1054; found: 342.1067.



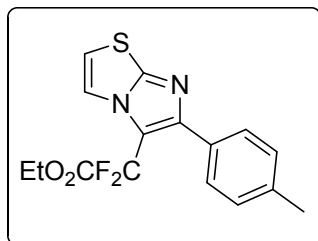
Ethyl-2,2-difluoro-2-(2-(naphthalen-2-yl)imidazo[1,2-a]pyridin-3-yl)acetate (3j): Brown oil (42%, 30 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.57 (d, $J = 7.2$ Hz, 1H), 8.11 (s, 1H), 7.93-7.86 (m, 3H), 7.81-7.79 (m, 1H), 7.74 (d, $J = 9.2$ Hz, 1H), 7.53-7.50 (m, 2H), 7.38 (t, $J = 8.0$ Hz, 1H), 6.97 (t, $J = 6.8$ Hz, 1H), 3.89 (q, $J = 7.2$ Hz, 2H), 1.08 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.6, 148.2, 146.5, 133.4, 133.0, 130.8, 129.3, 128.5, 127.9, 127.8, 127.1, 126.9, 126.8 (t, $J_{\text{C-F}} = 5$ Hz), 126.4, 125.3, 124.3, 118.0, 113.6, 111.6 (t, $J_{\text{C-F}} = 249$ Hz), 63.7, 13.6; ^{19}F NMR (376.5 MHz, CDCl_3): δ -98.5; Anal. Calcd for $\text{C}_{21}\text{H}_{16}\text{F}_2\text{N}_2\text{O}_2$: C, 68.85; H, 4.40; N, 7.65%; Found: C, 68.69; H, 4.29; N, 7.52%.



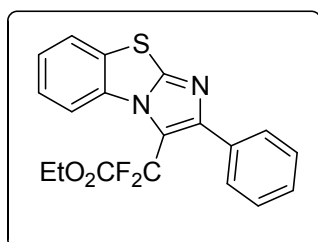
Ethyl-2,2-difluoro-2-(2-(pyridin-2-yl)imidazo[1,2-a]pyridin-3-yl)acetate (3k): Colourless oil (70%, 44 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.63 (d, $J = 7.2$ Hz, 1H), 8.52 (d, $J = 4.4$ Hz, 1H), 8.20 (d, $J = 7.6$ Hz, 1H), 7.83-7.78 (m, 1H), 7.76 (d, $J = 8.8$ Hz, 1H), 7.36 (t, $J = 8.8$ Hz, 1H), 7.27-7.24 (m, 1H), 6.96 (t, $J = 7.6$ Hz, 1H), 4.08 (q, $J = 7.2$ Hz, 2H), 1.04 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.2 (t, $J_{\text{C-F}} = 34$ Hz), 151.7, 147.9, 145.9, 145.3, 137.0, 127.3 (t, $J_{\text{C-F}} = 10$ Hz), 126.9, 123.3, 122.3, 118.1, 114.1, 113.8, 112.5 (t, $J_{\text{C-F}} = 243$ Hz), 62.8, 13.6; ^{19}F NMR (376.5 MHz, CDCl_3): δ -96.4; Anal. Calcd for $\text{C}_{16}\text{H}_{13}\text{F}_2\text{N}_3\text{O}_2$: C, 60.57; H, 4.13; N, 13.24%; Found: C, 60.39; H, 3.98; N, 13.16%.



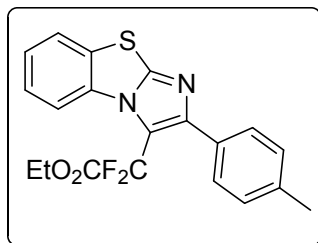
Ethyl-2-(6-chloro-2-phenylimidazo[1,2-a]pyridin-3-yl)-2,2-difluoroacetate (3l): Colourless oil (72%, 50 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.58 (s, 1H), 7.66-7.60 (m, 3H), 7.46-7.42 (m, 3H), 7.35-7.32 (m, 1H), 4.00 (q, $J = 7.2$ Hz, 2H), 1.16 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.2 (t, $J_{\text{C-F}} = 34$ Hz), 148.9, 144.7, 132.9, 129.6, 129.1, 128.9, 128.3, 124.6 (t, $J_{\text{C-F}} = 6$ Hz), 121.9, 118.3, 112.2 (t, $J_{\text{C-F}} = 31$ Hz), 111.2 (t, $J_{\text{C-F}} = 248$ Hz), 63.9, 13.7; ^{19}F NMR (376.5 MHz, CDCl_3): δ -98.8; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{17}\text{H}_{13}\text{ClF}_2\text{N}_2\text{O}_2$: 351.0712; found: 351.0700.



Ethyl-2,2-difluoro-2-(6-(*p*-tolyl)imidazo[2,1-*b*]thiazol-5-yl)acetate (5a): Yellow oil (85%, 57 mg); ^1H NMR (400 MHz, CDCl_3): δ 7.70 (d, $J = 4.4$ Hz, 1H), 7.50 (d, $J = 8.4$ Hz, 2H), 7.22 (d, $J = 8.0$ Hz, 2H), 6.94 (d, $J = 4.8$ Hz, 1H), 4.05 (q, $J = 7.2$ Hz, 2H), 2.37 (s, 3H), 1.12 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.4 (t, $J_{\text{C-F}} = 35$ Hz), 151.4, 148.8, 138.8, 129.8, 129.0, 129.0, 119.9 (t, $J_{\text{C-F}} = 5$ Hz), 113.7, 113.6 (t, $J_{\text{C-F}} = 31$ Hz), 110.9 (t, $J_{\text{C-F}} = 247$ Hz), 63.7, 21.4, 13.6; ^{19}F NMR (376.5 MHz, CDCl_3): δ -97.2; Anal. Calcd for $\text{C}_{16}\text{H}_{14}\text{F}_2\text{N}_2\text{O}_2\text{S}$: C, 57.13; H, 4.20; N, 8.33%; Found: C, 56.95; H, 4.09; N, 8.20%.

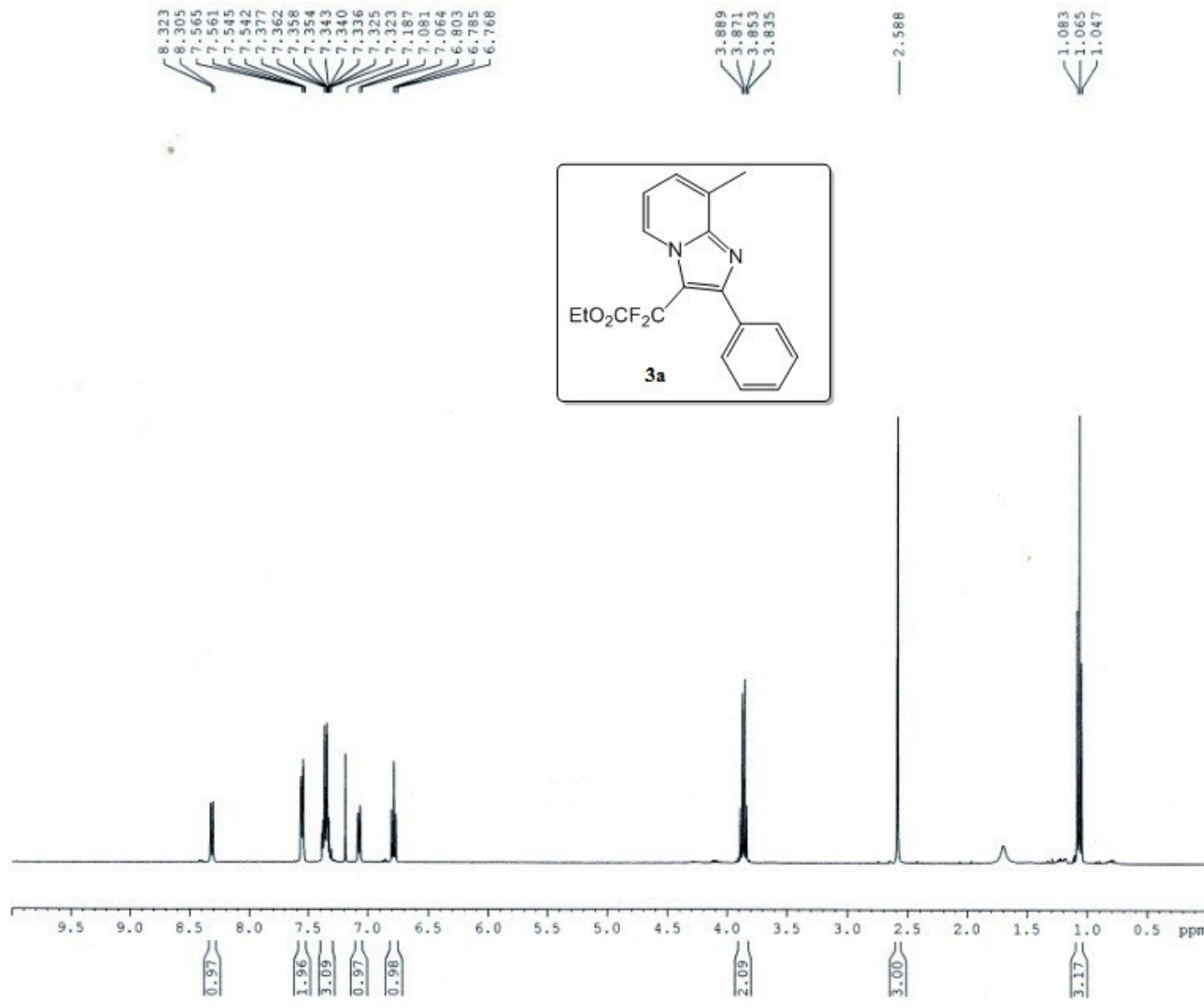


Ethyl-2,2-difluoro-2-(2-phenylbenzo[*d*]imidazo[2,1-*b*]thiazol-3-yl)acetate (5b): Brown oil (82%, 61 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.11 (d, $J = 8.0$ Hz, 1H), 7.73 (d, $J = 8.8$ Hz, 1H), 7.57-7.55 (m, 2H), 7.52-7.48 (m, 1H), 7.46-7.38 (m, 4H), 3.73 (q, $J = 7.2$ Hz, 2H), 1.05 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.1 (t, $J_{\text{C-F}} = 33$ Hz), 150.9, 150.2 (t, $J_{\text{C-F}} = 6$ Hz), 133.3, 132.8, 130.1, 129.7, 129.0, 128.2, 126.7, 125.5, 124.2, 116.0 (t, $J_{\text{C-F}} = 8$ Hz), 115.5 (t, $J_{\text{C-F}} = 30$ Hz), 110.8 (t, $J_{\text{C-F}} = 243$ Hz), 63.7, 13.5; ^{19}F NMR (376.5 MHz, CDCl_3): δ -90.1; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{19}\text{H}_{14}\text{F}_2\text{N}_2\text{O}_2\text{S}$: 373.0822; found: 373.0822.



Ethyl-2,2-difluoro-2-(2-(*p*-tolyl)benzo[*d*]imidazo[2,1-*b*]thiazol-3-yl)acetate (5c): Brown oil (80%, 61 mg); ^1H NMR (400 MHz, CDCl_3): δ 8.10 (d, $J = 8.0$ Hz, 1H), 7.73 (d, $J = 8.8$ Hz, 1H), 7.52-7.48 (m, 1H), 7.45-7.38 (m, 3H), 7.23 (d, $J = 7.6$ Hz, 2H), 3.76 (q, $J = 7.2$ Hz, 2H), 2.39 (s, 3H), 1.07 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 162.2 (t, $J_{\text{C-F}} = 35$ Hz), 150.8, 150.4, 138.9, 132.9, 130.4, 130.1, 129.6, 128.9, 126.7, 125.4, 124.2, 116.0 (t, $J_{\text{C-F}} = 8$ Hz), 115.3, 110.9 (t, $J_{\text{C-F}} = 245$ Hz), 63.7, 21.8, 13.6; ^{19}F NMR (376.5 MHz, CDCl_3): δ -90.1; HRMS (ESI-TOF) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{20}\text{H}_{16}\text{F}_2\text{N}_2\text{O}_2\text{S}$: 387.0979; found: 387.0979.

NMR spectra for the synthesized products

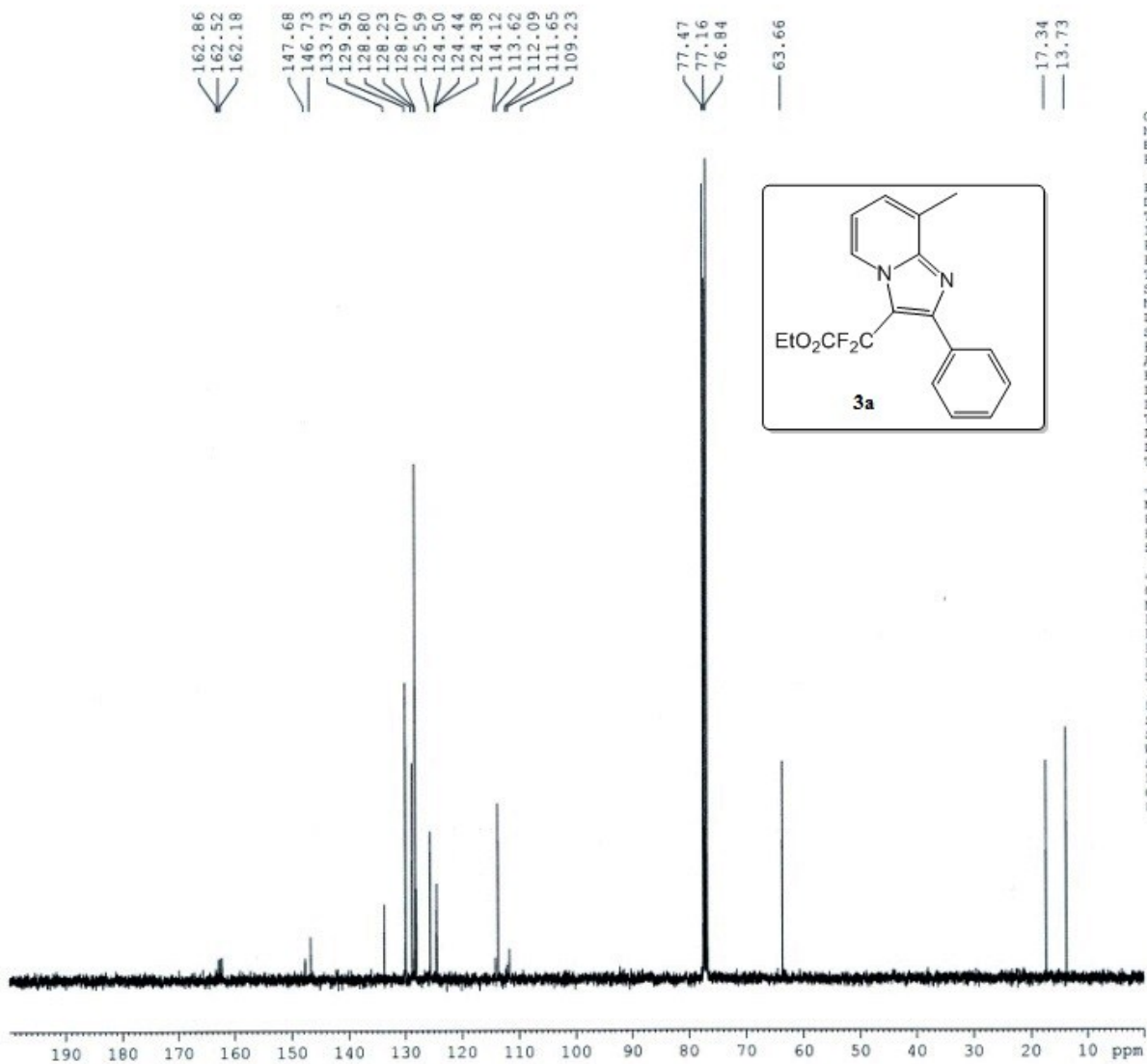


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 232
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150527
 Time_ 19.58
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 24
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 106.66
 DW 60.800 usec
 DE 6.50 usec
 TE 299.9 K
 D1 1.00000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500382 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 234
 PROCNO 1

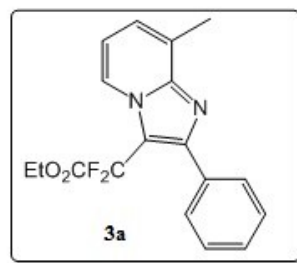
F2 - Acquisition Parameters
 Date 20150527
 Time 20.29
 INSTRUM spect
 PROBHD 5 mm PARBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 500
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 106.66
 DW 20.800 usec
 DE 6.50 usec
 TE 301.1 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177830 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

-98.39

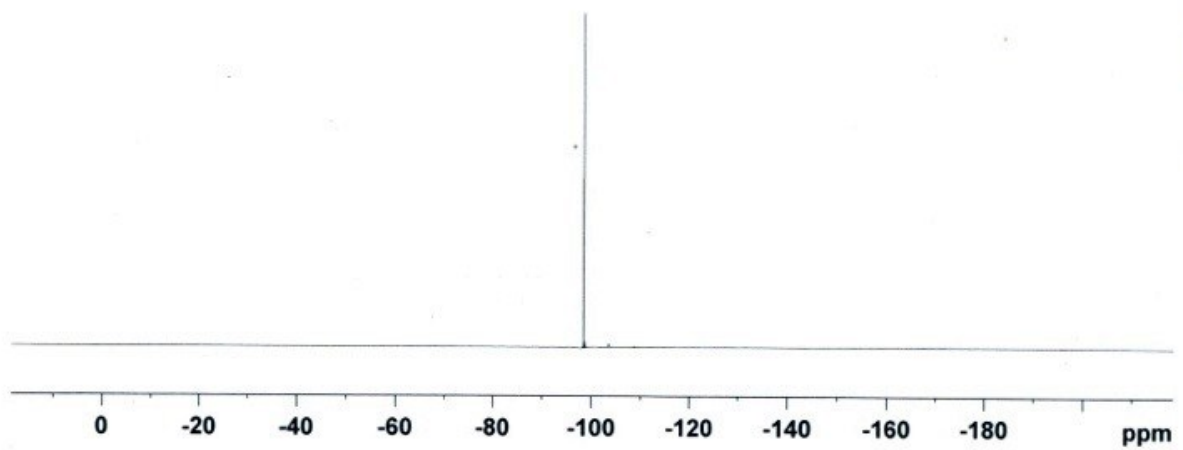


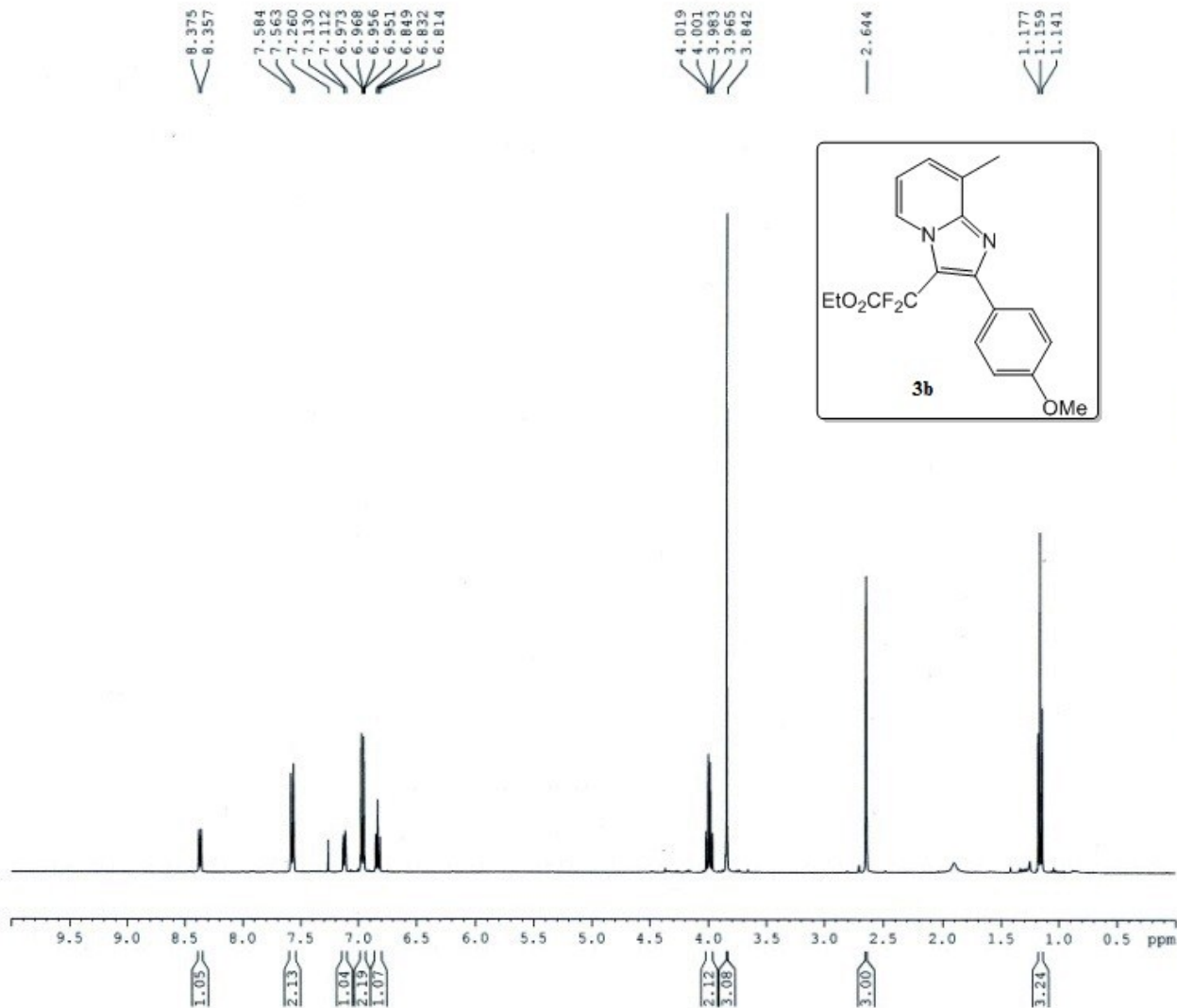
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 233
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150527
Time 20.02
INSTRUM spect
PROBHD 5 mm FABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 106.66
DW 5.600 usec
DE 6.50 usec
TE 299.9 K
D1 1.00000000 sec
TDO 1

----- CHANNEL f1 -----
NUC1 19F
P1 12.50 usec
PLW1 20.00000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



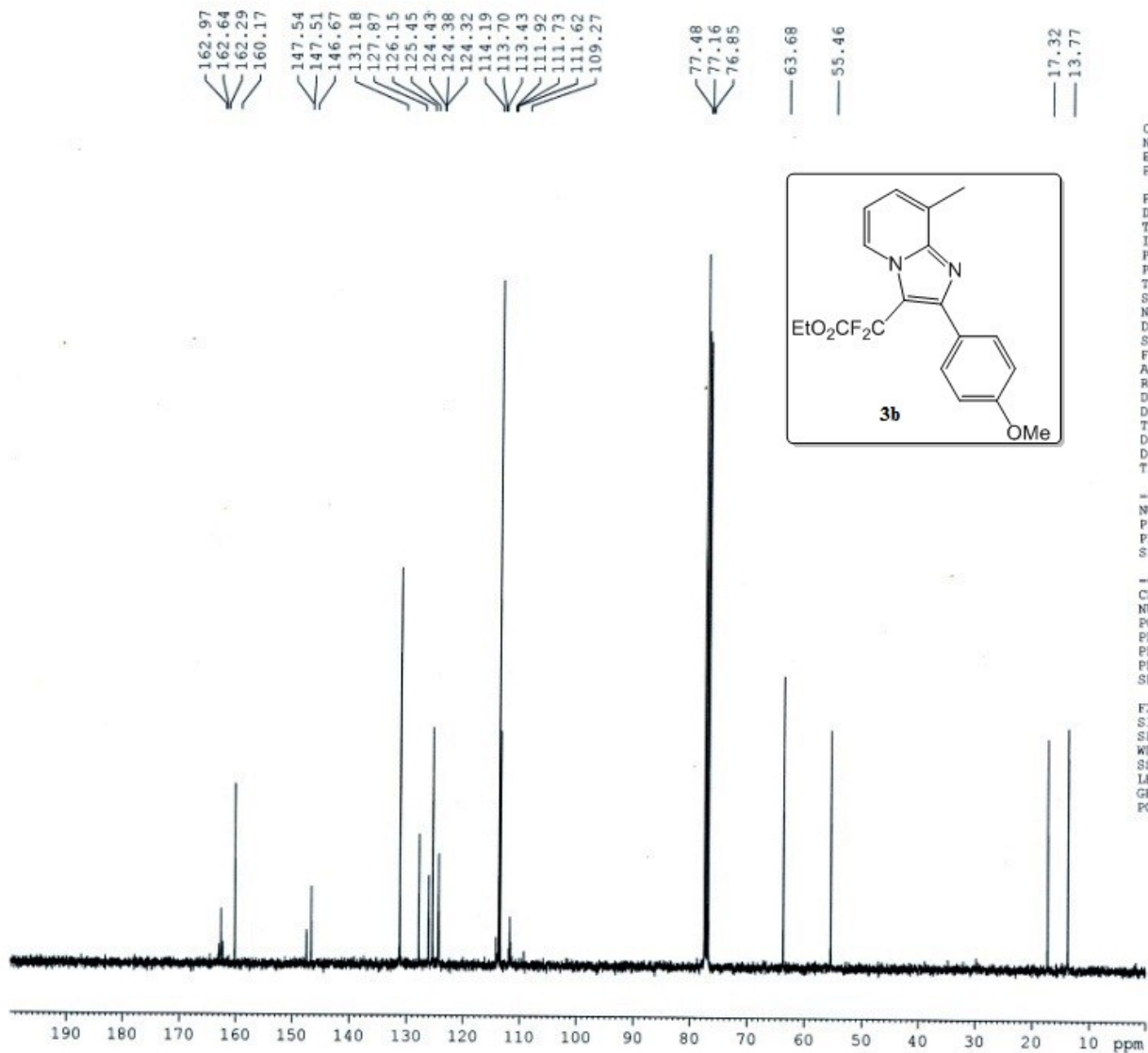


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 418
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150722
 Time_ 12.39
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 32
 DS 1
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 67.81
 DW 60.800 usec
 DE 6.50 usec
 TE 296.4 K
 D1 1.00000000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500090 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 420
 PROCNO 1

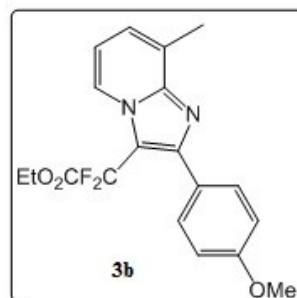
F2 - Acquisition Parameters
 Date_ 20150722
 Time_ 13.07
 INSTRUM spect
 PROBRD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDC13
 NS 512
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 67.81
 DW 20.800 usec
 DE 6.50 usec
 TE 297.6 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SF01 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 FCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792599 W
 PLW13 0.26107001 W
 SF02 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177854 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

-98.60

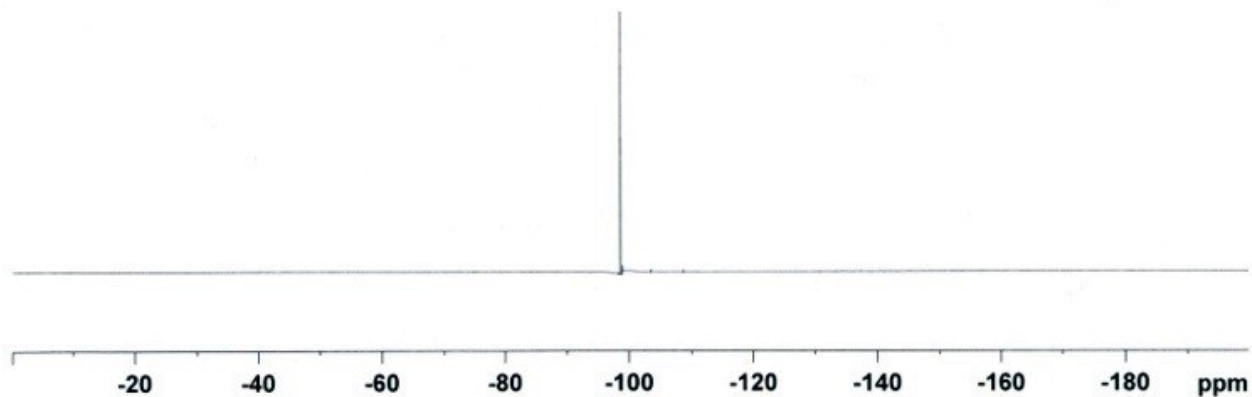


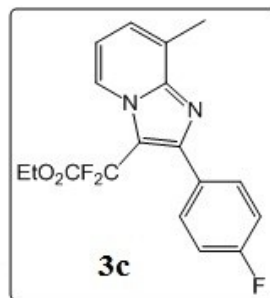
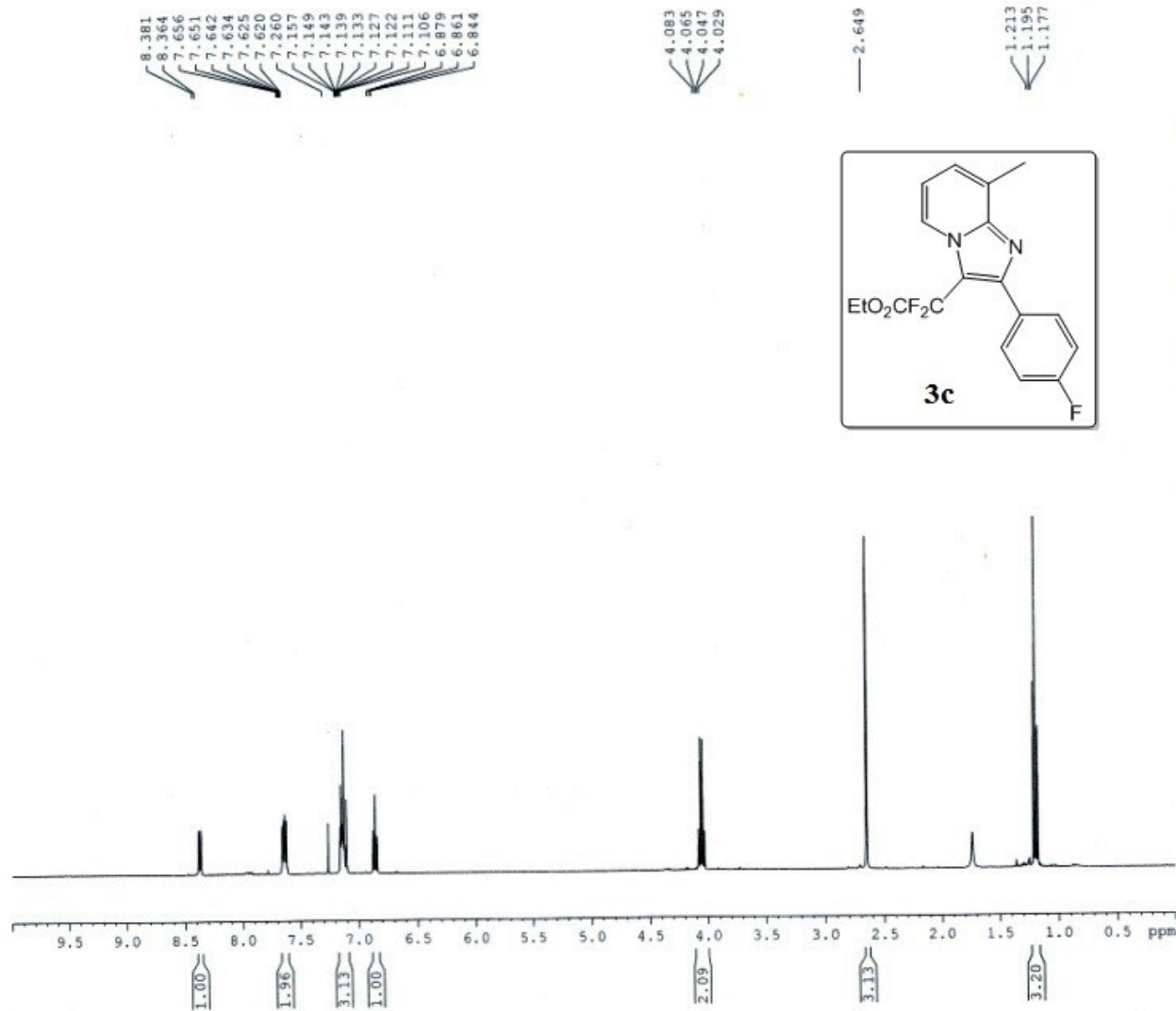
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 419
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150722
Time 12.41
INSTRUM spect
PROBHD 5 mm PARAC SB/
PULPROG zgpg30
TD 32768
SOLVENT CDC13
NS 4
DS 2
SWH 89265.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 67.81
DW 5.600 usec
DE 6.50 usec
TE 296.4 K
D1 1.0000000 sec
TDO 1

***** CHANNEL f1 *****
NUC1 13F
P1 12.75 usec
PLM1 20.0000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



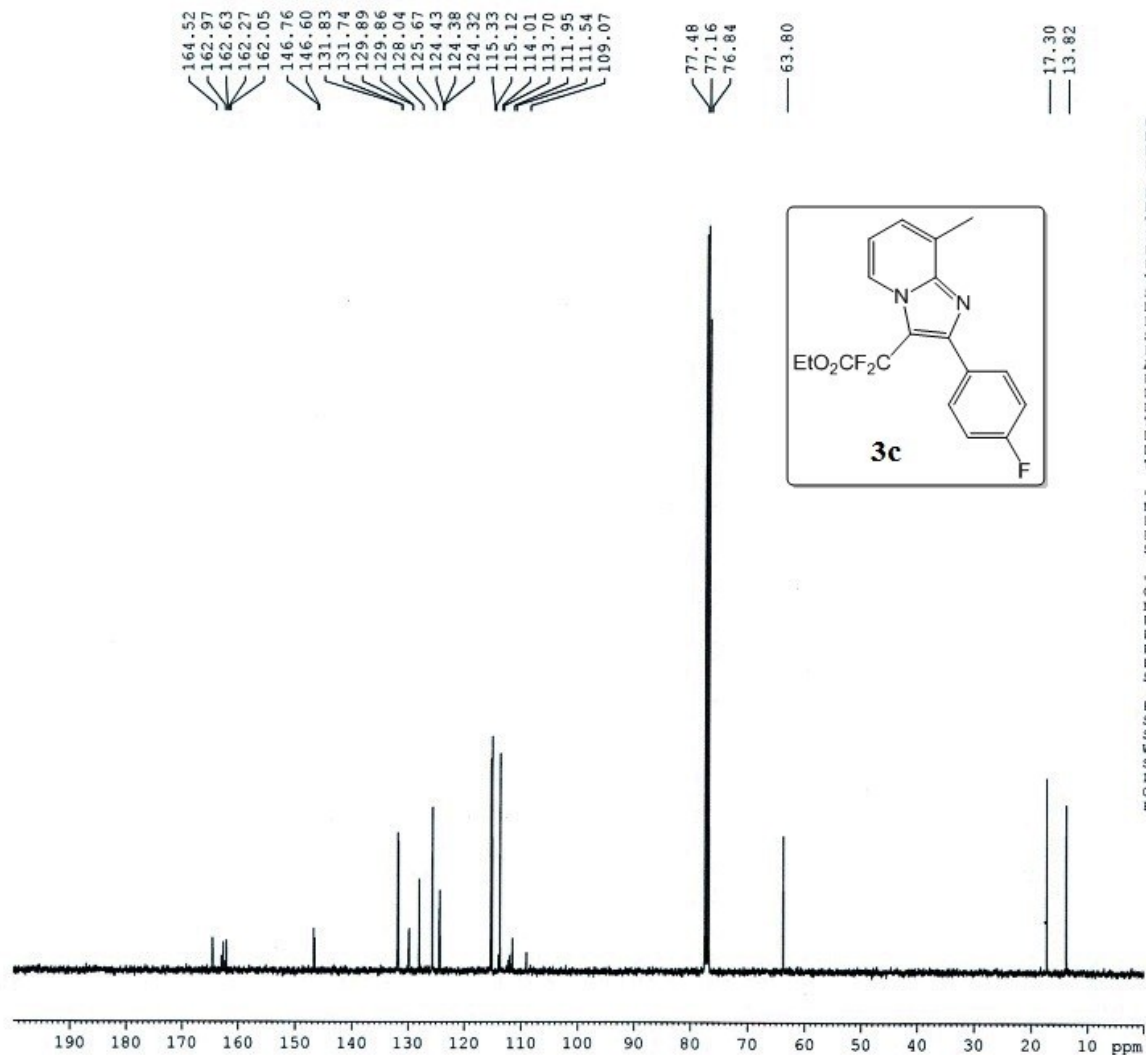


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 425
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150723
 Time_ 12.06
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDCl₃
 NS 32
 DS 1
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 93.46
 DW 60.800 usec
 DE 6.50 usec
 TE 296.4 K
 D1 1.00000000 sec
 TDO 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 S1 16384
 SF 400.1500090 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



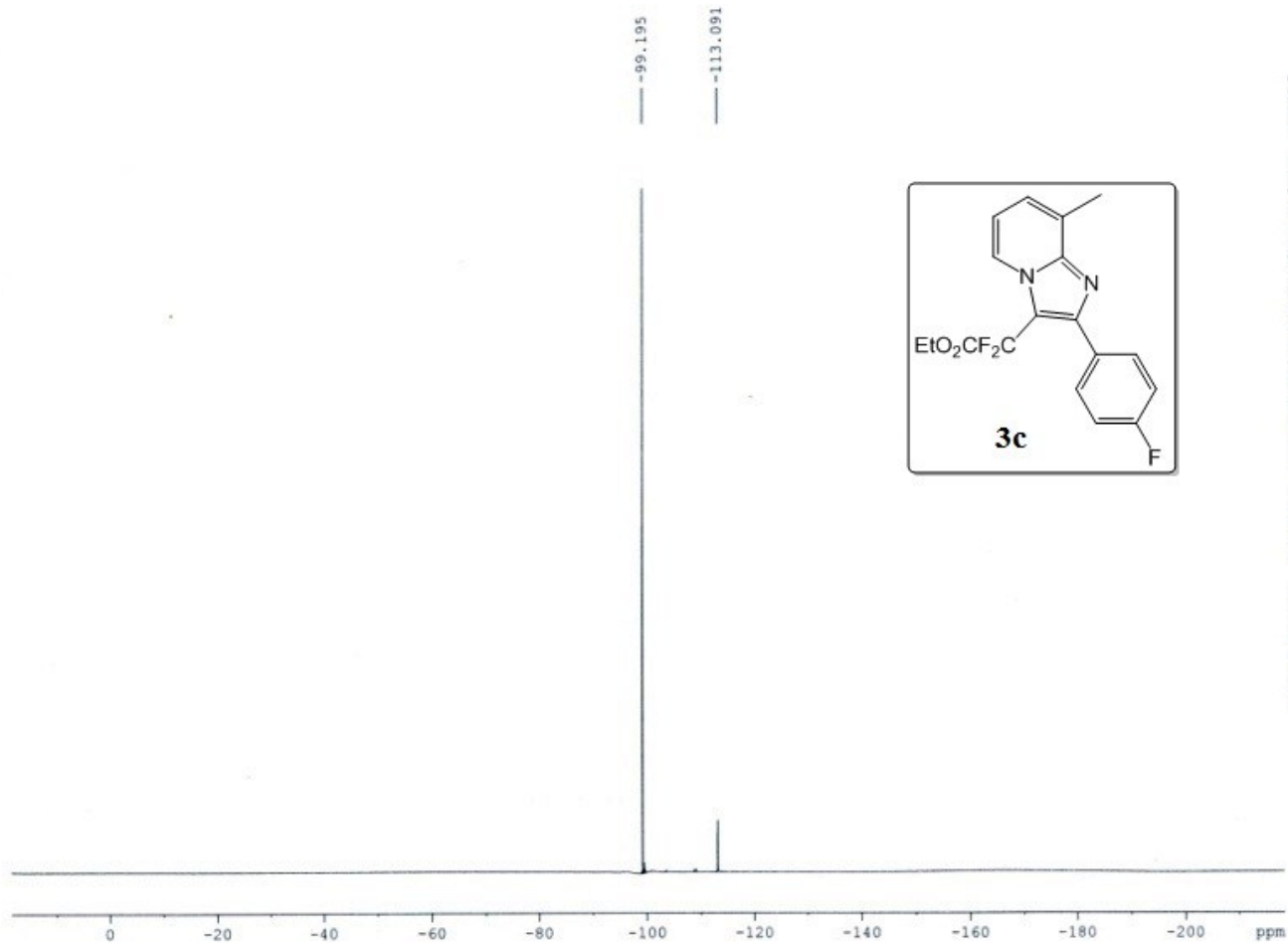
Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 426
 PROCNO 1

F2 - Acquisition Parameters
 Date 20150723
 Time 12.55
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 1024
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 93.46
 DW 20.800 usec
 DE 6.50 usec
 TE 297.9 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.0000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.0000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177836 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

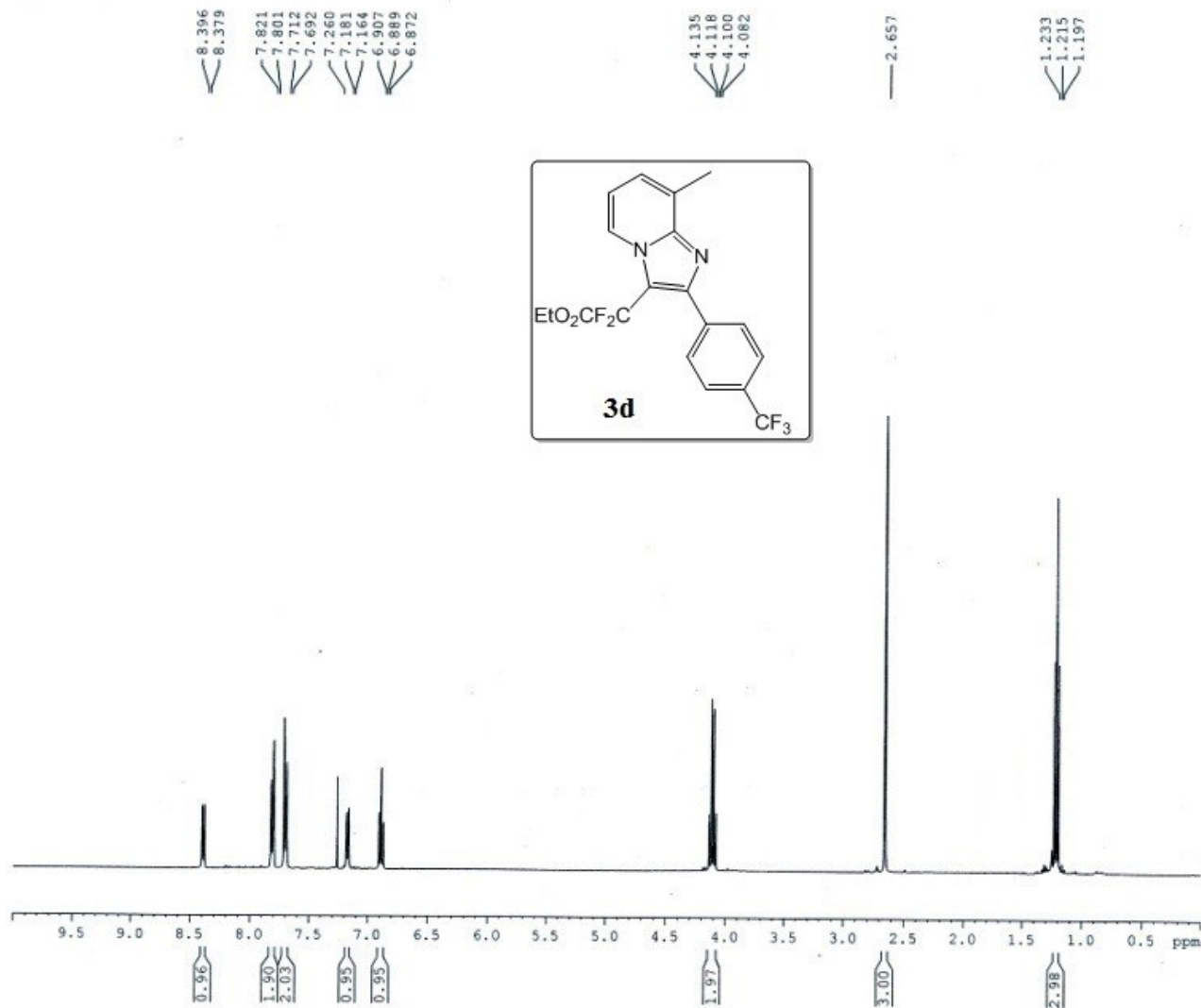


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 427
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150723
 Time 12.58
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgfgqn
 TD 32768
 SOLVENT CDCl3
 NS 4
 DS 2
 SWH 89285.711 Hz
 FIDRES 2.724784 Hz
 AQ 0.1835508 sec
 RG 87.66
 DW 5.600 usec
 DE 6.50 usec
 TE 297.1 K
 D1 1.00000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 19F
 P1 12.75 usec
 PLW1 20.00000000 W
 SFO1 376.4795333 MHz

F2 - Processing parameters
 SI 16384
 SF 376.5171850 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

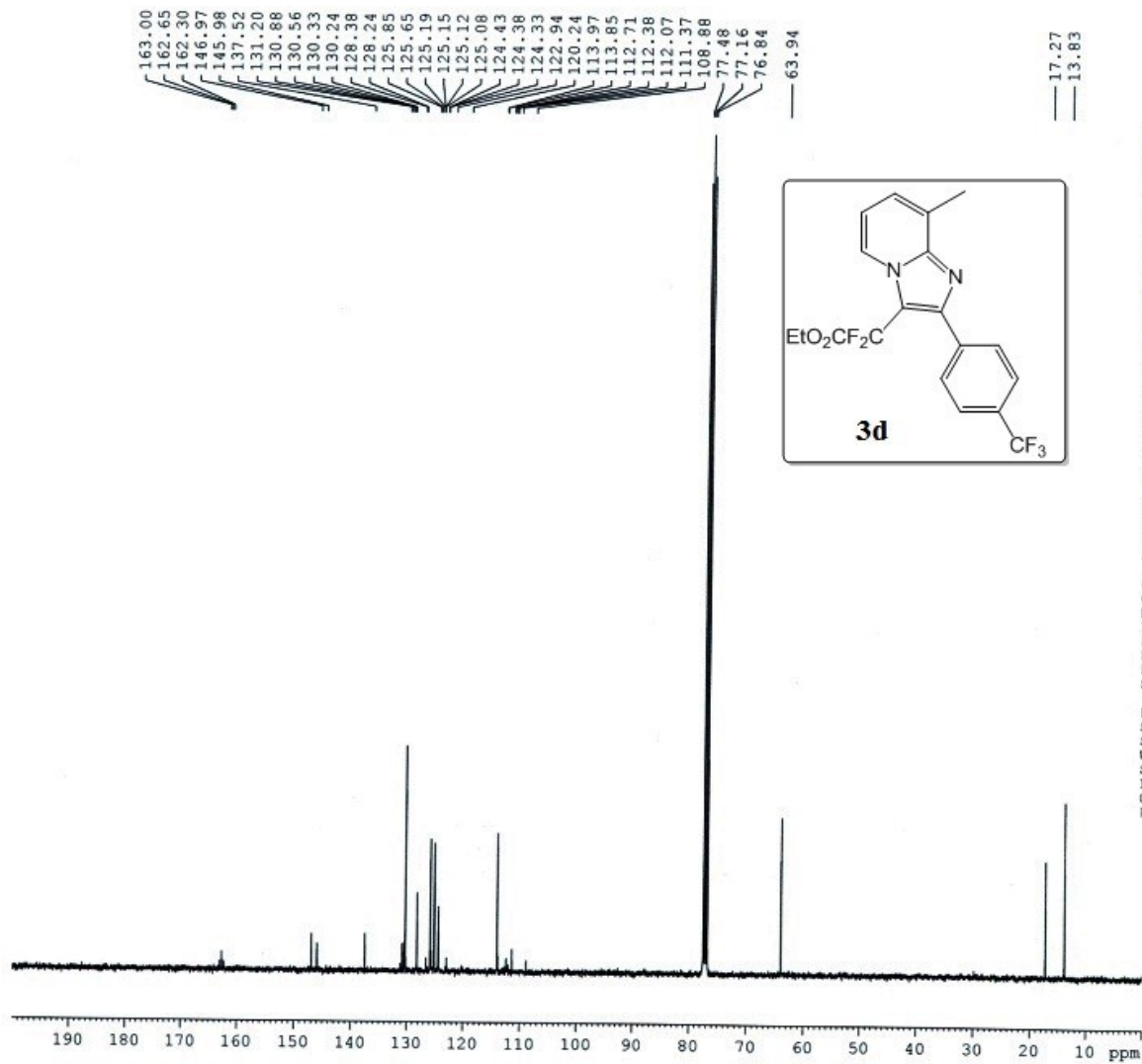


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 454
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150729
 Time_ 12.19
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 24
 DS 1
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 106.66
 DW 60.800 usec
 DE 6.50 usec
 TE 293.8 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500090 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 456
 PROCNO 1

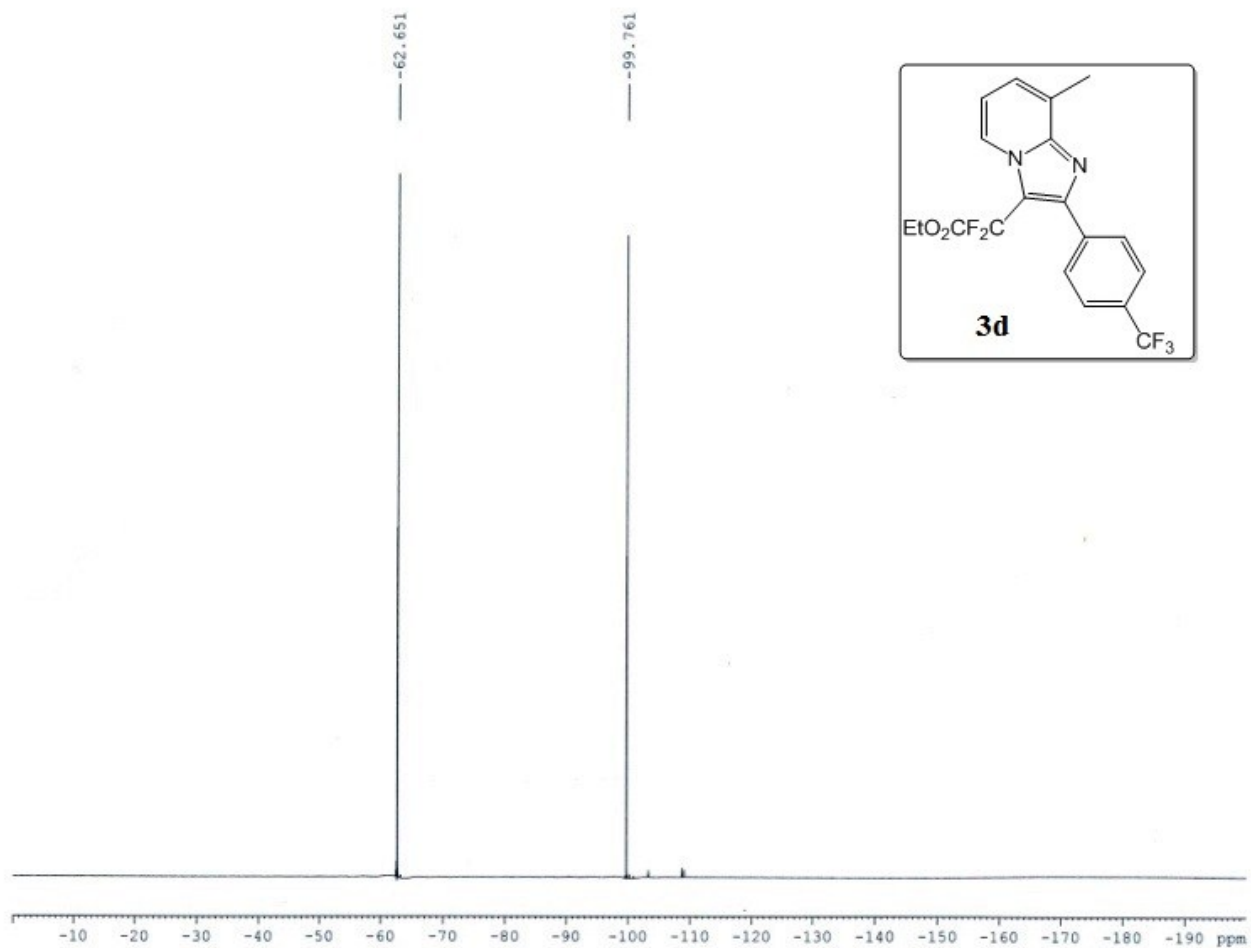
F2 - Acquisition Parameters
 Date_ 20150729
 Time 14.10
 INSTRUM spect
 PROBRD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 2048
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 106.66
 DW 20.800 usec
 DE 6.50 usec
 TE 297.7 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177836 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

F19 1H coupled VBPM-459 I



Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 455
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150729
Time 12.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 106.66
DW 5.600 usec
DE 6.50 usec
TE 294.2 K
D1 1.00000000 sec
TD0 1

----- CHANNEL f1 -----
NUC1 19F
P1 12.50 usec
PLW1 20.00000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

8.364
8.347
7.437
7.434
7.428
7.421
7.414
7.412
7.409
7.260
7.126
7.108
7.099
7.090
7.087
7.078
6.846
6.829
6.811

4.163
4.145
4.127
4.109

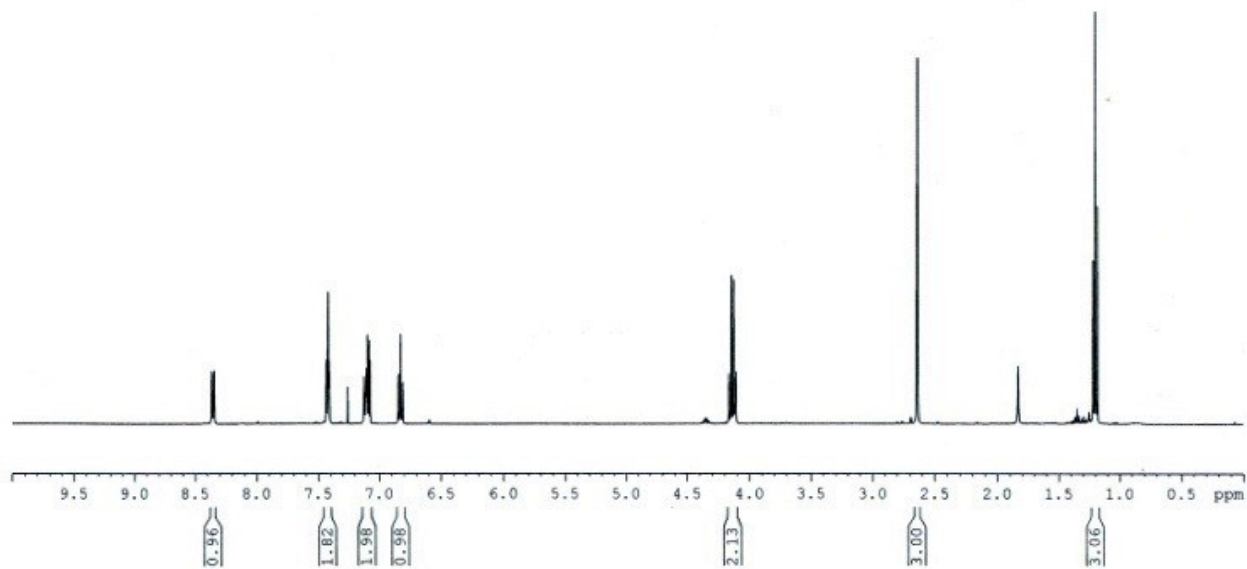
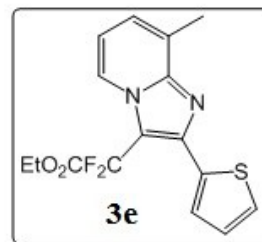
2.640

1.220
1.202
1.184



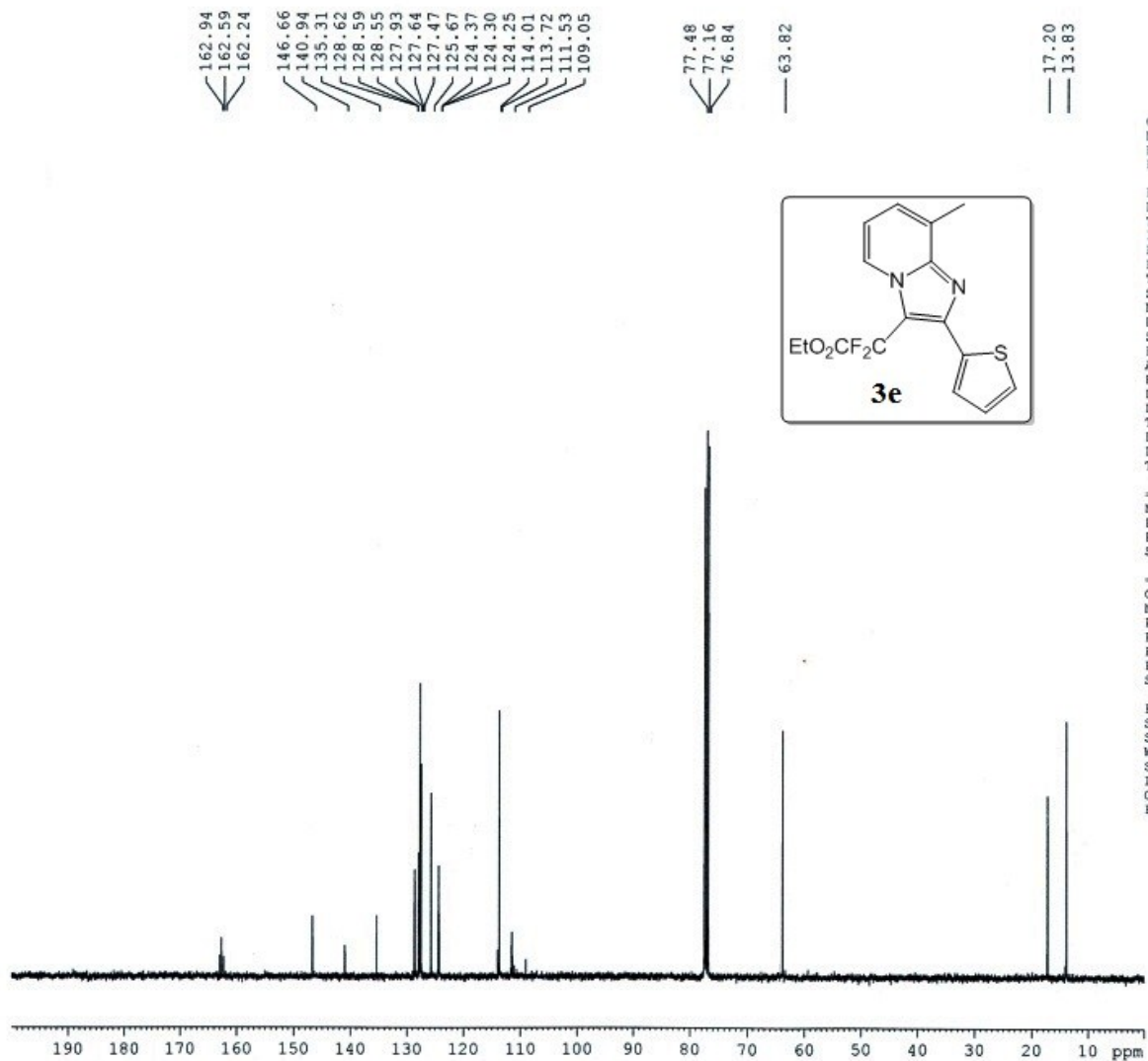
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 442
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150727
Time_ 10.38
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 24
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 67.81
DW 60.800 usec
DE 6.50 usec
TE 295.5 K
D1 1.00000000 sec
TDO 1



===== CHANNEL f1 =====
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME Dr. A HAJRA 2015
EXNO 444
PROCNO 1

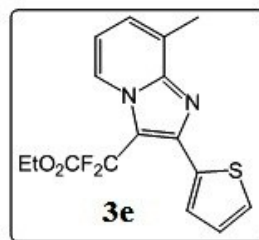
F2 - Acquisition Parameters
Date_ 20150727
Time_ 11.06
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl₃
NS 512
DS 2
SMH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6816244 sec
RG 67.81
DM 20.800 usec
DE 6.50 usec
TE 296.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TDO 1

----- CHANNEL f1 -----
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
SFO1 100.6278588 MHz

----- CHANNEL f2 -----
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PLW2 12.00000000 W
PLW12 0.40792999 W
PLW13 0.26107001 W
SFO2 400.1516006 MHz

F2 - Processing parameters
SI 16384
SF 100.6177865 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

-99.89

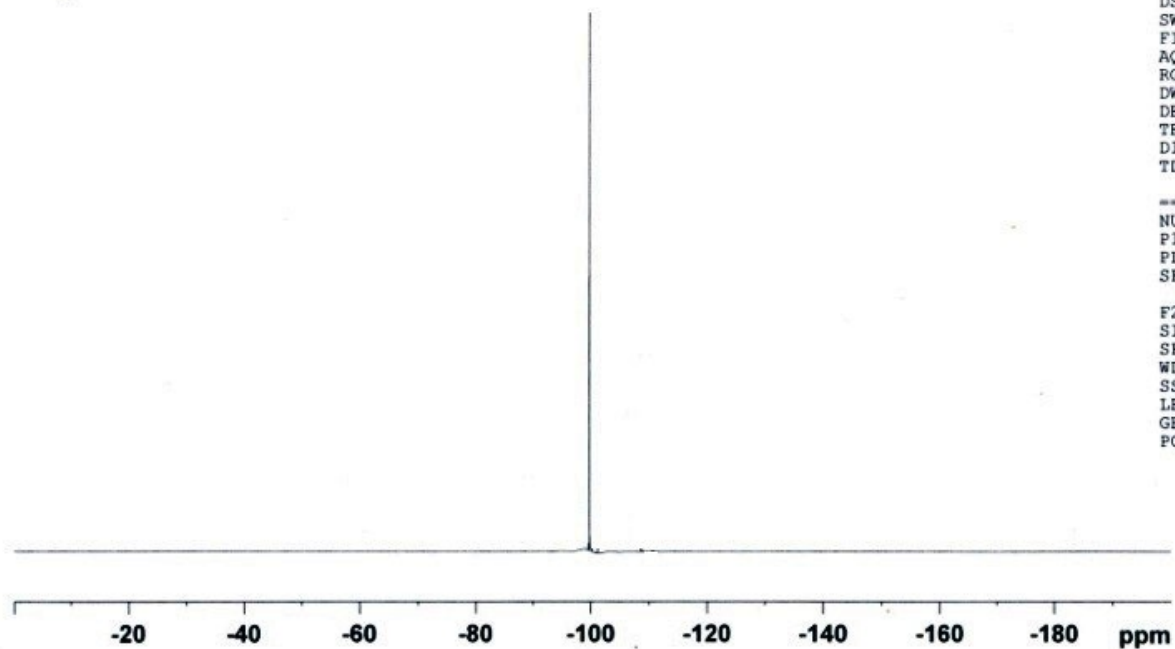


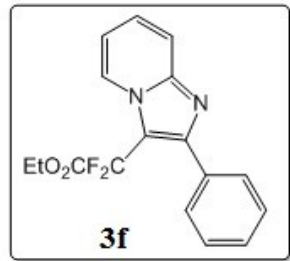
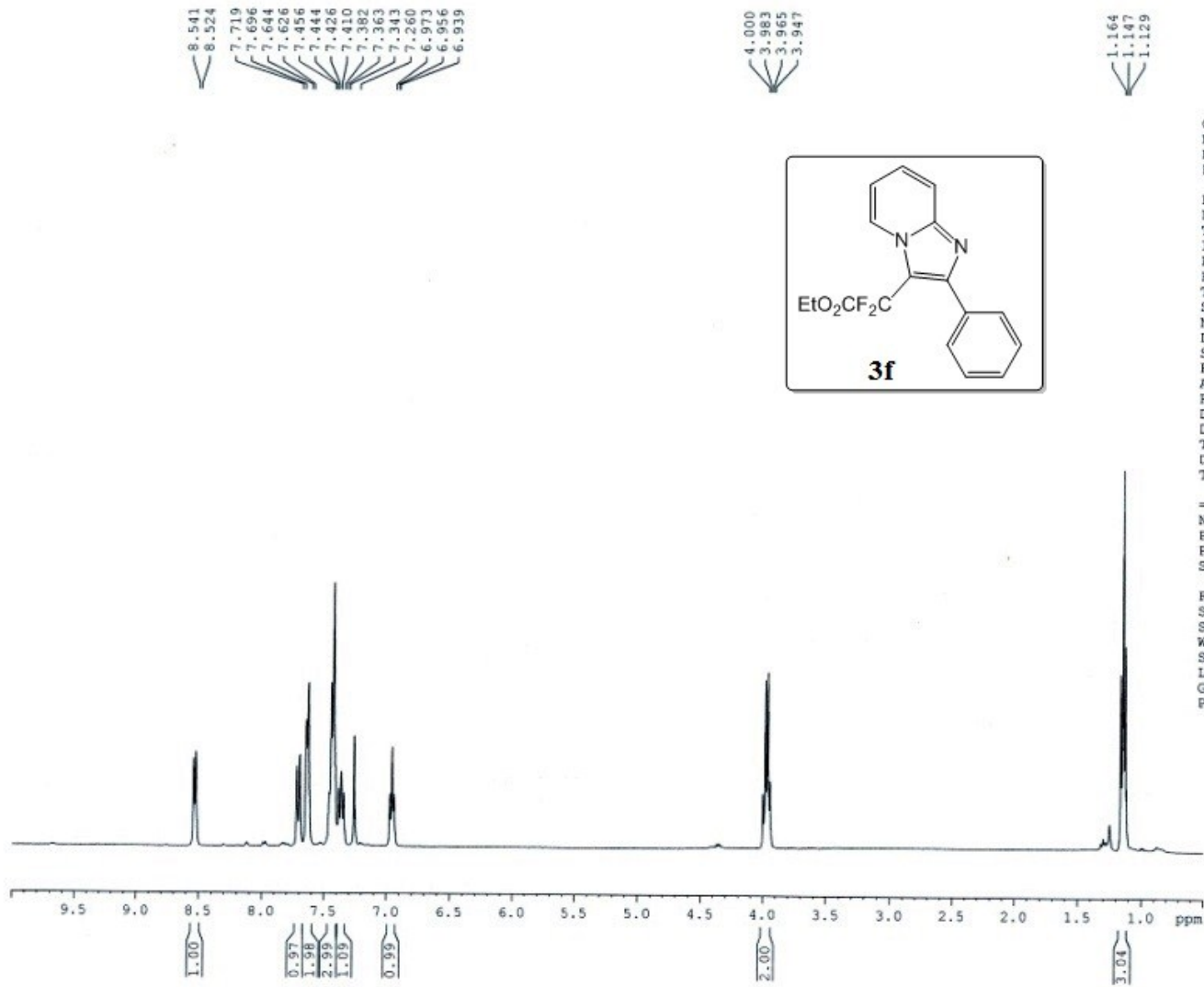
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 443
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150727
Time 10.40
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfglqn
TD 32768
SOLVENT CDC13
NS 4
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 67.81
DW 5.600 usec
DE 6.50 usec
TE 295.4 K
D1 1.00000000 sec
TD0 1

----- CHANNEL f1 -----
NUC1 19F
P1 12.75 usec
PLW1 20.00000000 W
SF01 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



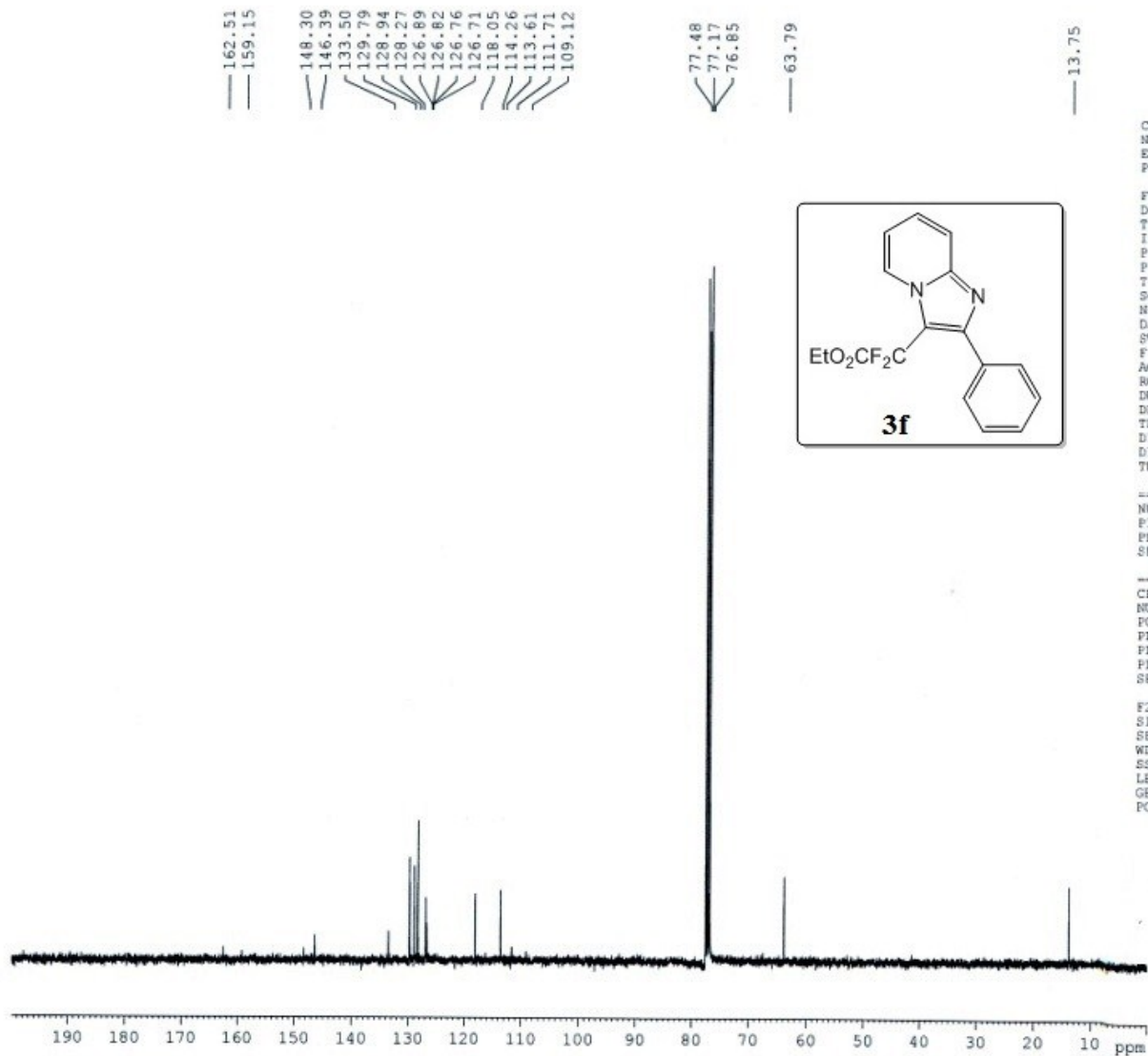


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 289
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150619
 Time_ 12.46
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 FULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 32
 DS 1
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 135.7
 DW 60.800 usec
 DE 6.50 usec
 TE 297.1 K
 D1 1.00000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SF01 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500097 MHz
 WDN EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
 NAME Dr. A SAJRA 2015
 EXPNO 290
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150619
 Time 13.27
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDC13
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 87.66
 DW 20.800 usec
 DE 6.50 usec
 TE 298.5 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177823 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

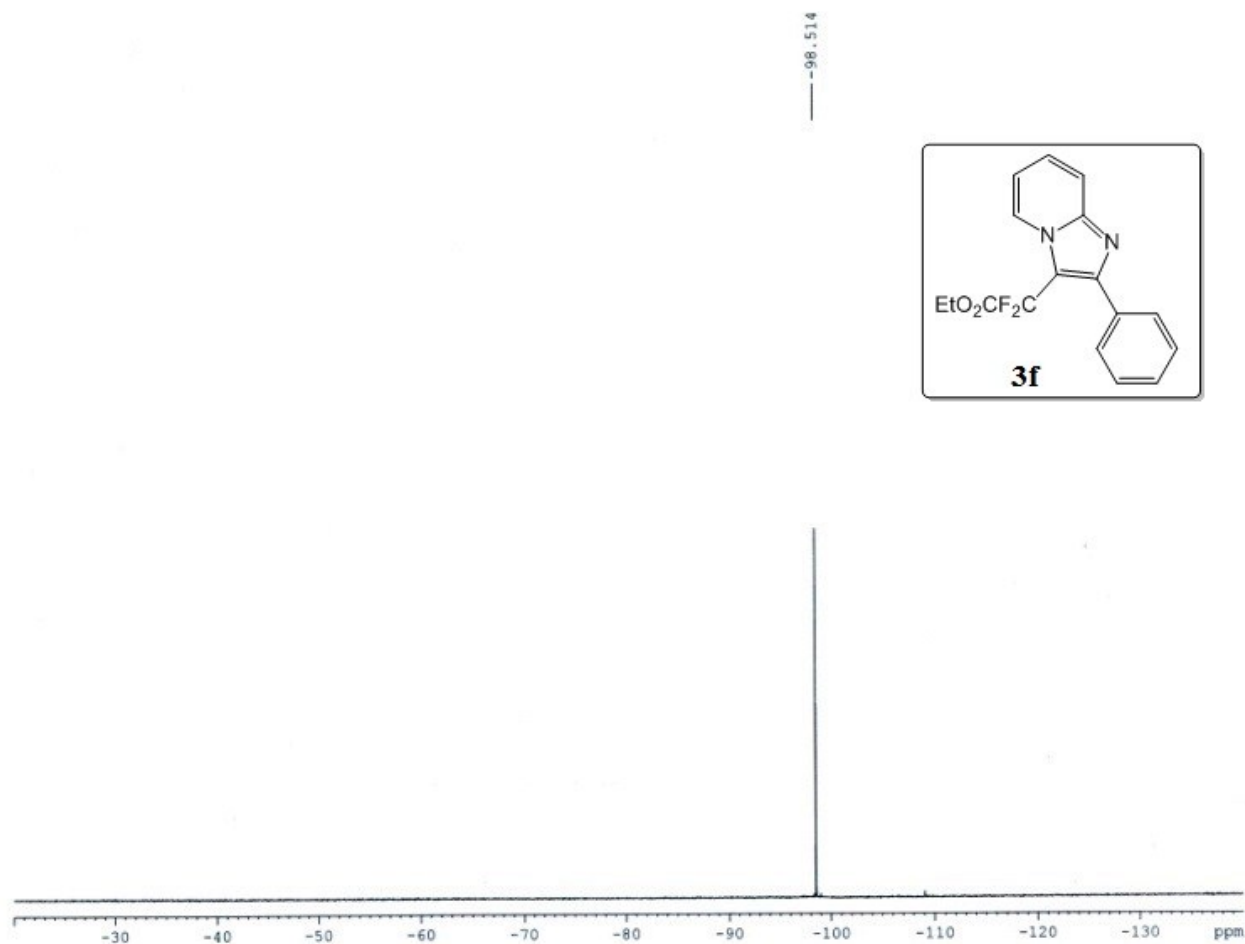
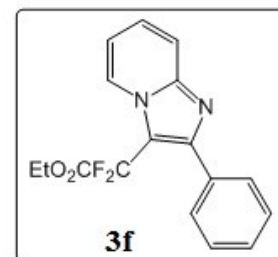


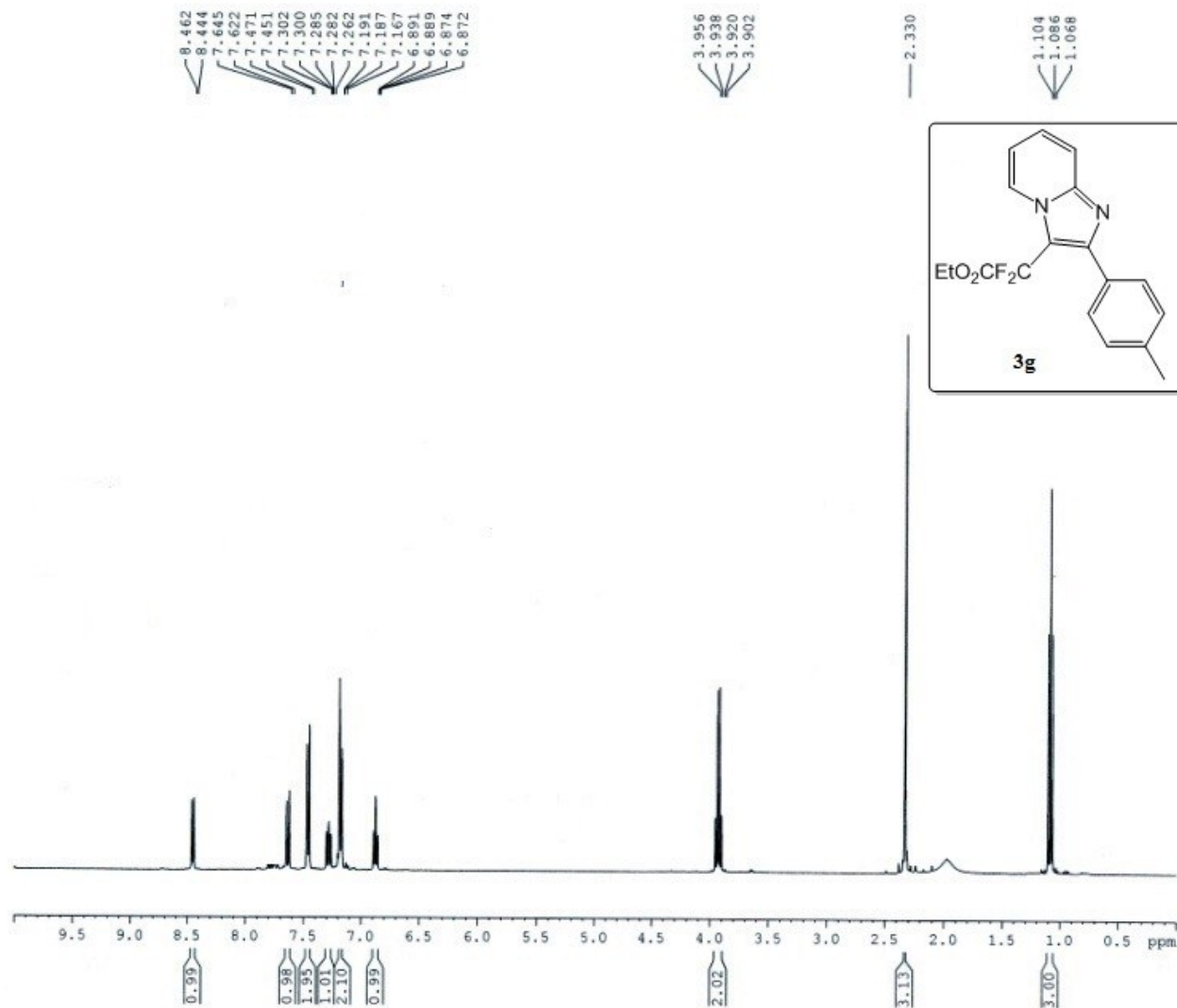
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 291
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150619
Time_ 12.49
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgflqn
TD 32768
SOLVENT CDCl3
NS 2
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 87.66
DW 5.600 usec
DE 6.50 usec
TE 297.1 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 19F
P1 12.50 usec
PLW1 20.00000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



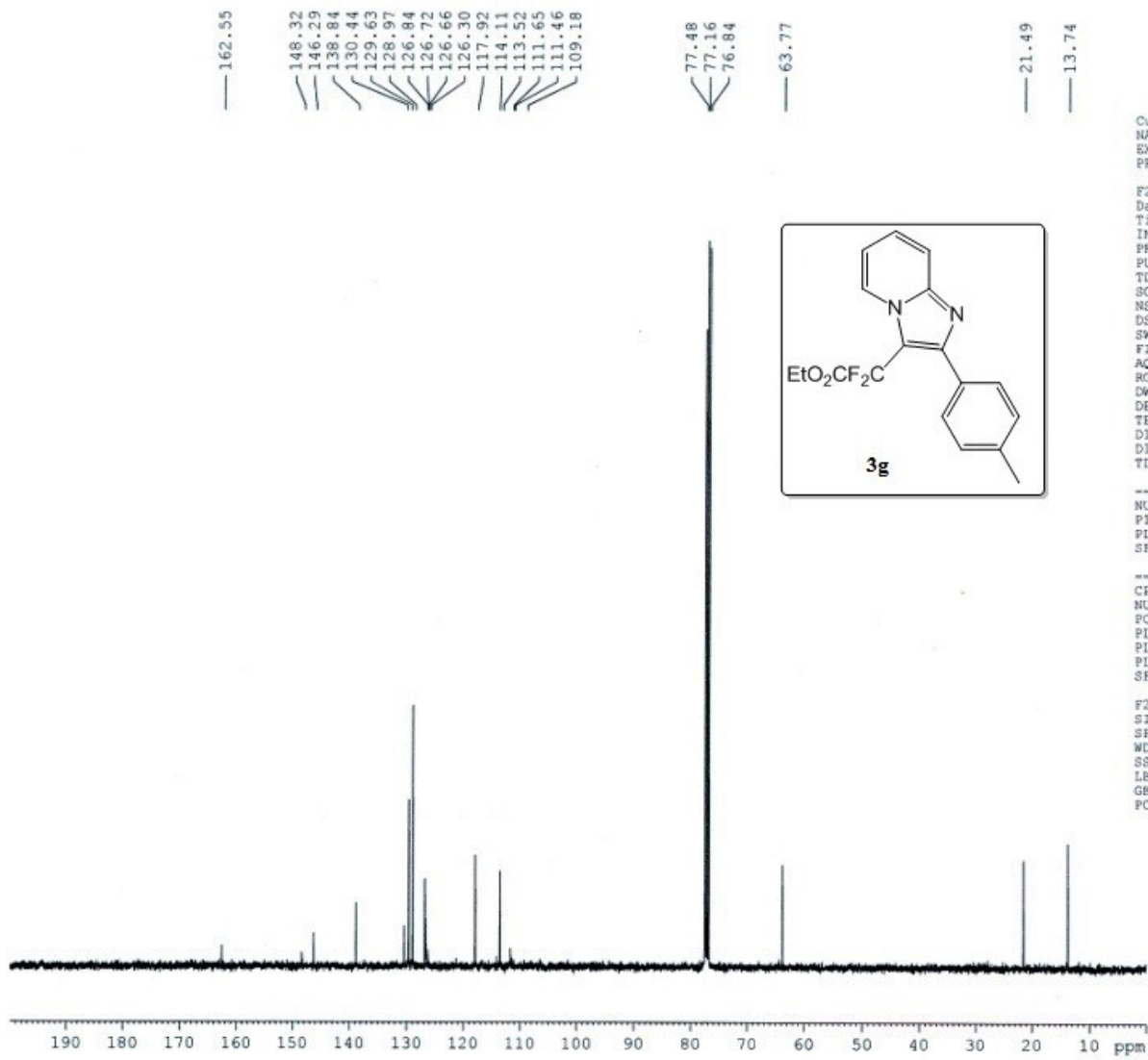


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 247
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150529
 Time 20.12
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 24
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 120.16
 DW 60.800 usec
 DE 6.50 usec
 TE 295.4 K
 D1 1.00000000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500364 MHz
 WDM EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 249
 PROCNO 1

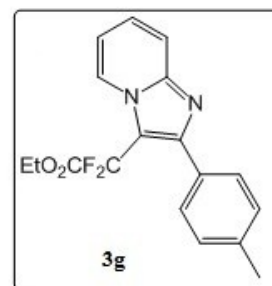
F2 - Acquisition Parameters
 Date_ 20150530
 Time 11.57
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDC13
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.4816244 sec
 RG 87.66
 DW 20.800 usec
 DE 6.50 usec
 TE 295.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177851 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

98.66

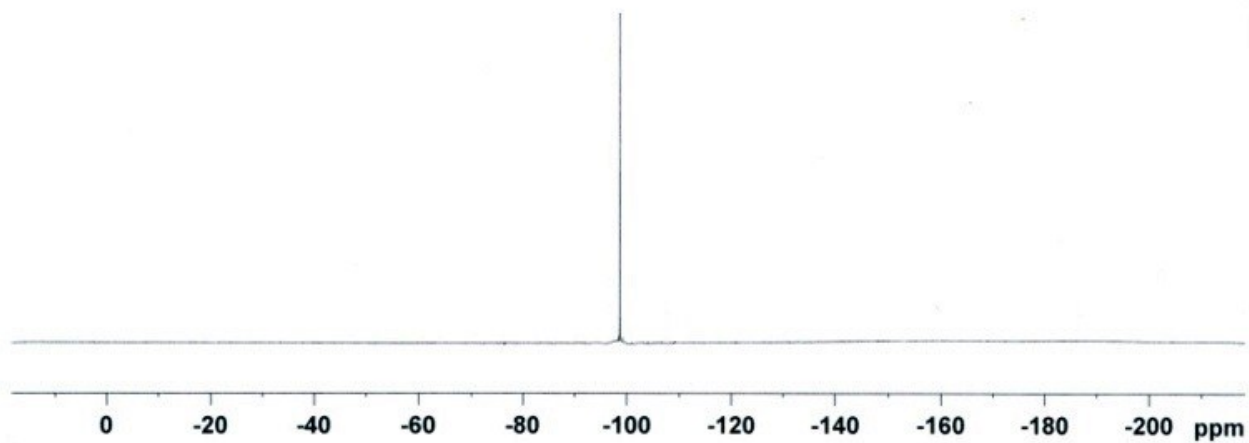


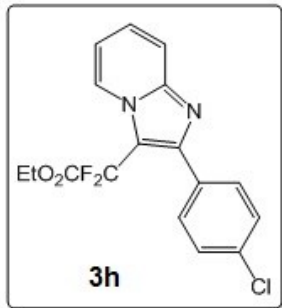
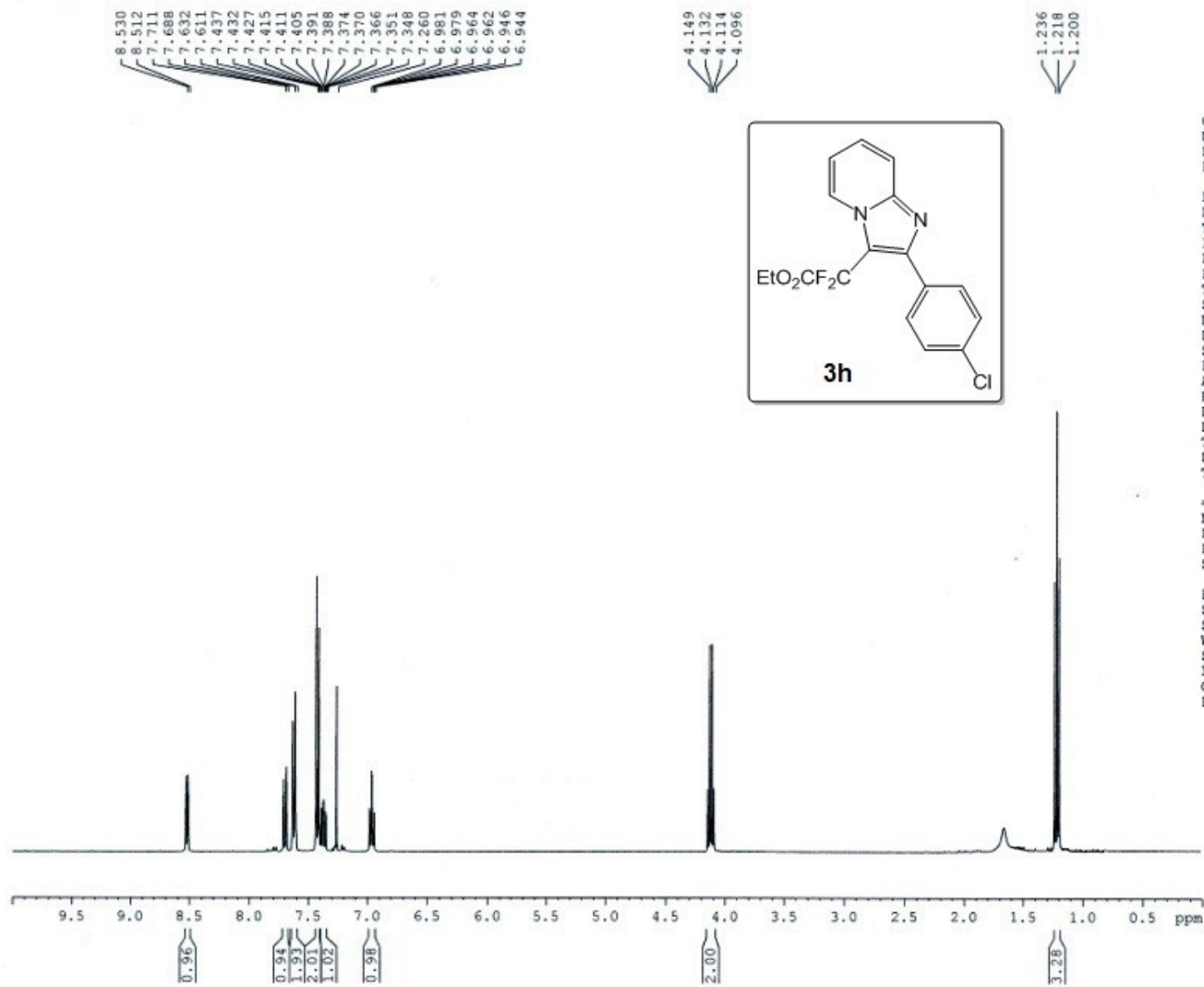
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 248
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150529
Time 20.14
INSTRUM spect
PROBHD 5 mm F4BBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 120.16
DW 5.600 usec
DE 6.50 usec
TE 295.3 K
D1 1.00000000 sec
TDO 1

----- CHANNEL f1 -----
NUC1 19F
P1 12.50 usec
PL1 20.0000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



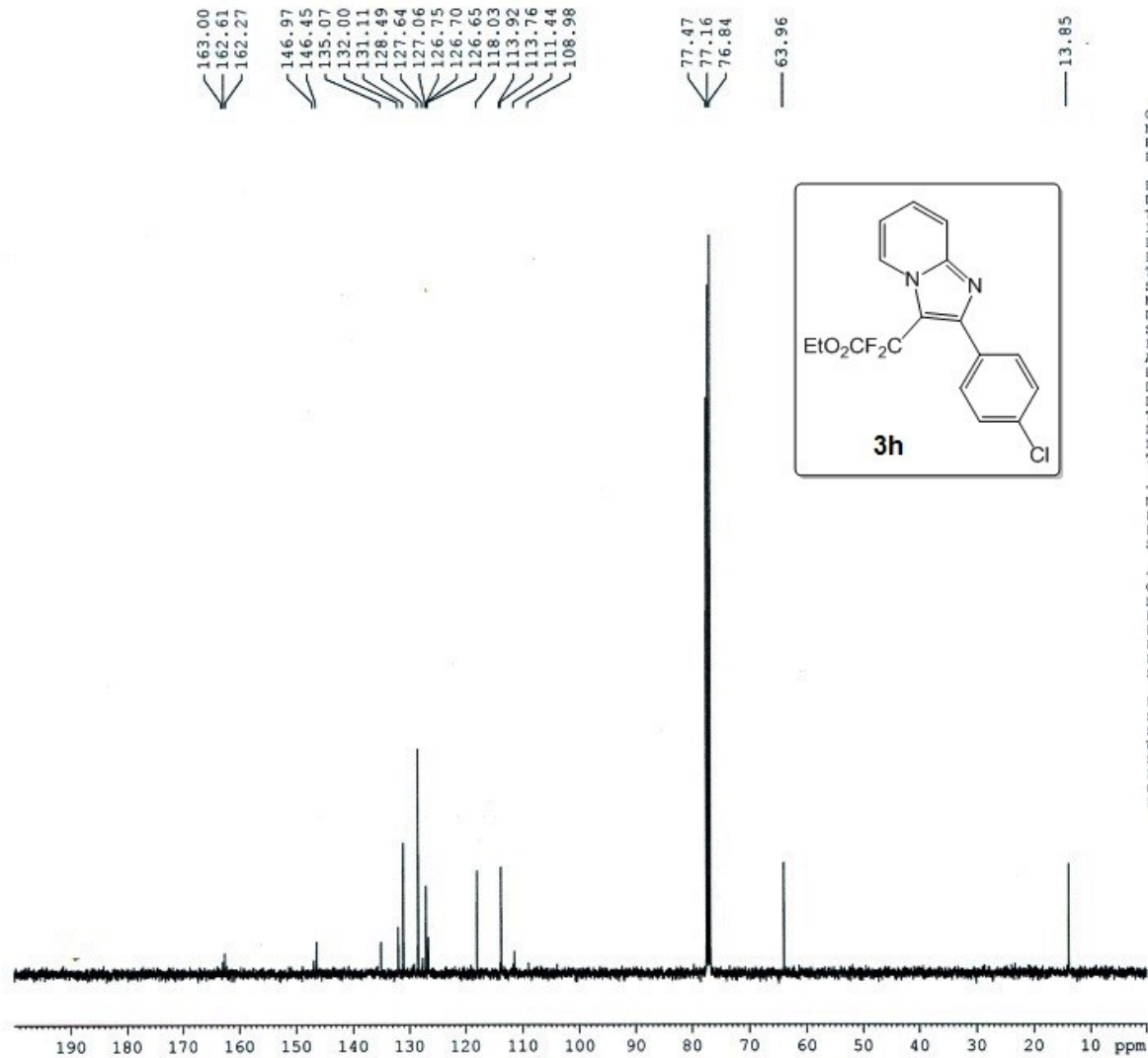


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 236
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150528
 Time 14.35
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 32
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 135.7
 DW 60.800 usec
 DE 6.50 usec
 TE 296.7 K
 D1 1.00000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500090 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 237
 PROCNO 1

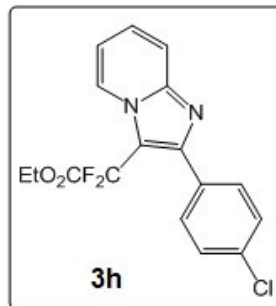
F2 - Acquisition Parameters
 Date 20150528
 Time 15.05
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 512
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 135.7
 DW 20.800 usec
 DE 6.50 usec
 TE 297.4 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177836 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

99.568



Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 238
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150528
Time_ 16.47
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 4
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 87.66
DW 5.600 usec
DE 6.50 usec
TE 295.4 K
D1 1.00000000 sec
TD0 1

----- CHANNEL f1 -----
NUC1 19F
P1 12.50 usec
PLW1 20.00000000 W
SF01 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

-30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 ppm

8.542
8.524
7.857
7.855
7.835
7.753
7.749
7.736
7.732
7.707
7.426
7.423
7.409
7.406
7.401
7.386
7.383
7.260
7.019
7.016
7.001
6.998
6.984
6.981

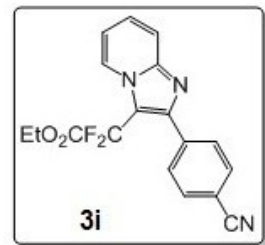
4.252
4.234
4.216
4.198

1.288
1.271
1.253



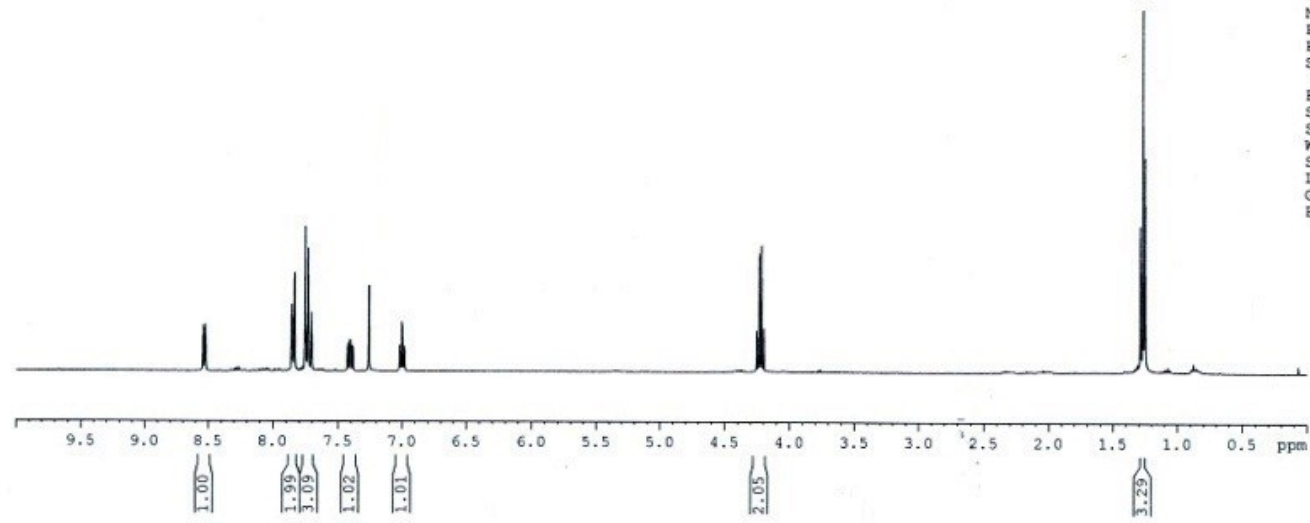
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 296
PROCNO 1

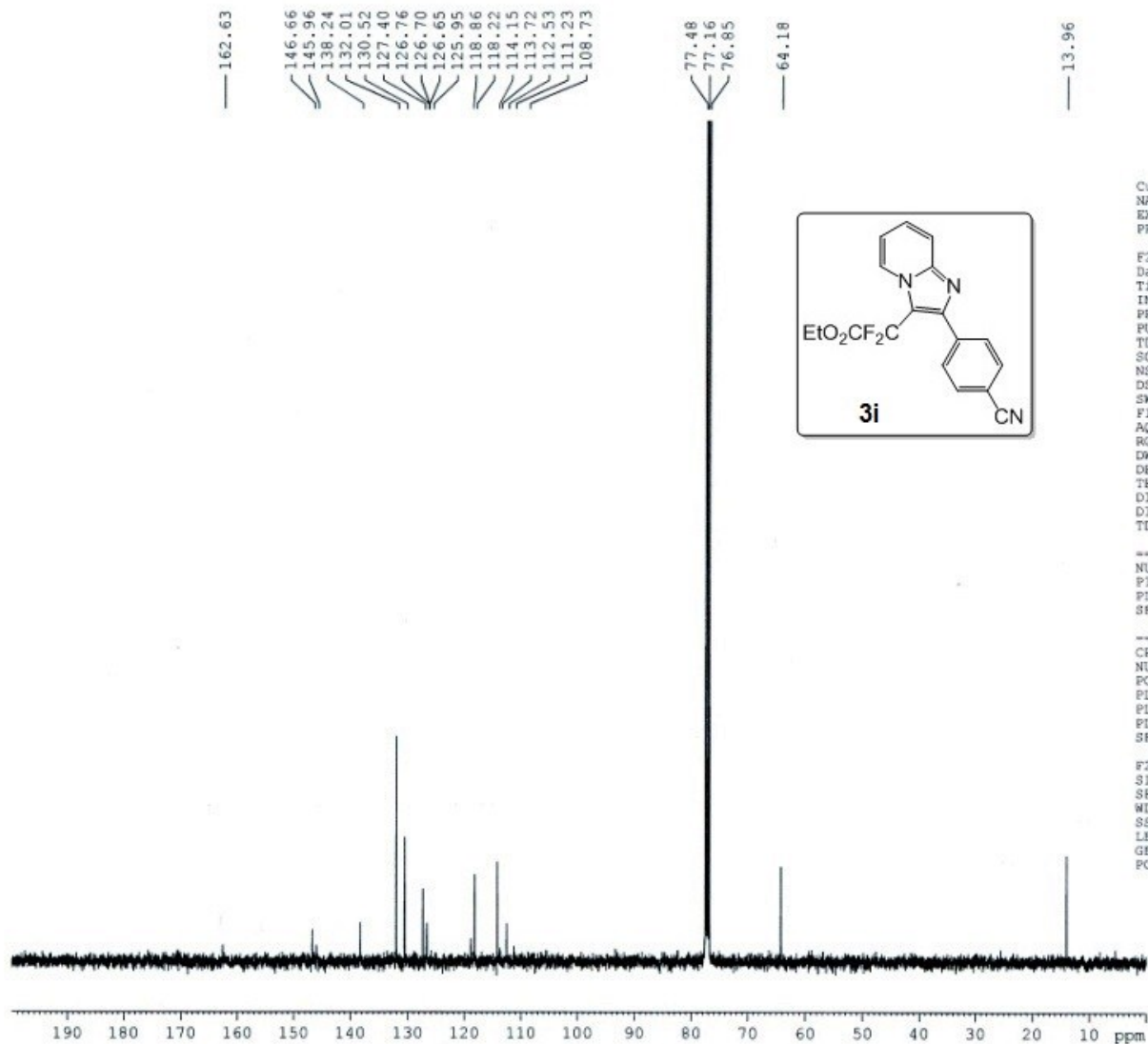
F2 - Acquisition Parameters
Date_ 20150620
Time 12.39
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 87.66
DN 60.800 usec
DE 6.50 usec
TE 296.0 K
D1 1.0000000 sec
TD0 1



===== CHANNEL f1 =====
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





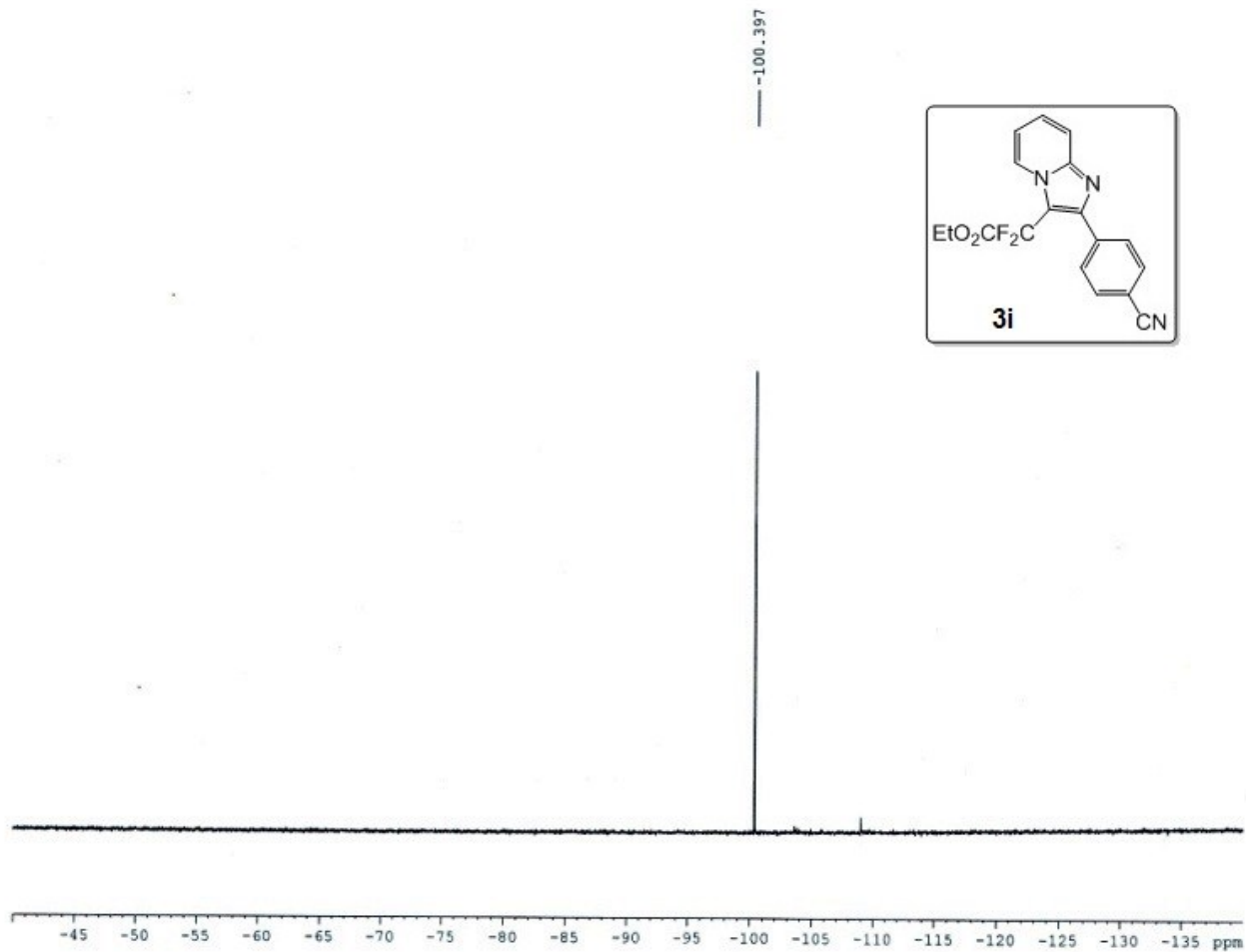
Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 297
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150620
 Time 14.14
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 87.66
 DW 20.800 usec
 DE 6.50 usec
 TE 297.9 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107801 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177828 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 293
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150619
 Time_ 18.10
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 4
 DS 2
 SWH 89285.711 Hz
 FIDRES 2.724784 Hz
 AQ 0.1835508 sec
 RG 87.66
 DW 5.600 usec
 DE 6.50 usec
 TE 297.7 K
 D1 1.0000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 19F
 P1 12.50 usec
 PLW1 20.0000000 W
 SFO1 376.4795333 MHz

F2 - Processing parameters
 SI 16384
 SF 376.5171850 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

8.580
8.562
8.118
7.932
7.921
7.911
7.897
7.890
7.882
7.866
7.819
7.798
7.795
7.757
7.734
7.533
7.526
7.524
7.518
7.516
7.509
7.404
7.402
7.384
7.380
7.365
7.260
6.994
6.992
6.976
6.974
6.959
6.957

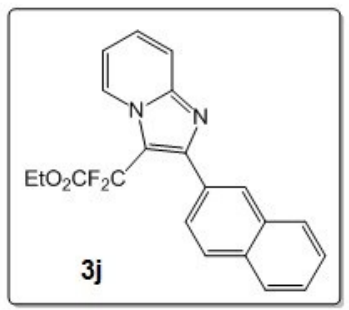
3.924
3.906
3.889
3.871

1.106
1.088
1.070



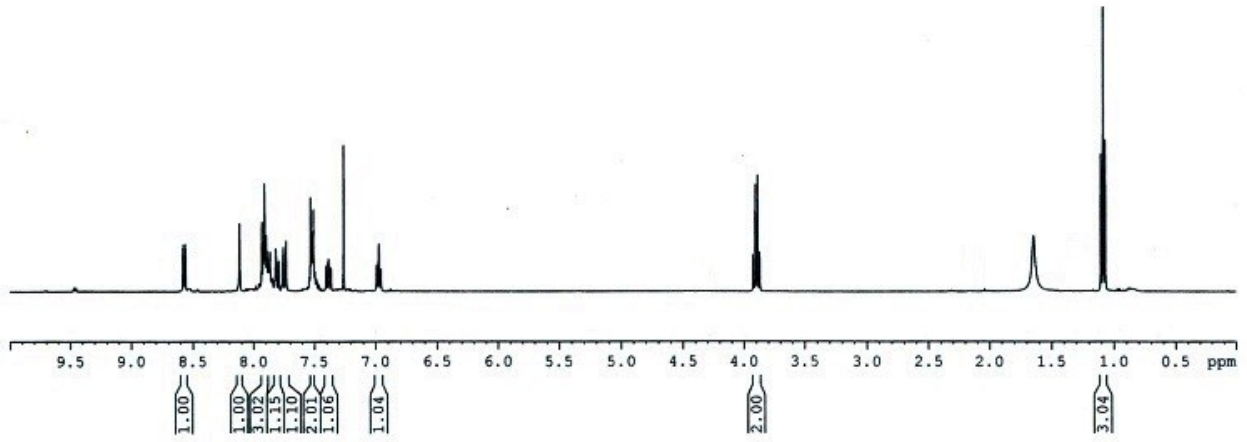
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 433
PROCNO 1

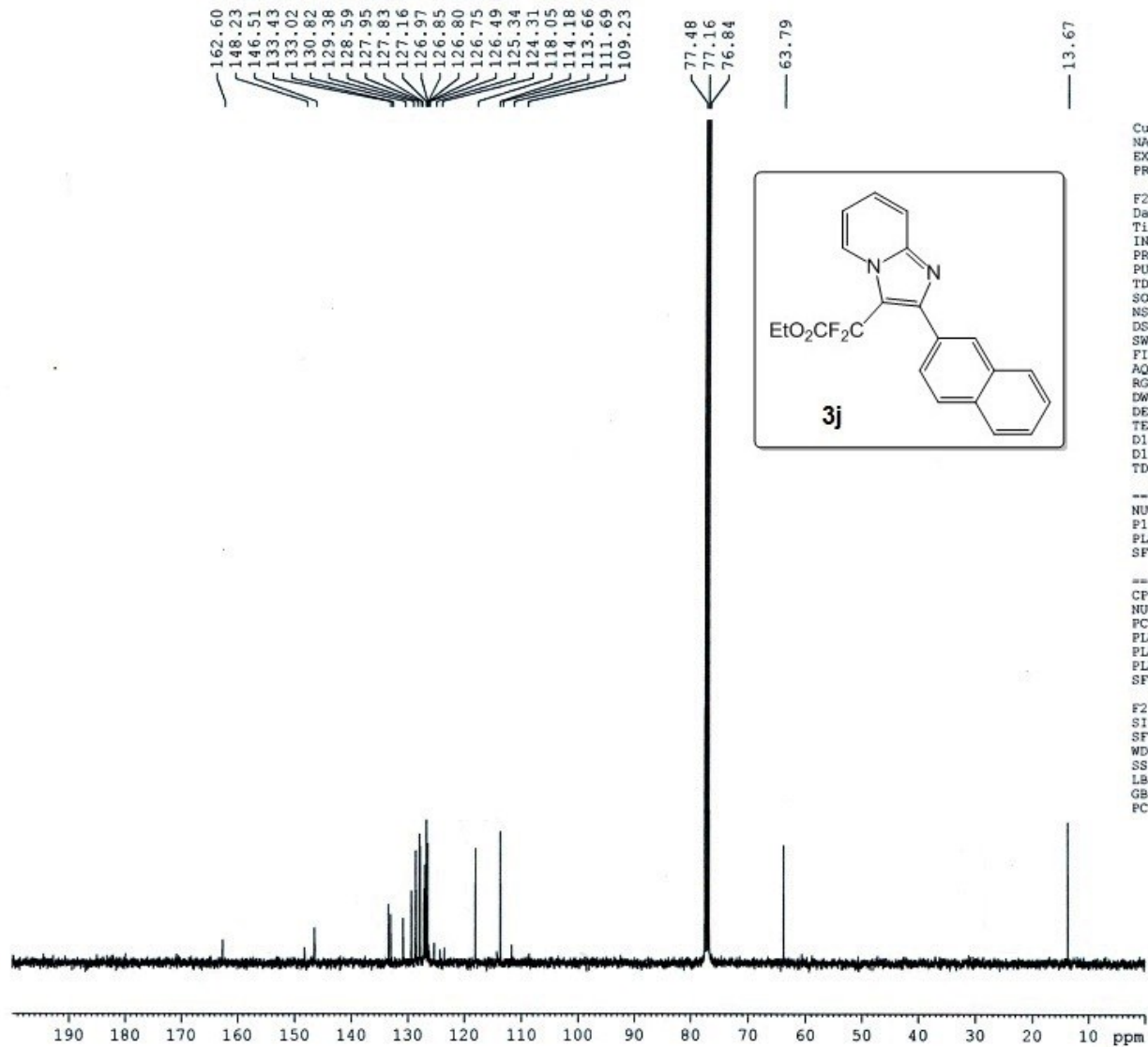
F2 - Acquisition Parameters
Date_ 20150724
Time 11.58
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDC13
NS 32
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 135.7
DW 60.800 usec
DE 6.50 usec
TE 299.9 K
D1 1.00000000 sec
TDO 1



----- CHANNEL f1 -----
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500089 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





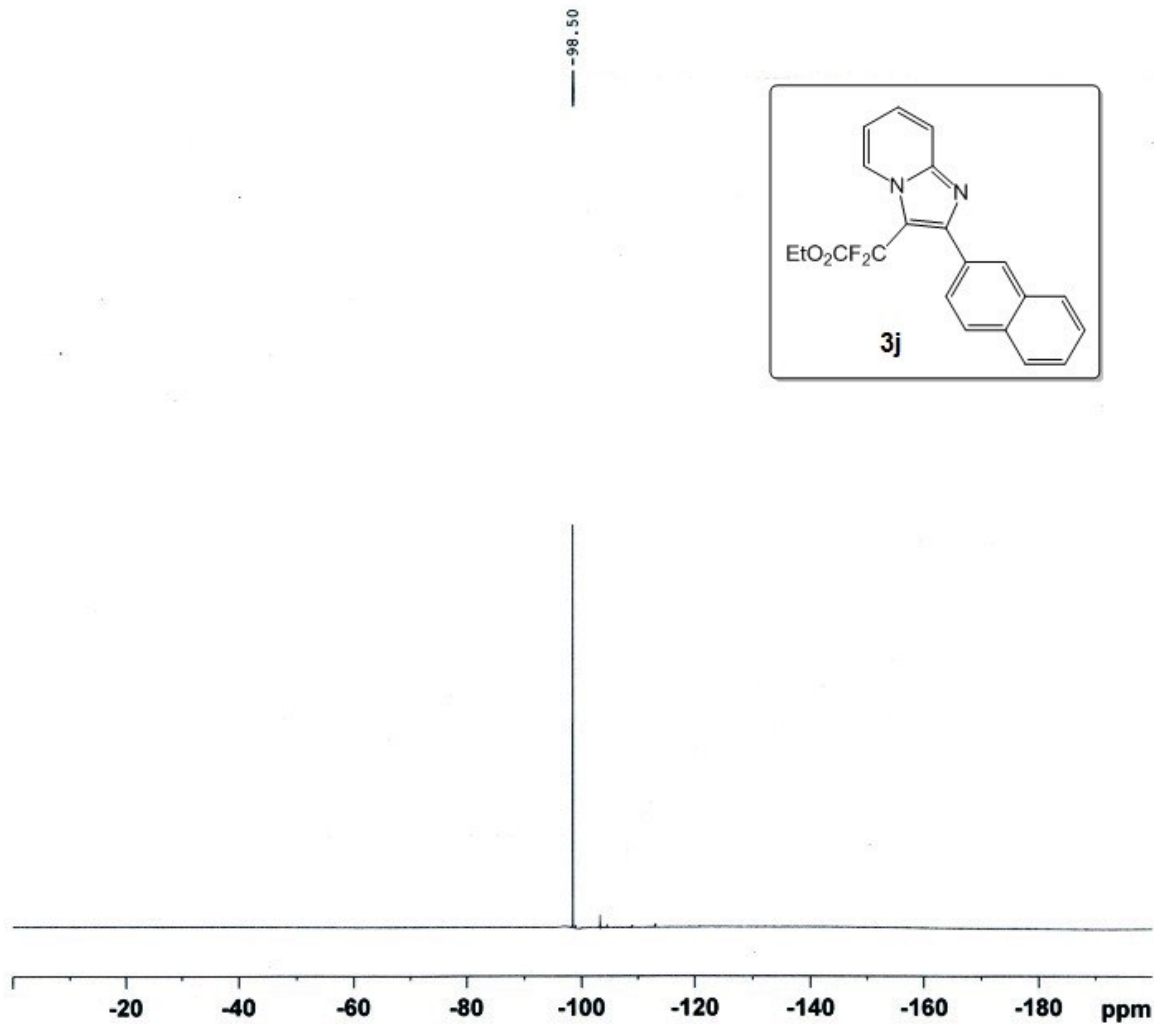
Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 438
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150726
 Time 18.39
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 87.66
 DW 20.800 usec
 DE 6.50 usec
 TE 299.1 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CFDPFG2 waltz16
 NUC2 1H
 FCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 S1 16384
 SF 100.6177836 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 437
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150724
 Time 19.41
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 89285.711 Hz
 FIDRES 2.724784 Hz
 AQ 0.1835508 sec
 RG 135.7
 DW 5.600 usec
 DE 6.50 usec
 TE 297.6 K
 D1 1.00000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 12.50 usec
 PLW1 20.00000000 W
 SF01 376.4795333 MHz

F2 - Processing parameters
 SI 16384
 SF 376.5171850 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

8.644
8.626
8.534
8.523
8.217
8.198
7.831
7.827
7.812
7.807
7.792
7.788
7.771
7.749
7.384
7.369
7.366
7.361
7.346
7.344
7.276
7.274
7.260
7.245
7.243
6.980
6.978
6.962
6.961
6.945
6.943

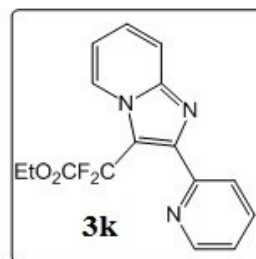
4.115
4.097
4.079
4.061

1.067
1.049
1.031



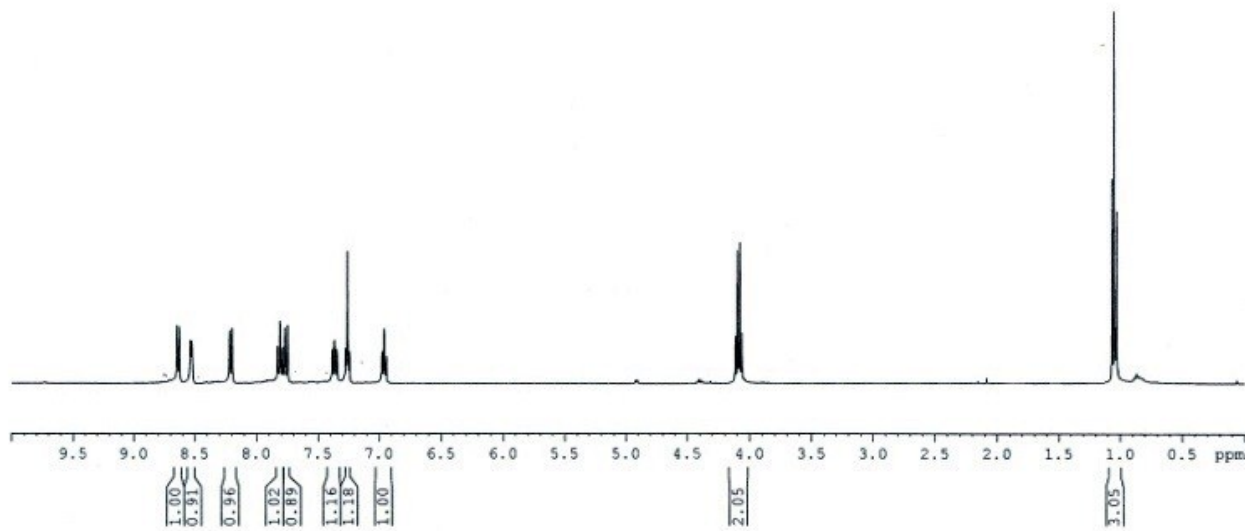
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 567
PROCNO 1

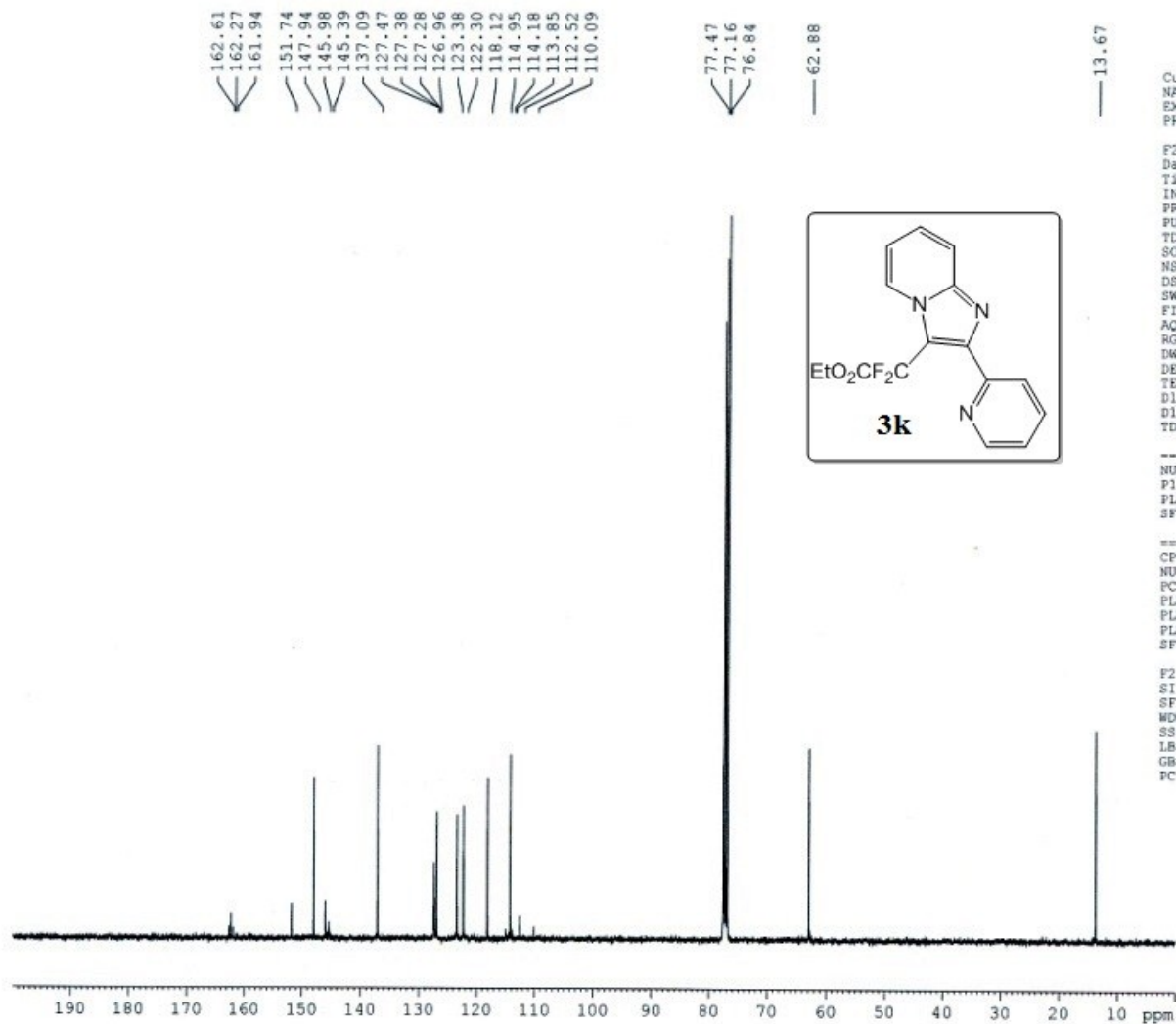
F2 - Acquisition Parameters
Date_ 20150831
Time 11.27
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 93.46
DW 60.800 usec
DE 6.50 usec
TE 296.8 K
D1 1.00000000 sec
TDO 1



----- CHANNEL f1 -----
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 569
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150831
 Time 13.05
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDC13
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 93.46
 DW 20.800 usec
 DE 6.50 usec
 TE 298.8 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.0000000 W
 SFO1 100.6278588 MHz

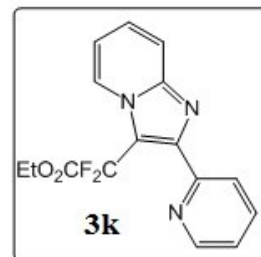
----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.0000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177850 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

-96.43



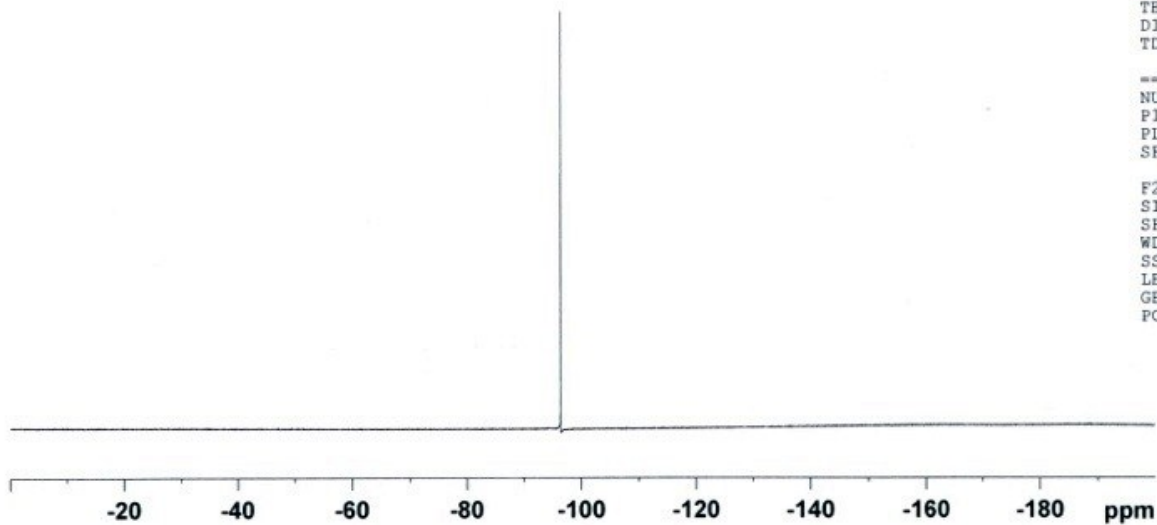
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 565
PROCNO 1



F2 - Acquisition Parameters
Date_ 20150829
Time 12.33
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfglqn
TD 32768
SOLVENT CDCl3
NS 4
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 135.7
DW 5.600 usec
DE 6.50 usec
TE 296.8 K
D1 1.00000000 sec
TDO 1

===== CHANNEL f1 =====
NUC1 19F
P1 12.75 usec
PLW1 20.00000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



8.584
8.580
7.662
7.638
7.630
7.624
7.610
7.607
7.460
7.456
7.447
7.444
7.439
7.433
7.429
7.422
7.351
7.346
7.327
7.322
7.260

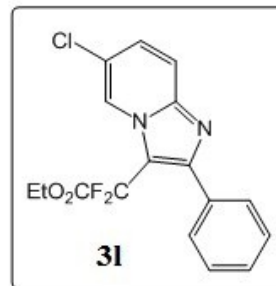
4.035
4.017
3.999
3.981

1.183
1.165
1.147



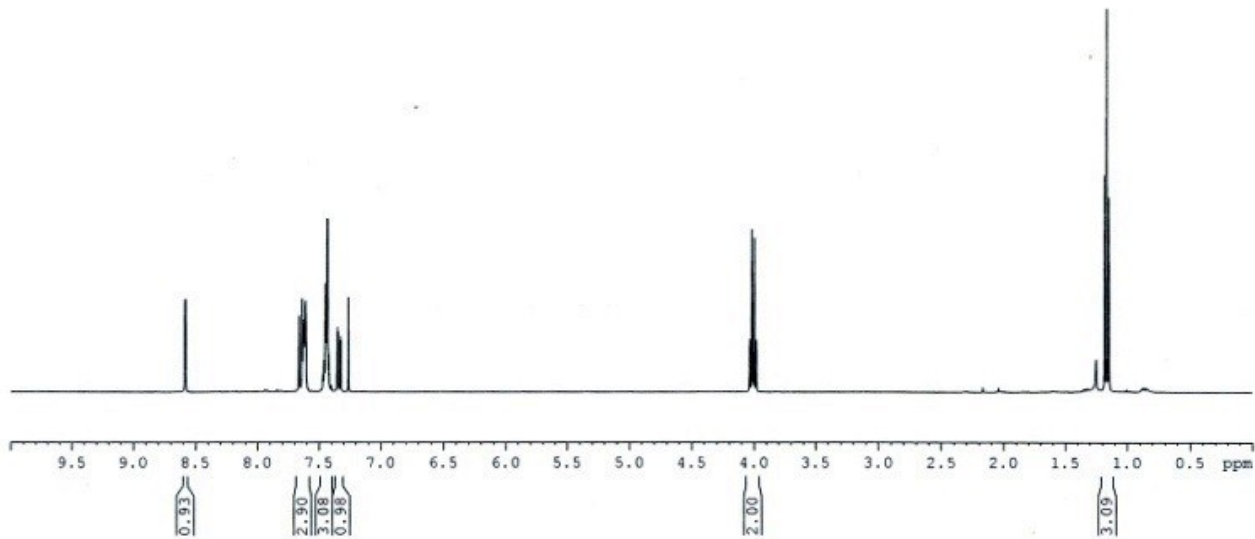
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 514
PROCNO 1

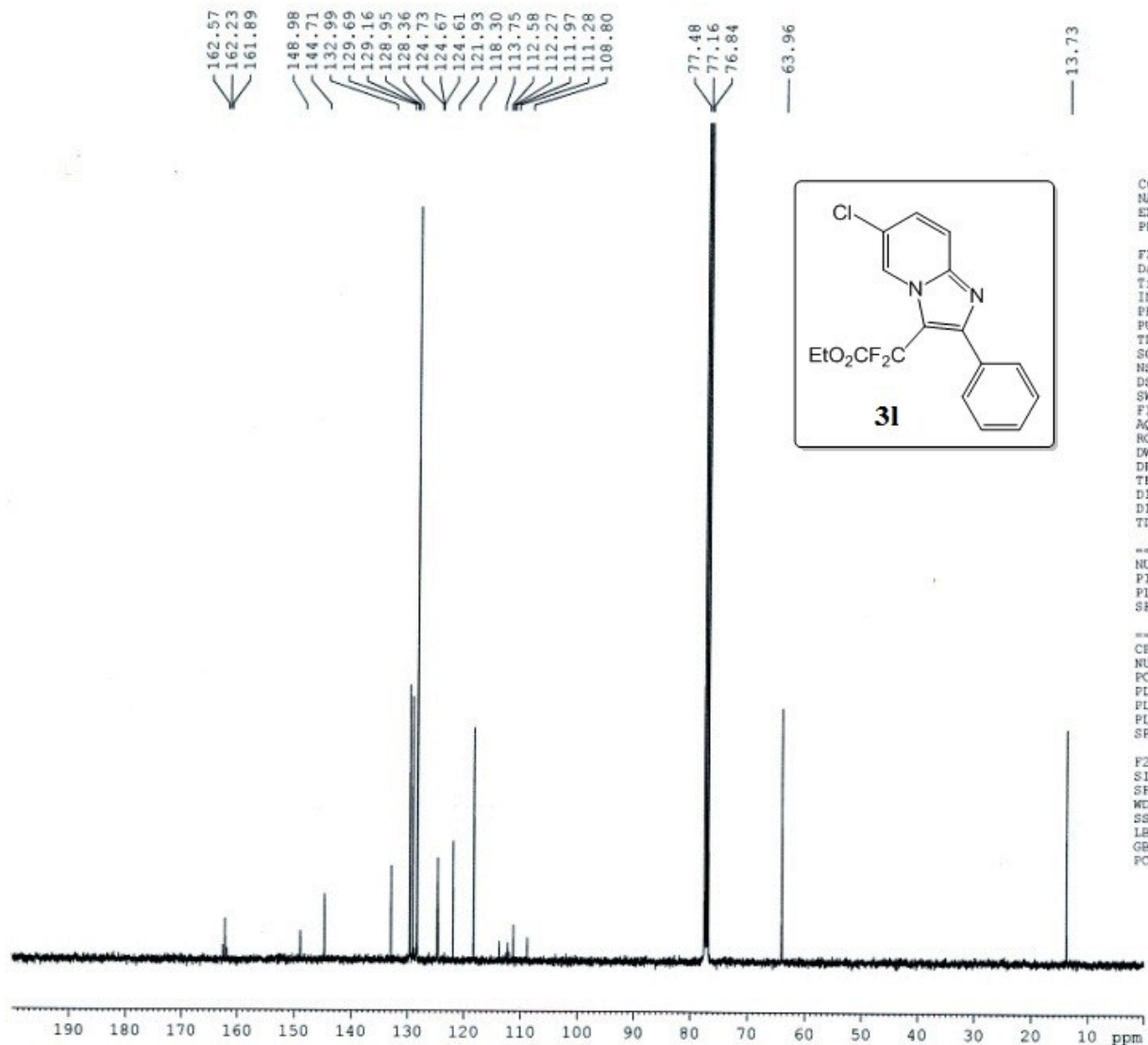
F2 - Acquisition Parameters
Date_ 20150809
Time 10.10
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.992344 sec
RG 120.16
DW 60.800 usec
DE 6.50 usec
TE 296.1 K
D1 1.00000000 sec
TDO 1



===== CHANNEL f1 =====
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SF01 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 516
 PROCNO 1

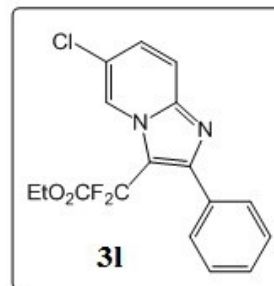
F2 - Acquisition Parameters
 Date_ 20150809
 Time 12.42
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 120.16
 DW 20.800 usec
 DE 6.50 usec
 TE 298.7 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177836 MHz
 MW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

---99.86---

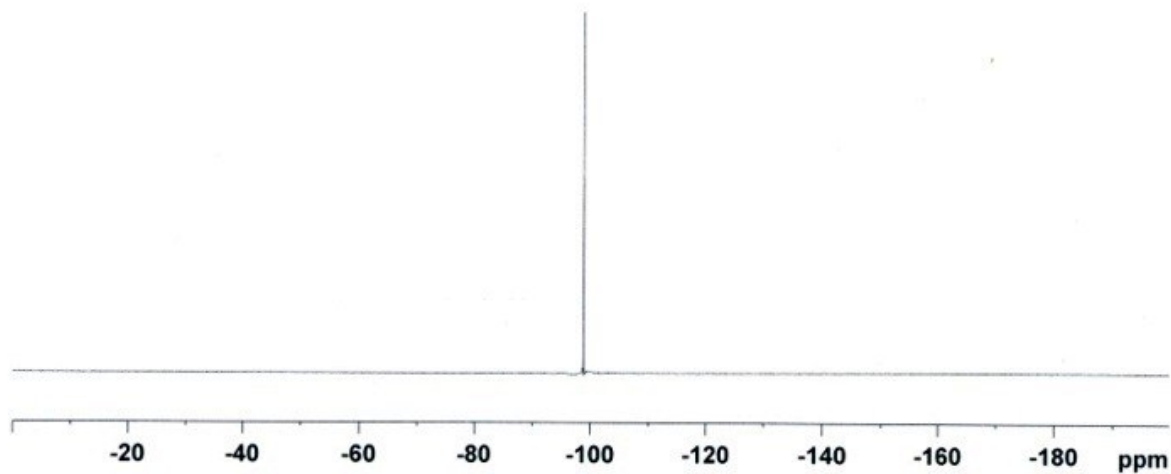


Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 515
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150809
Time 10.12
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 4
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 120.16
DW 5.600 usec
DE 6.50 usec
TE 296.1 K
D1 1.00000000 sec
TDO 1

----- CHANNEL f1 -----
NUC1 19F
P1 12.75 usec
PL1 20.0000000 W
SFO1 376.4793333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



7.712
7.701
7.519
7.498
7.260
7.231
7.211
6.952
6.940

4.082
4.064
4.046
4.028

2.376

1.137
1.120
1.101

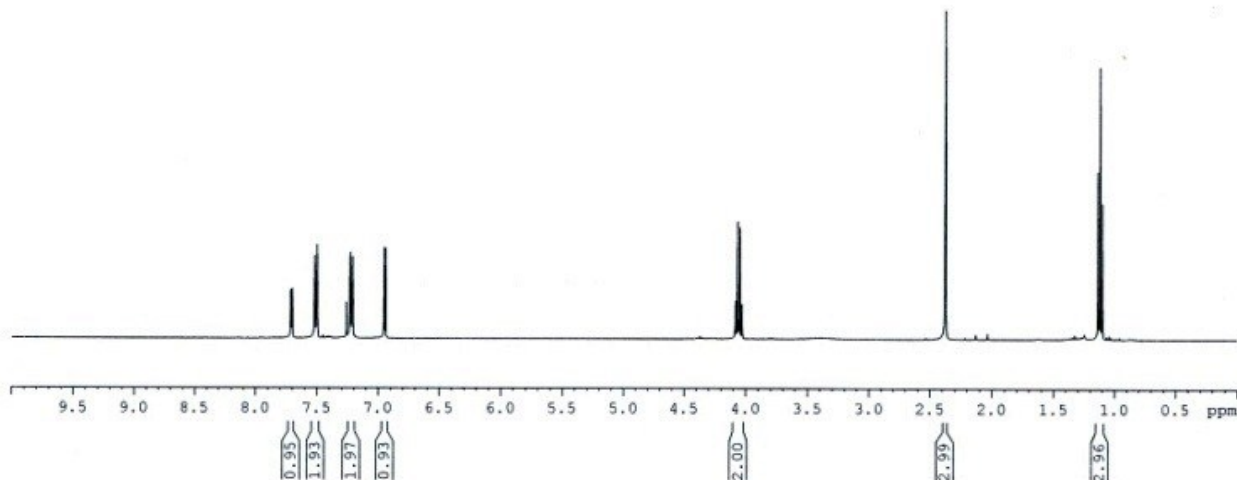
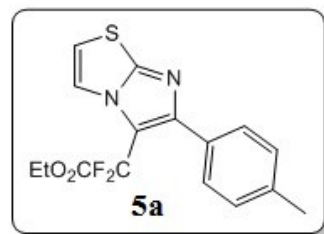


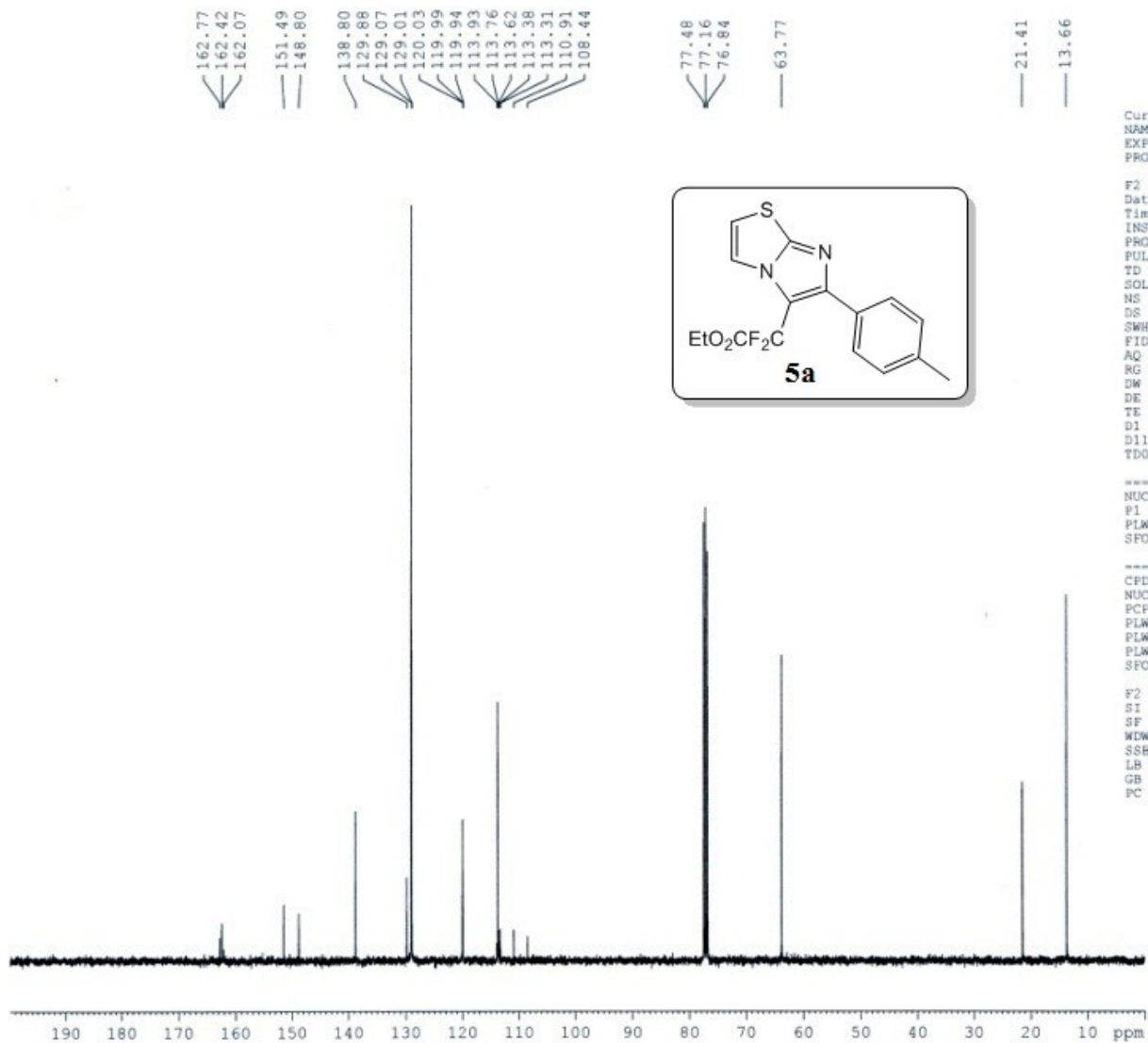
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 519
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150811
Time 9.33
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 24
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 40.87
DW 60.800 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TDO 1

----- CHANNEL f1 -----
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
S1 16384
SF 400.1500090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 521
 PROCNO 1

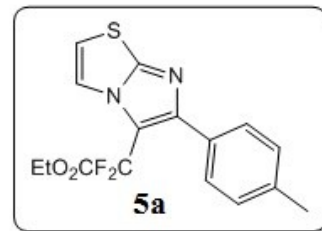
F2 - Acquisition Parameters
 Date_ 20150811
 Time_ 9.52
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 320
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 40.87
 DW 20.800 usec
 DE 6.50 usec
 TE 297.4 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CFDPGR2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.24107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177880 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

— -97.26

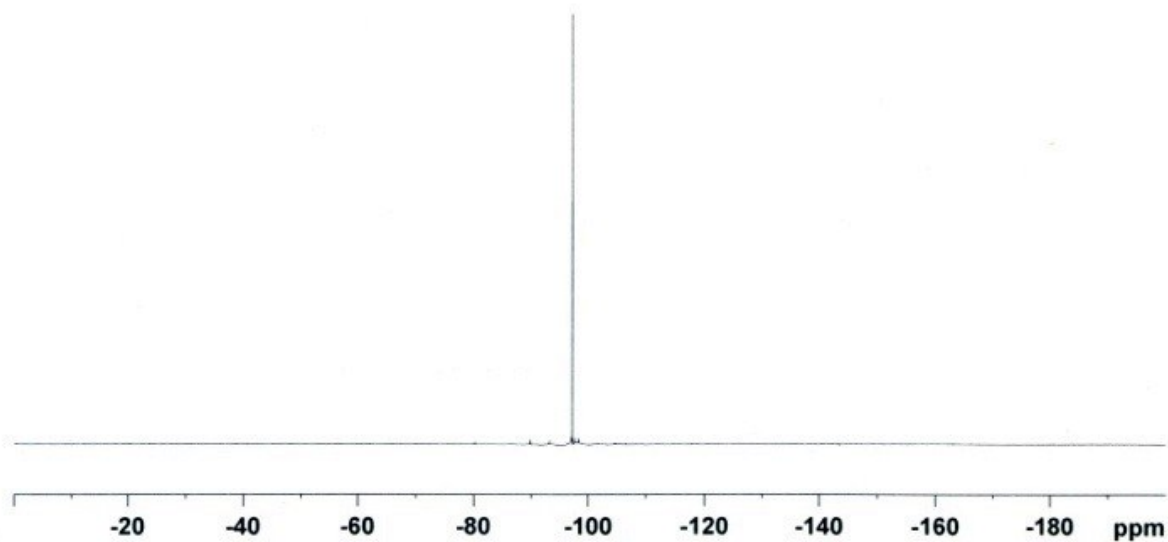


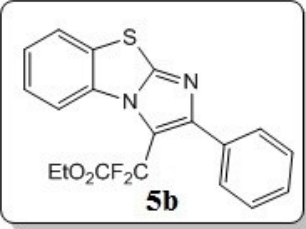
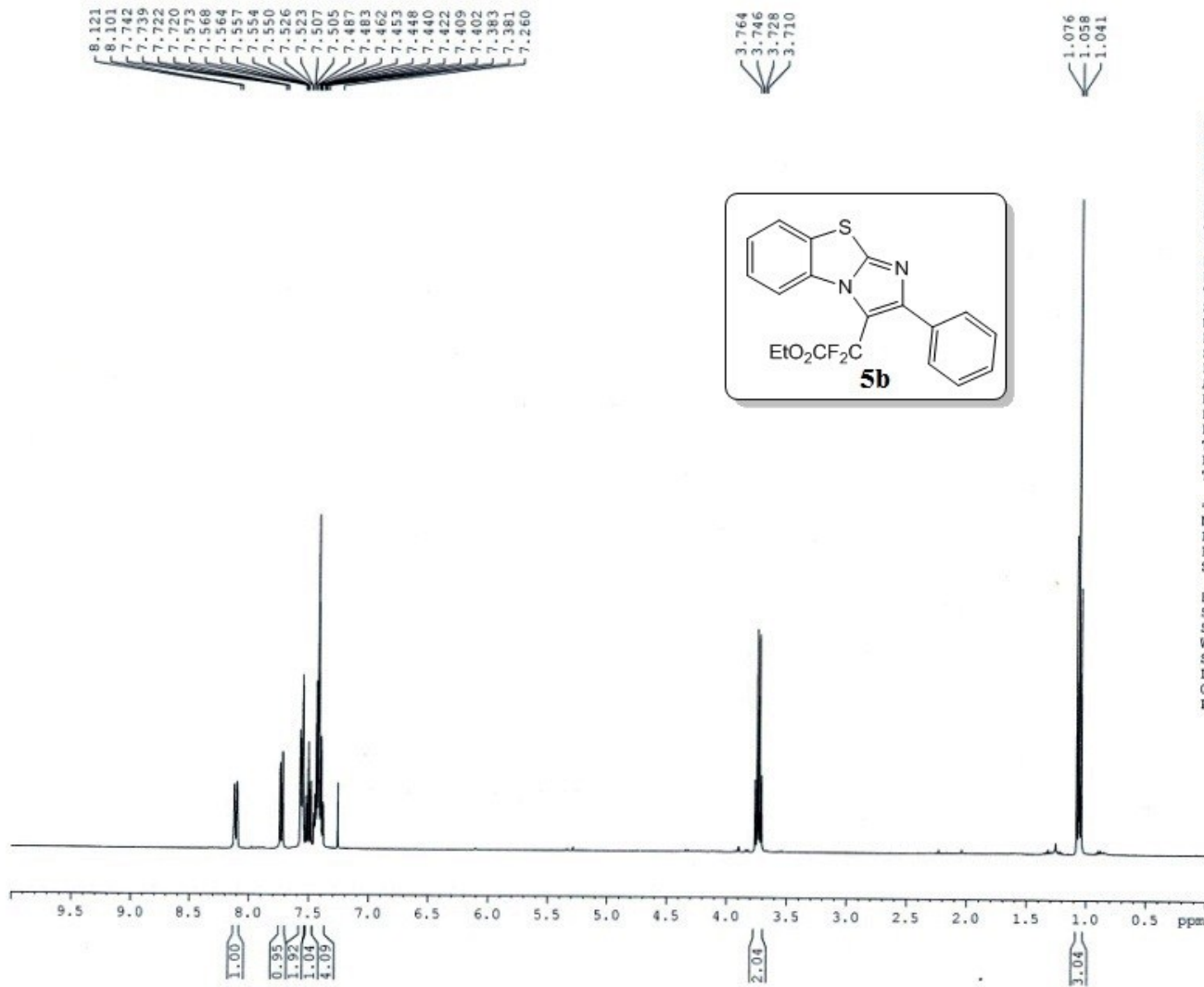
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 520
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150811
Time 9.35
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 4
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 40.87
DW 5.600 usec
DE 6.50 usec
TE 296.3 K
D1 1.00000000 sec
TDO 1

***** CHANNEL f1 *****
NUC1 19F
P1 12.75 usec
PLW1 20.00000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



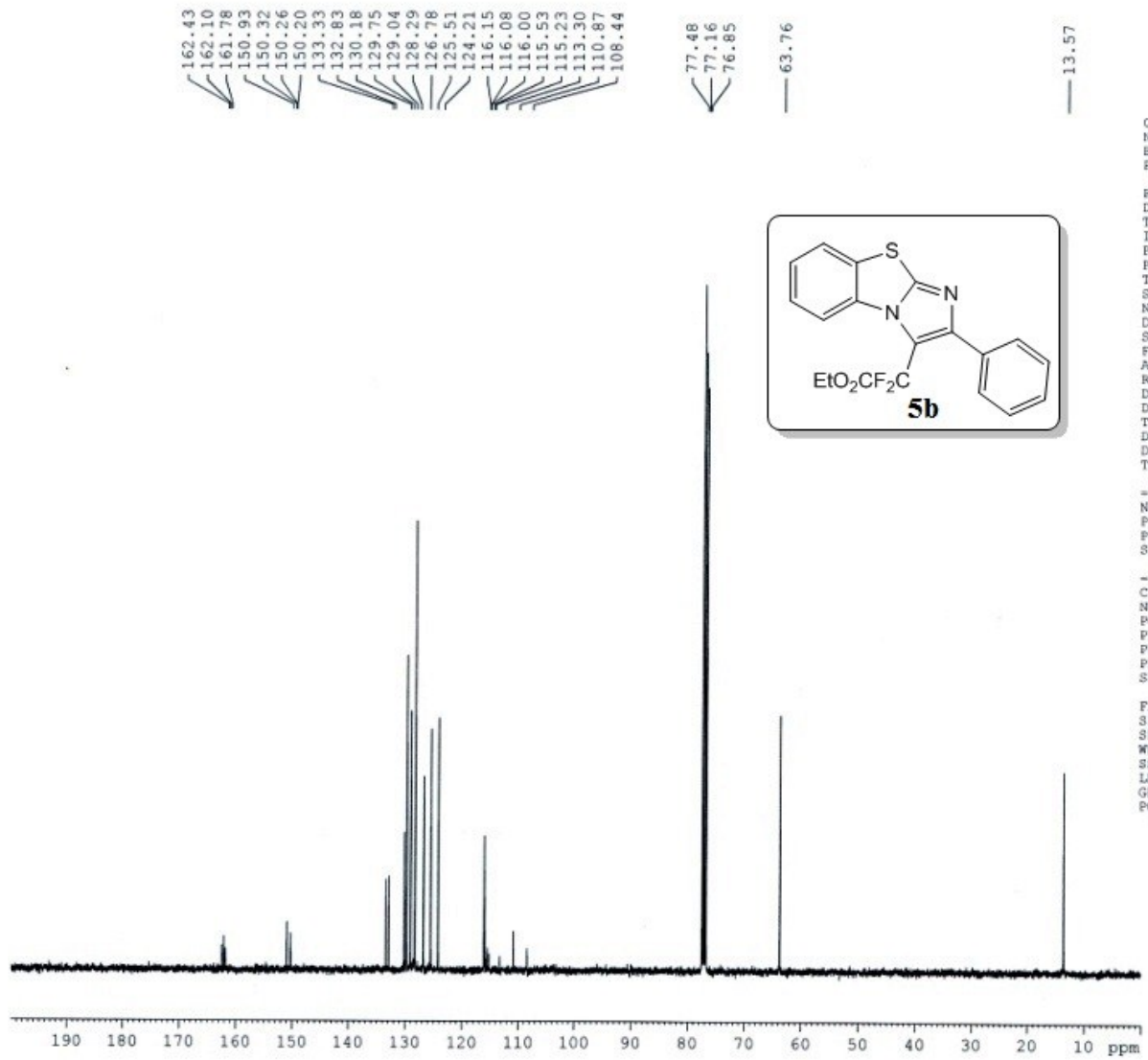


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 495
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150804
 Time 17.29
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 32
 DS 1
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 87.66
 DW 60.800 usec
 DE 6.50 usec
 TE 297.0 K
 D1 1.00000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 1H
 P1 14.75 usec
 PLW1 11.99499989 W
 SFO1 400.1524711 MHz

F2 - Processing parameters
 SI 16384
 SF 400.1500089 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



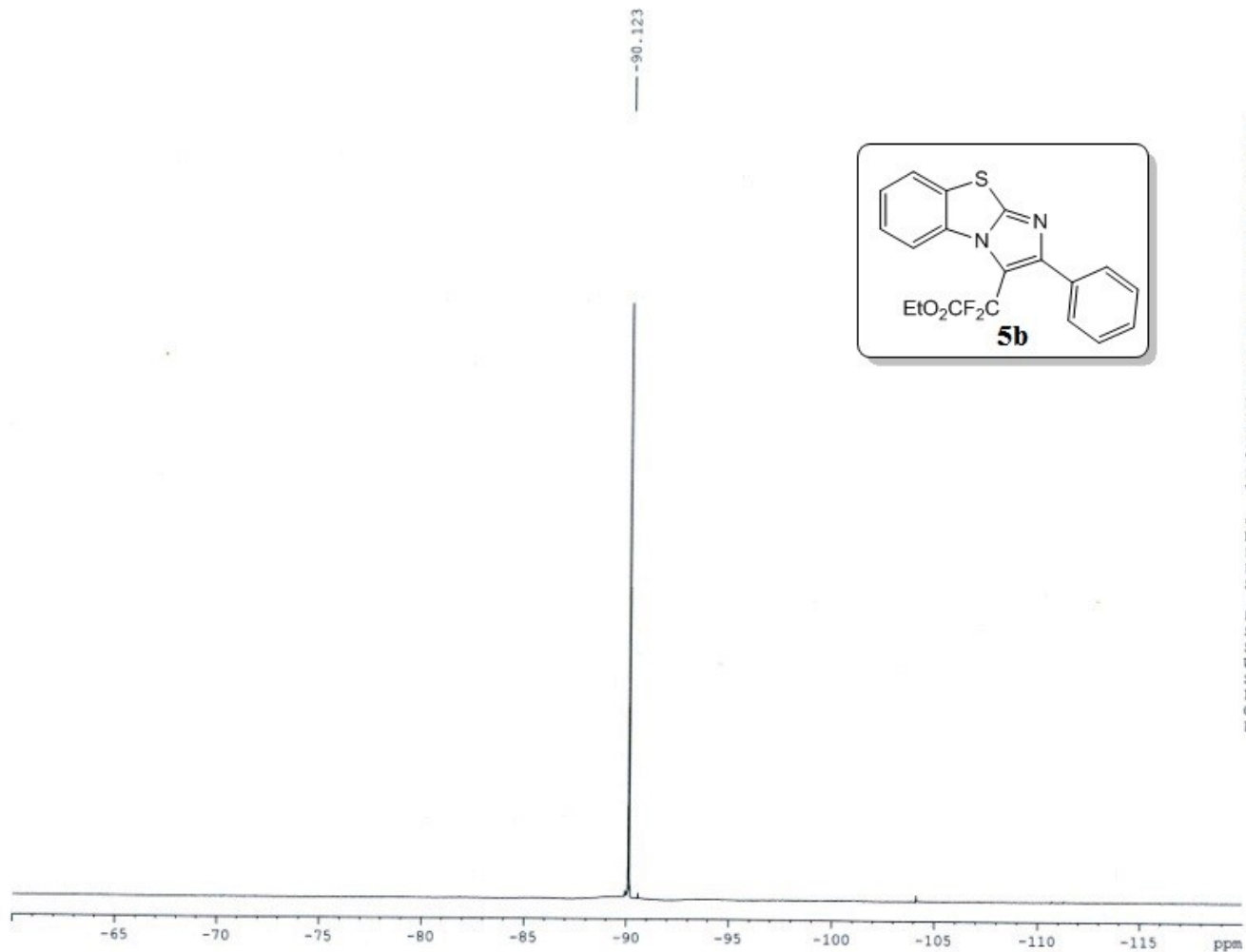
Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 497
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150804
 Time 19.36
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 912
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 87.66
 DW 20.800 usec
 DE 6.50 usec
 TE 298.7 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177851 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

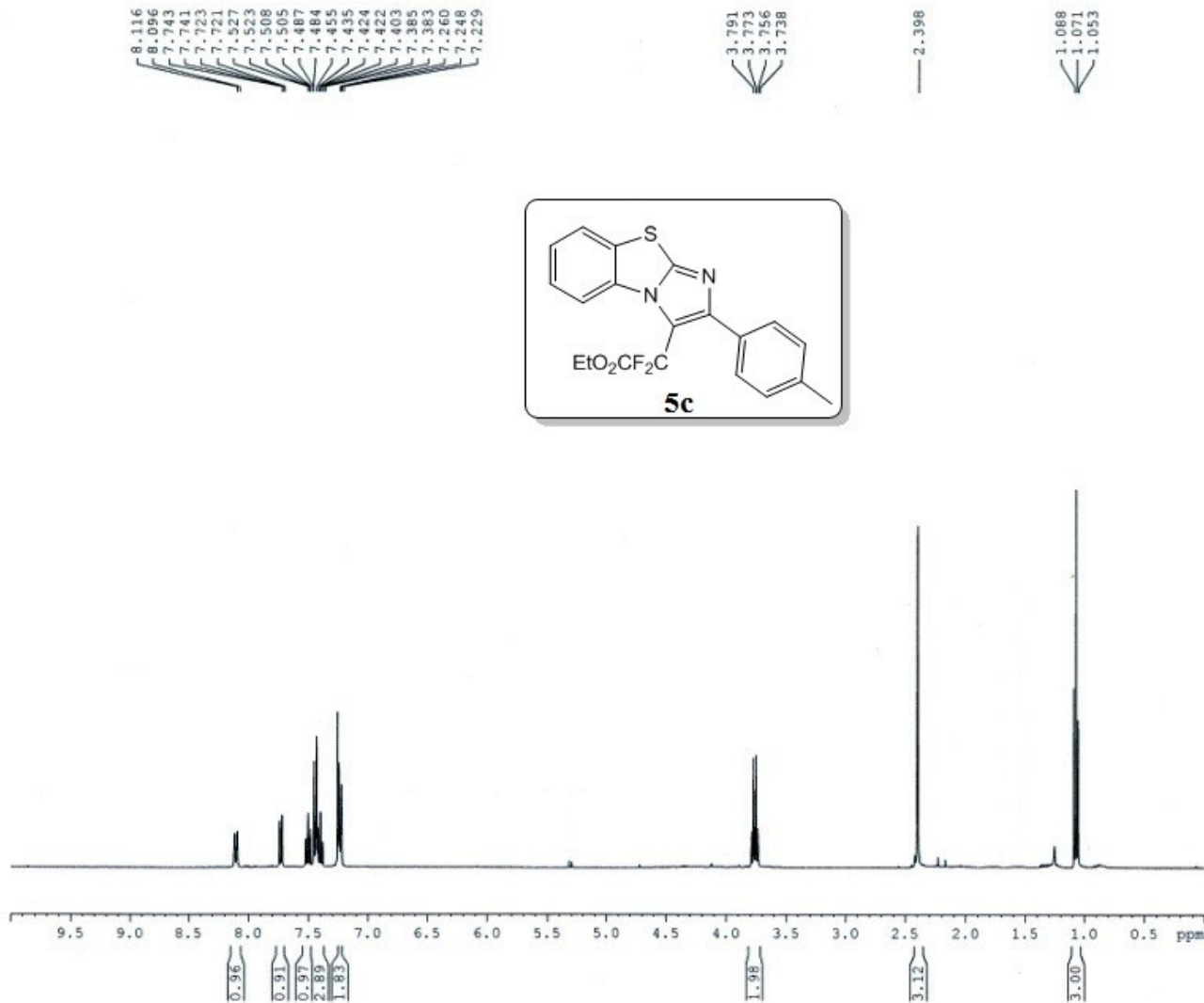


Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 496
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150804
 Time_ 17.31
 INSTRUM spect
 PROBHD 5 mm PABBO BB/
 PULPROG zgflgn
 TD 32768
 SOLVENT CDC13
 NS 4
 DS 2
 SWH 89285.711 Hz
 FIDRES 2.724784 Hz
 AQ 0.1835508 sec
 RG 87.66
 DW 5.600 usec
 DE 6.50 usec
 TE 297.0 K
 D1 1.00000000 sec
 TDO 1

===== CHANNEL f1 =====
 NUC1 19F
 P1 12.50 usec
 PLW1 20.00000000 W
 SFO1 376.4795333 MHz

F2 - Processing parameters
 SI 16384
 SF 376.5171850 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



3.791
3.773
3.756
3.738

2.398

1.068
1.071
1.053

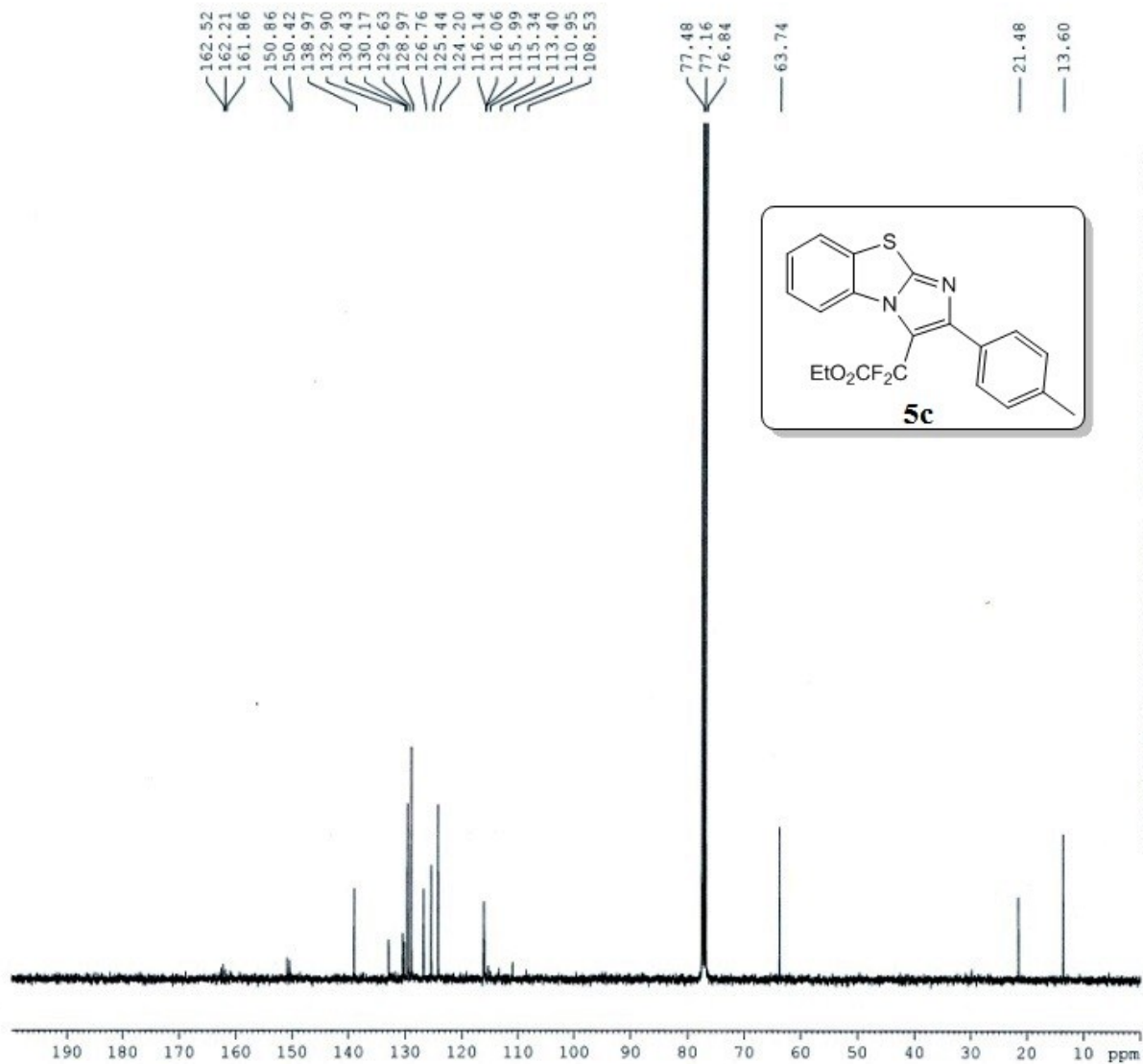


Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 481
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150803
Time 13.06
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 24
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 120.16
DW 60.800 usec
DE 6.50 usec
TE 296.9 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.75 usec
PLN1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
 NAME Dr. A HAJRA 2015
 EXPNO 463
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20150803
 Time 14.56
 INSTRUM spect
 PROBRD 5 mm PABBO BB/
 PULPROG zgpg30
 TD 32768
 SOLVENT CDC13
 NS 800
 DS 2
 SWH 24038.461 Hz
 FIDRES 0.733596 Hz
 AQ 0.6816244 sec
 RG 120.16
 DW 20.800 usec
 DE 6.50 usec
 TE 298.3 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TDO 1

----- CHANNEL f1 -----
 NUC1 13C
 P1 8.90 usec
 PLW1 54.00000000 W
 SFO1 100.6278588 MHz

----- CHANNEL f2 -----
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PLW2 12.00000000 W
 PLW12 0.40792999 W
 PLW13 0.26107001 W
 SFO2 400.1516006 MHz

F2 - Processing parameters
 SI 16384
 SF 100.6177836 MHz
 NDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

---90.14



Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 482
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150803
Time 13.16
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDC13
NS 16
DS 2
SWH 89285.711 Hz
FIDRES 2.724784 Hz
AQ 0.1835508 sec
RG 120.16
DF 5.600 usec
DE 6.50 usec
TE 296.8 K
D1 1.00000000 sec
TDO 1

***** CHANNEL f1 *****
NUC1 19F
P1 12.50 usec
PLW1 20.00000000 W
SFO1 376.4795333 MHz

F2 - Processing parameters
SI 16384
SF 376.5171850 MHz
WVW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

