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An Expeditious Microwave Assisted One-Pot Sequential Route to Pyrido fused Imidazo[4,5-*c*] quinolines in Green Media

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Experimental Section

General Procedure

Unless otherwise indicated all common reagents and solvents were used as obtained from commercial suppliers without further purification. ^{1}H NMR (400 MHz) and ^{13}C NMR (100 MHz) were recorded on a Bruker DRX400 spectrometer. Chemical shifts are reported in ppm relative to the internal solvent peak. Coupling constants, *J*, are given in Hz. Multiplicities of peaks are given as: d (doublet), m (multiplet), s (singlet), and t (triplet). Mass spectra were recorded on a Perkin Elmer Calrus 600 GC-MS spectrometer. IR spectra were recorded on a Bomen DA8 3FTS spectrometer. Microwave assisted reactions were carried out in a Catalyst Scientific Microwave oven system (Model No: CATA R (Catalyst System, Pune) operating at 2450 MHz equipped with glass vial extension by a condenser was used for performing the reaction. The microwave was equipped with a temperature control system (external probe).

2-(2-nitrophenyl)imidazo[1,2-*a*]pyridine 3a.

Yield = 0.36 g, 95%; Yellow solid; R_f = 0.5 (20%EtOAc/*n*-hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (d, *J* = 6.76 Hz, 1H), 7.99 (d, *J* = 7.8 Hz, 1H), 7.76 (s, 1H), 7.71(d, *J* = 8.04 Hz, 1H), 7.62 (t, *J* = 6.9 Hz, 2H), 7.45 (t, *J* =7.8 Hz, 1H), 7.19 (t, *J*=7.24 Hz, 1H), 6.80 (t, *J* = 6.76 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.0, 140.0, 134.9, 126.5, 126.1, 123.2, 122.4, 120.5, 120.0, 118.2, 112.6, 107.6, 105.3; MS (GC-MS): 239; HRMS (EI, m/z) calcd for $C_{13}H_9N_3O_2$: m/z 239.0695; Found 239.0697; IR (cm^{-1}, KBr) 3149, 3020, 1519, 1354, 1276, 1193.

2-(imidazo[1,2-*a*]pyridin-2-yl)aniline 4a.

Yield = 0.415 g, 93%; white solid; R_f = 0.4 (20%EtOAc/*n*-hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (d, *J* = 6.6 Hz, 1H), 7.80 (s, 1H), 7.57 (d, *J* = 9 Hz, 1H), 7.51 (d, *J* = 7.68 Hz, 1H), 7.16-7.09 (m, 2H) 6.79-6.70 (m, 3H); ^{13}C NMR (100MHz, $CDCl_3$) δ 146.6, 145.8, 144.5, 128.9,128.2, 125.2, 124.1, 117.3, 117.2, 116.8, 112.4, 108.3; MS (GC-MS) 209;

HRMS (EI, m/z) calcd for $C_{13}H_{11}N_3$: m/z 209.0953; Found 209.0950; IR (cm^{-1}, KBr) 3448, 3296, 1595, 1315, 937, 731.

8-methyl-2-(2-nitrophenyl)imidazo[1,2-*a*]pyridine 3b.

Yield = 0.435 g, 92%; white solid; R_f = 0.5 (20%EtOAc/*n*-hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.01-7.90 (m, 2H), 7.71 (d, *J* = 8.8 Hz, 2H), 7.61 (t, *J* = 6.8 Hz, 1H), 7.45 (t, *J* = 7.6 Hz, 1H), 6.97 (d, *J* =6.8 Hz, 1H), 6.71 (t, *J* =6.8 Hz, 1H), 2.61 (3H); ^{13}C NMR (100MHz,$CDCl_3$) δ 149.3, 145.9, 139.6, 131.8, 131.5, 128.3, 128.1, 127.9, 123.7, 123.5, 123.4, 112.8, 110.9, 16.9 MS (GC-MS) 253; HRMS (EI, m/z)calcd for $C_{14}H_{11}N_3O_2$: m/z 253.0851; Found 253.0835; IR (cm^{-1}, KBr) 3059, 1658, 1554, 1315, 1423, 778.

2-(8-methylimidazo[1,2-*a*]pyridin-2-yl)aniline 4b.

Yield = 0.39 g, 95%; white solid; R_f = 0.48 (20%EtOAc/*n*-hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, *J* = 8 Hz, 1H), 7.70 (s, 1H), 7.44 (d, *J* = 7.6 Hz, 1H), 7.03 (t, *J* = 8 Hz, 1H), 6.86 (d, *J* =8.4 Hz, 1H), 6.68 (d, *J* =8.4 Hz, 1H), 6.67-6.58 (m, 2H), 2.53 (3H); ^{13}C NMR (100MHz,$CDCl_3$) δ 145.9, 145.0, 128.7,, 128.0, 127.1, 123.0, 122.9, 117.2, 116.8, 116.8, 112.4, 108.6, 16.9; MS (GC-MS) 223; HRMS (EI, m/z)calcd for $C_{14}H_{13}N_3$: m/z 223.1109; Found 223.1109; IR (cm^{-1}, KBr) 3057, 1604, 1463, 773, 729.

7-methyl-2-(2-nitrophenyl)imidazo[1,2-*a*]pyridine 3c

Yield = 0.43 g, 91%; white solid; R_f = 0.51 (20%EtOAc/*n*-hexane); ^1H NMR (400 MHz, $CDCl_3$) δ 8.20 (d, *J* = 8 Hz, 1H), 7.89 (d, *J* = 7.2 Hz, 1H), 7.88-7.76 (m, 2H), 7.68 (d, *J* = 7.2 Hz, 1H) 7.51 (d, *J* = 6.8 Hz, 1H), 7.31 (d, *J* = 6.8 Hz, 1H), 6.68 (d, *J* =6.91 Hz, 1H), 2.83 (3H); ^{13}C NMR(100MHz,$CDCl_3$) δ 148.1, 146.8, 134.2, 131.7, 130.6, 128.8, 128.4, 126.8, 125.2, 123.5, 122.9, 122.0, 112.6, 17.6; MS (GC-MS) 253; HRMS (EI, m/z)calcd for $C_{14}H_{11}N_3O_2$: m/z 253.0851; Found 253.0841; IR (cm^{-1}, KBr) 3057, 1718, 1589, 1460, 796.

2-(7-methylimidazo[1,2-*a*]pyridin-2-yl)aniline 4c.

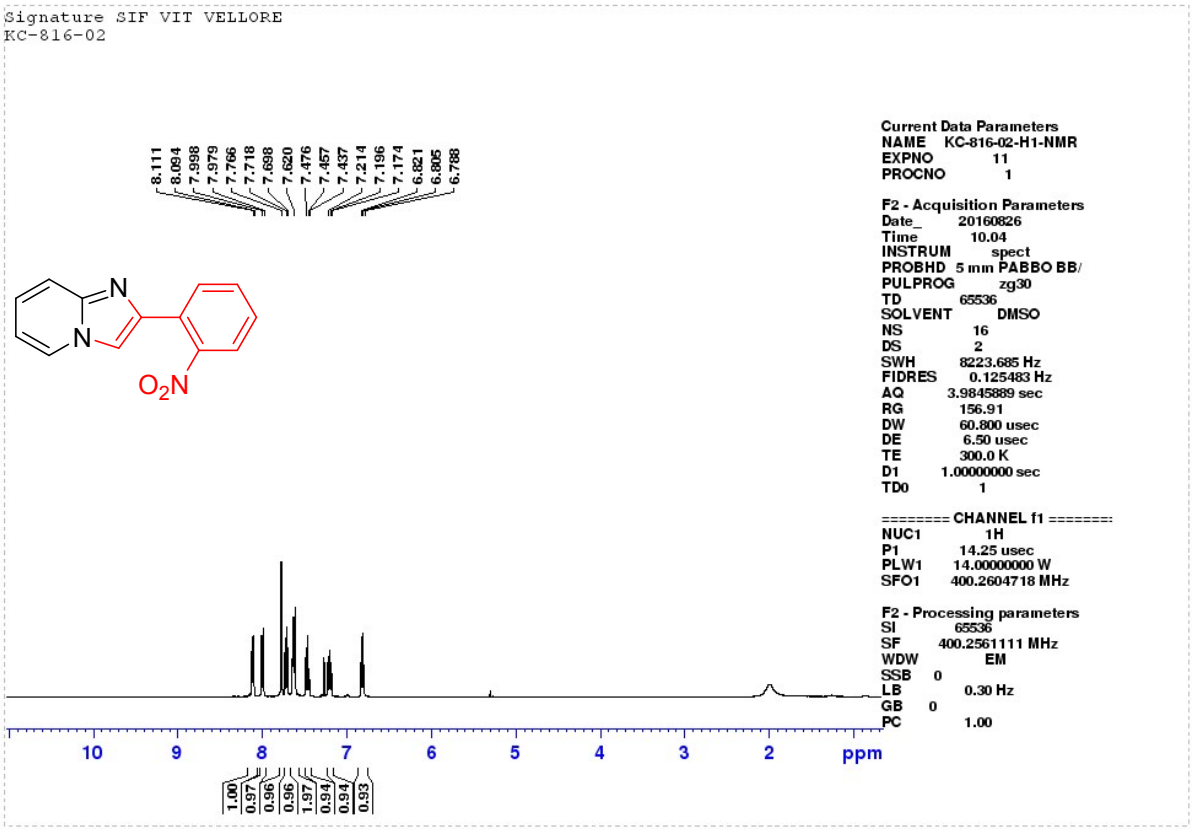
Yield: 0.372 g, 90%; white solid; R_f = 0.45 (20%EtOAc/*n*-hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.0 (d, J = 6.8 Hz, 1H), 7.72 (s, 1H), 7.50 (d, J = 7.6 Hz, 1H), 7.34 (s, 1H), 7.10 (t, J = 8.4 Hz, 1H), 6.72 (t, J =6.1 Hz, 2H), 6.62 (d, J =6.8 Hz, 1H), 2.39 (3H); ^{13}C NMR(100MHz,$CDCl_3$) δ 135.2, 128.7, 128.1, 124.4, 117.3, 116.9, 116.7, 115.6, 115.1, 107.7, 21.3; MS (GC-MS) 223; HRMS (EI, m/z) calcd for $C_{14}H_{13}N_3$: m/z 223.1109; Found 223.1101; IR (cm^{-1}, KBr) 3414, 1712, 1604, 1456, 769.

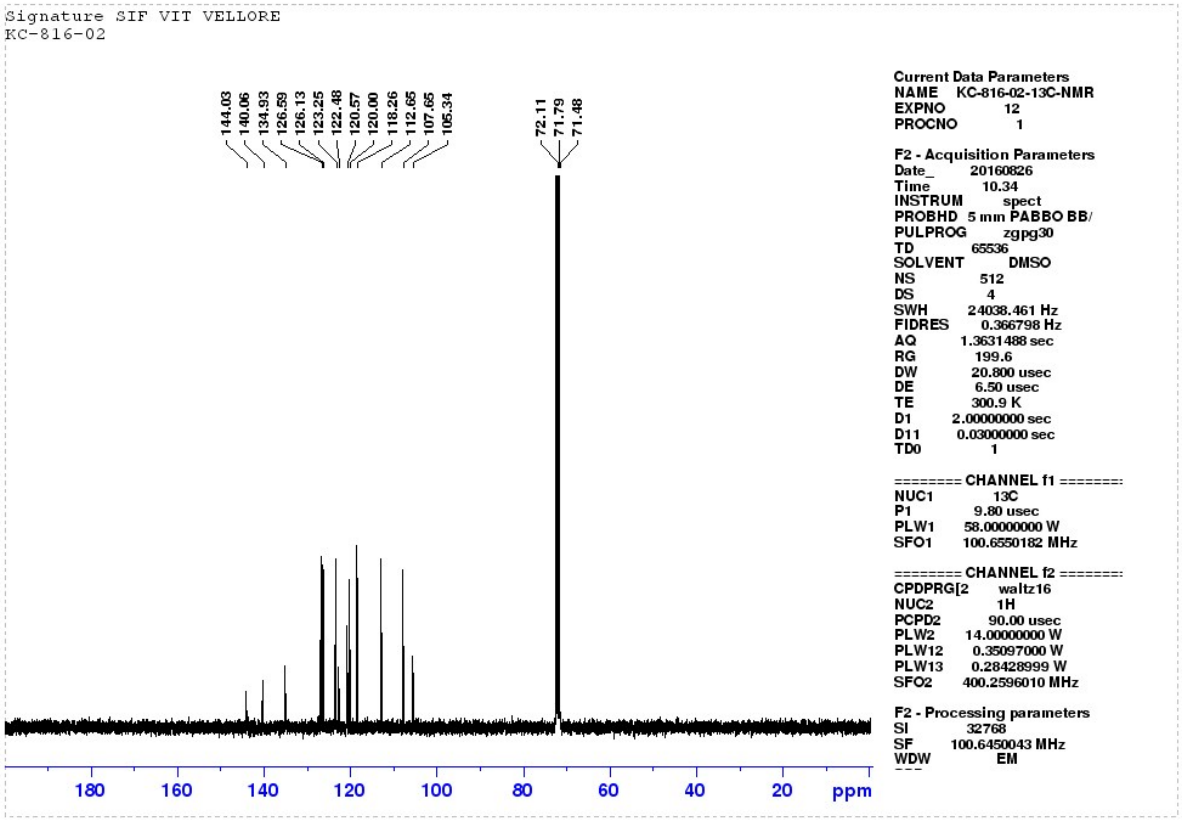
6,8-difluoro-2-(2-nitrophenyl)imidazo[1,2-*a*]pyridine 3d.

Yield = 0.375 g, 89 %; white solid; R_f = 0.4 (20%EtOAc/*n*-hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ Yield = 0.375 g, 89 %; white solid; R_f = 0.4 (20%EtOAc/*n*-hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (d, J = 8.32 Hz, 2H), 7.72 (t, J = 7.48 Hz, 2H), 7.61 (t, J = 7.32 Hz, 1H), 7.43 (d, J = 7.4 Hz, 2H); ^{13}C NMR (100MHz,$CDCl_3$) δ 158.1, 156.5, 145.3, 135.1, 134.9, 134.7, 131.8, 129.1, 128.1, 127.8, 124.8, 124.4; MS (GC-MS) 275; HRMS (EI, m/z)calcd for $C_{13}H_7F_2N_3O_2$: m/z 275.0506; Found 275.0500; IR (cm^{-1}, KBr) 2814, 1627, 147, 1180, 781.

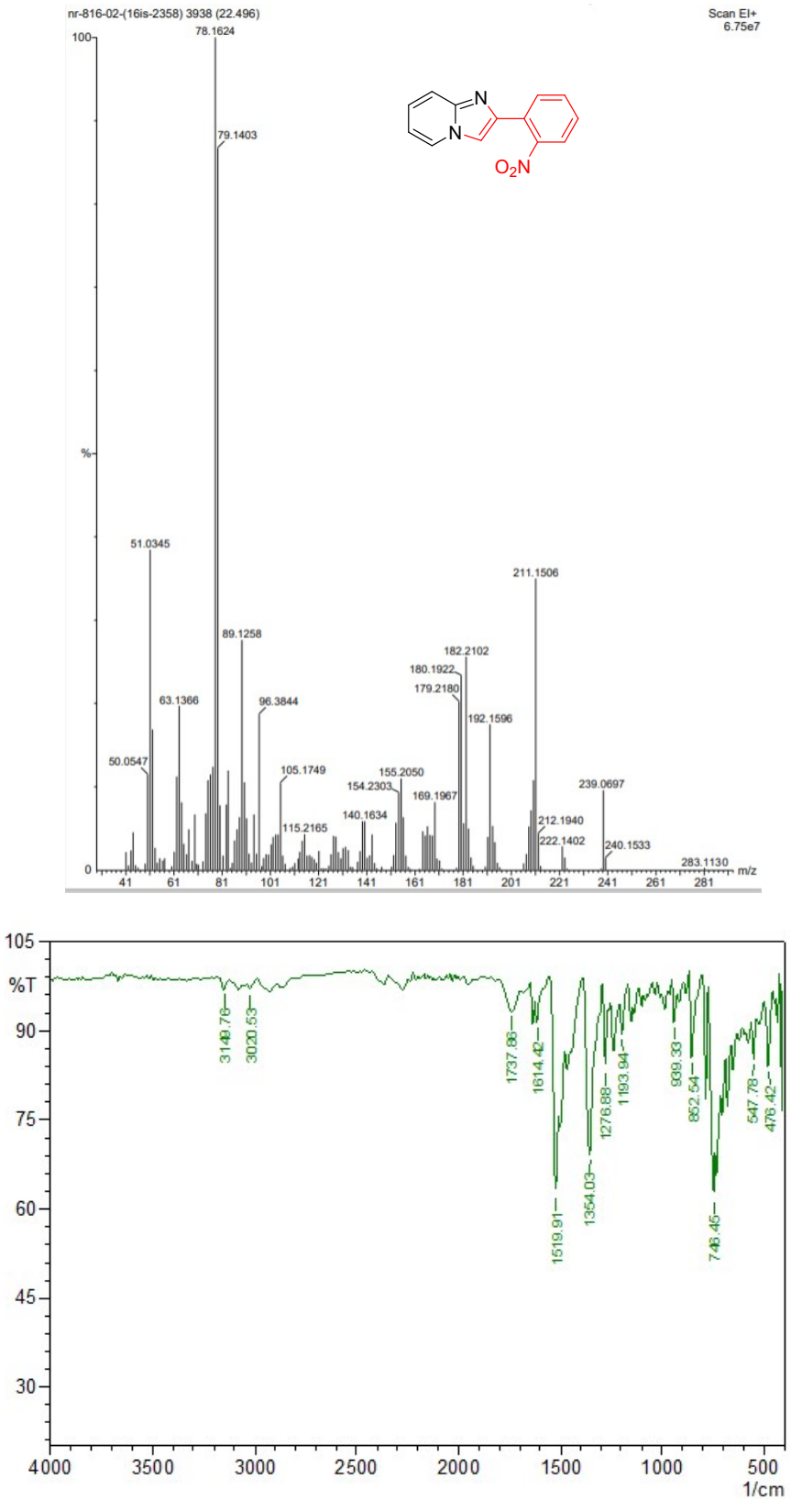
2-(6,8-difluoroimidazo[1,2-*a*]pyridin-2-yl)aniline 4d.

Yield = 0.345 g, 91%; white solid; R_f = 0.42 (20%EtOAc/*n*-hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, J = 6.4 Hz, 2H), 7.95 (s, 2H), 7.68-7.64 (m, 1H), 7.36 (t, J = 7.2 Hz, 1H), 6.89 (t, J = 8 Hz, 1H); ^{13}C NMR (100MHz,$CDCl_3$) δ 149.5, 146.9, 139.9, 132.0, 131.4, 130.1, 129.4, 128.1, 124.6, 110.7; MS (GC-MS) 245; HRMS (EI, m/z)calcd for $C_{14}H_{13}N_3$: m/z 245.0765; Found 245.0750; IR(cm^{-1}, KBr) 3369, 2872, 1618, 1435, 769, 750.

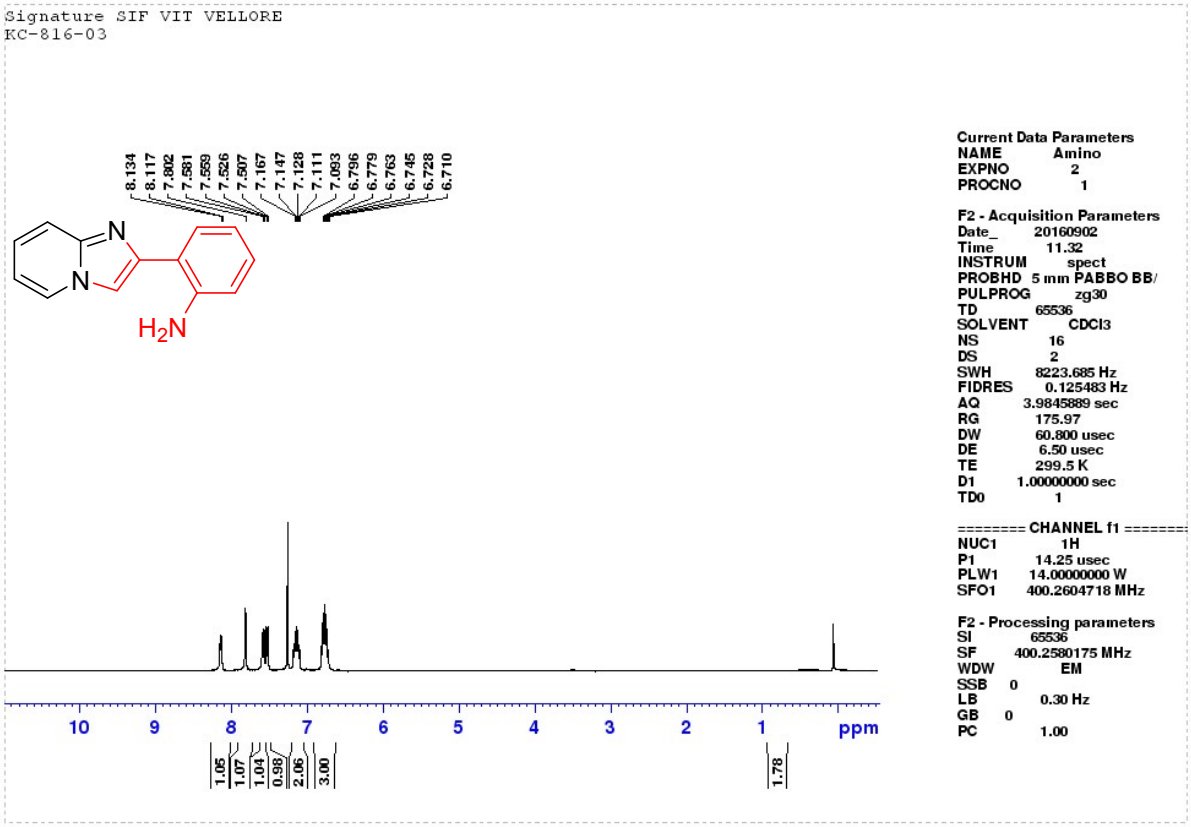


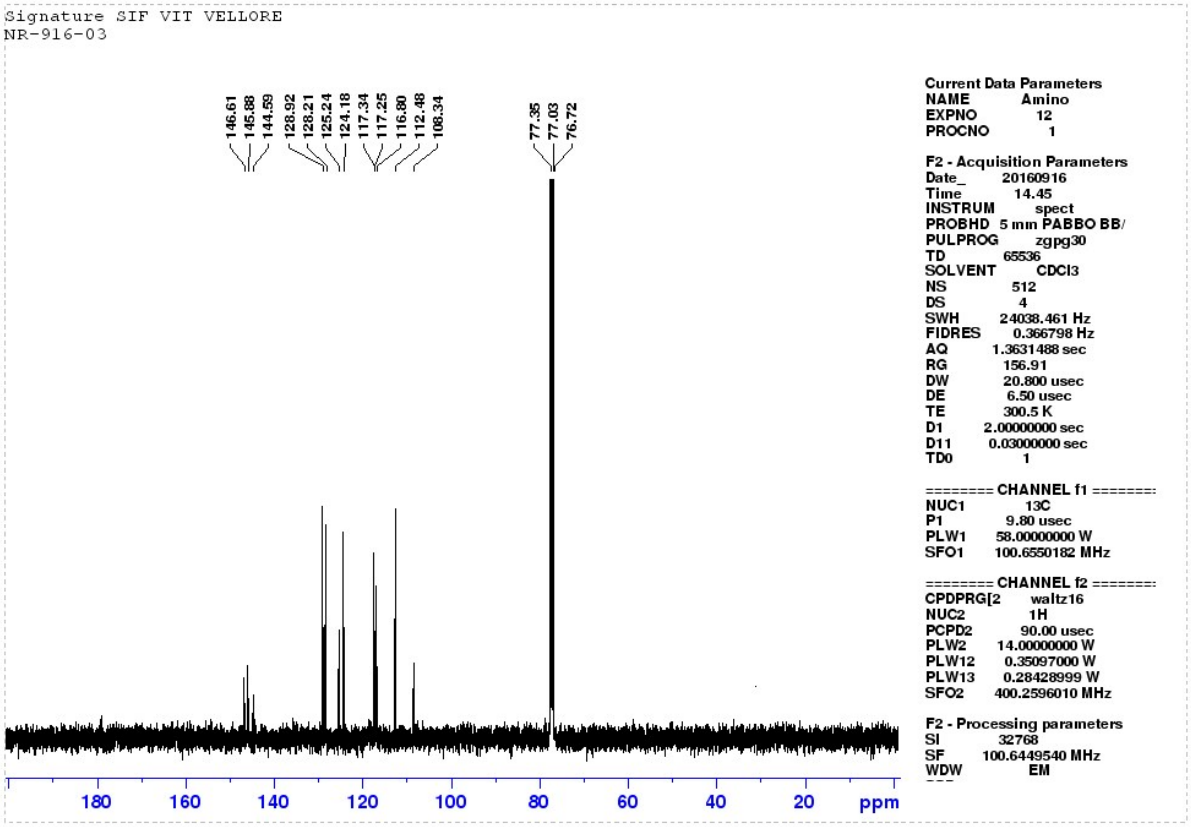


^{1}H-NMR and ^{13}C-NMR of compound **3a** in $CDCl_3$

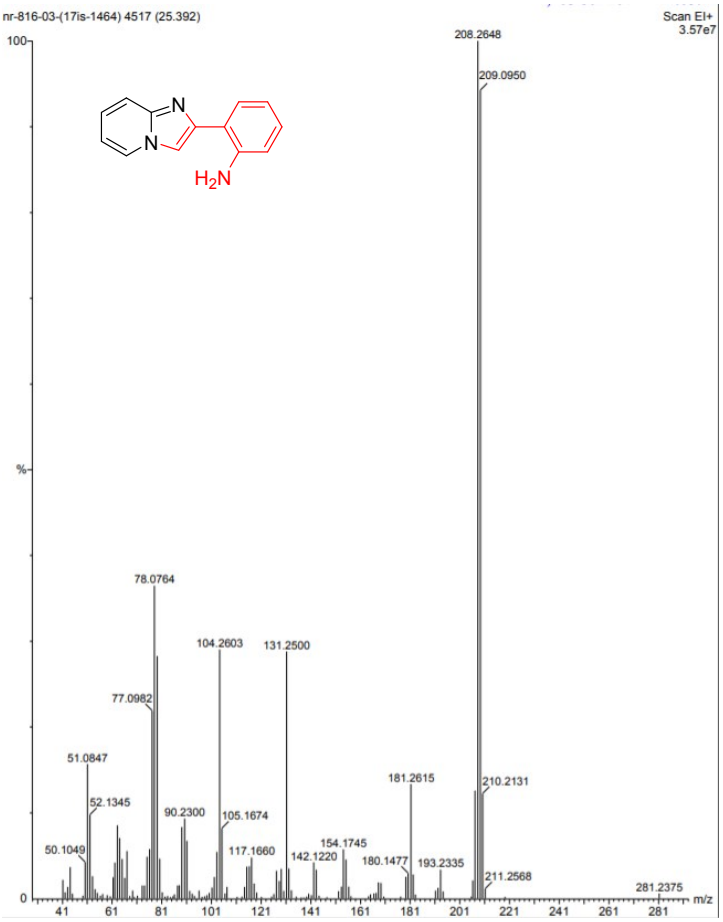


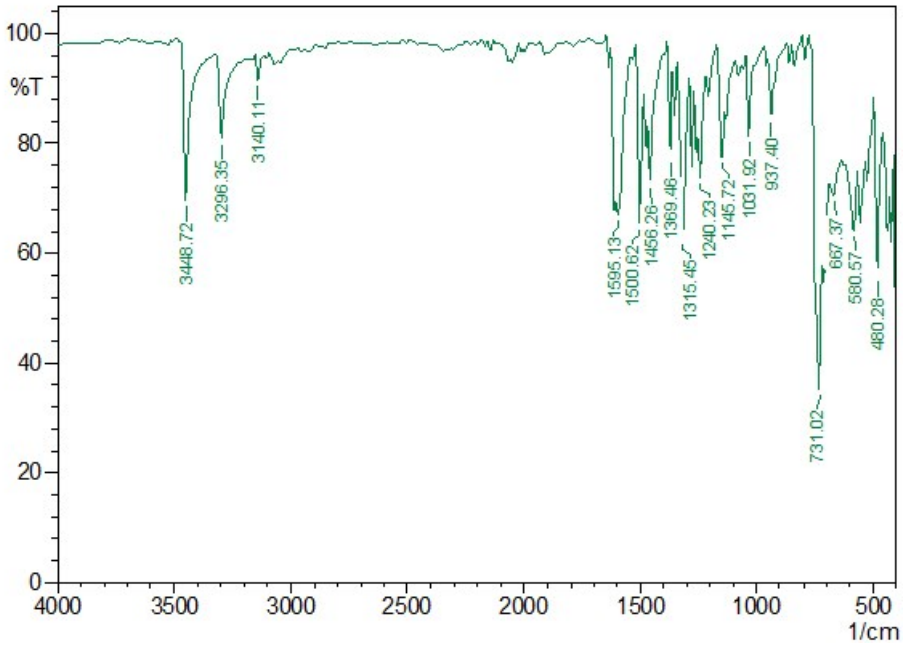
Mass and IR of Compound **3a**



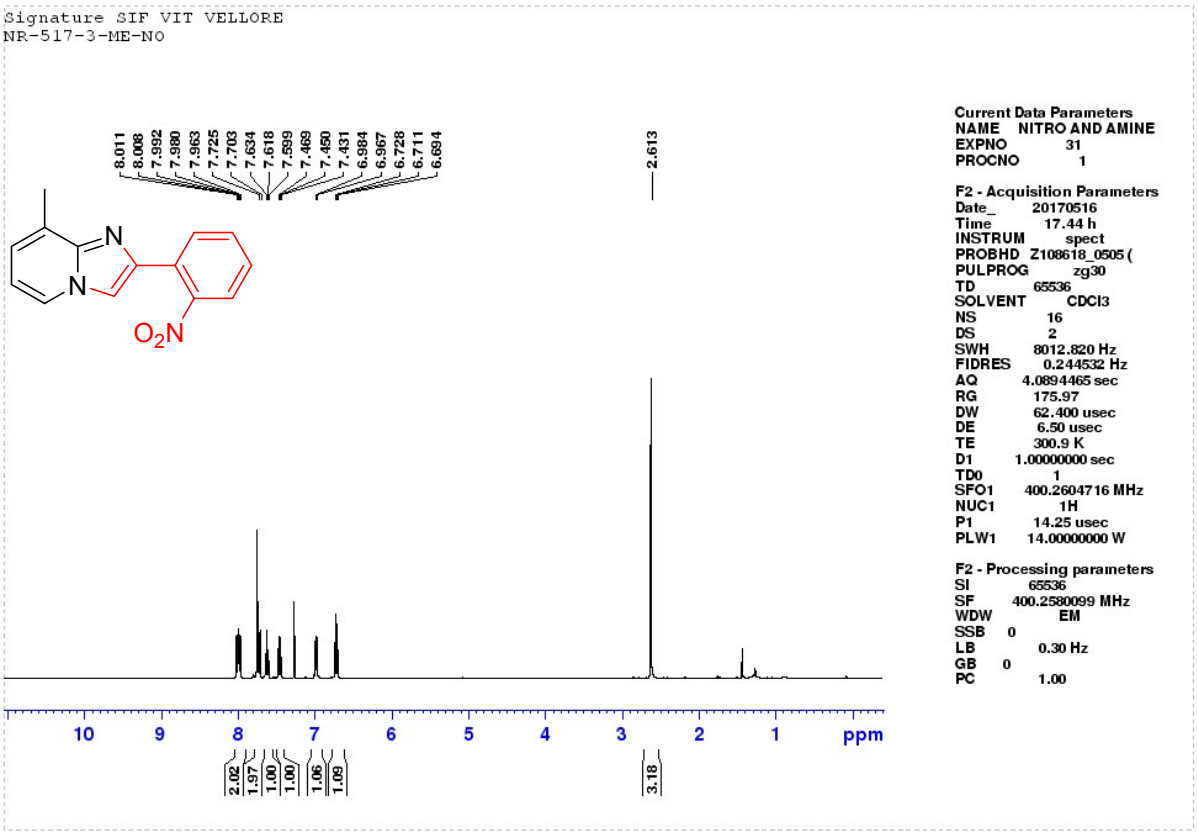


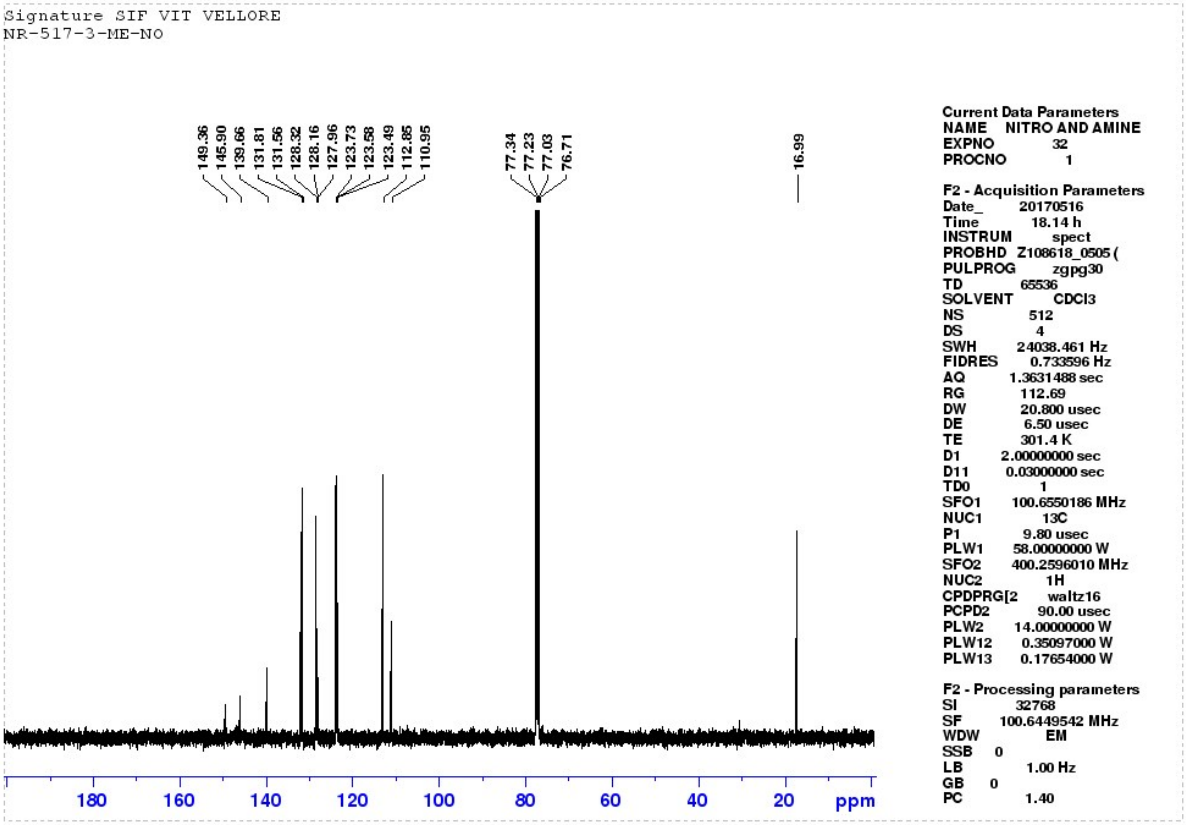
^{1}H-NMR and ^{13}C-NMR of compound **4a** in $CDCl_3$.



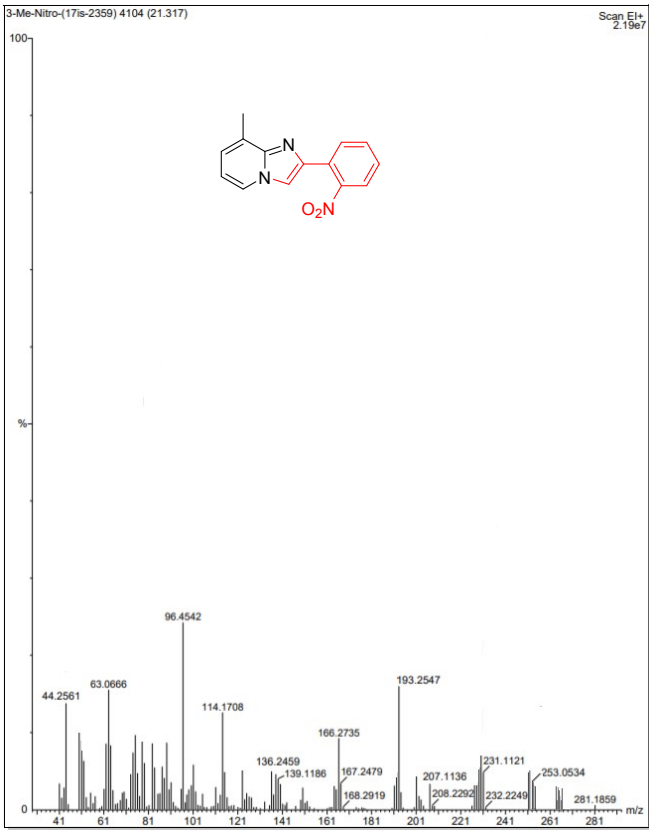


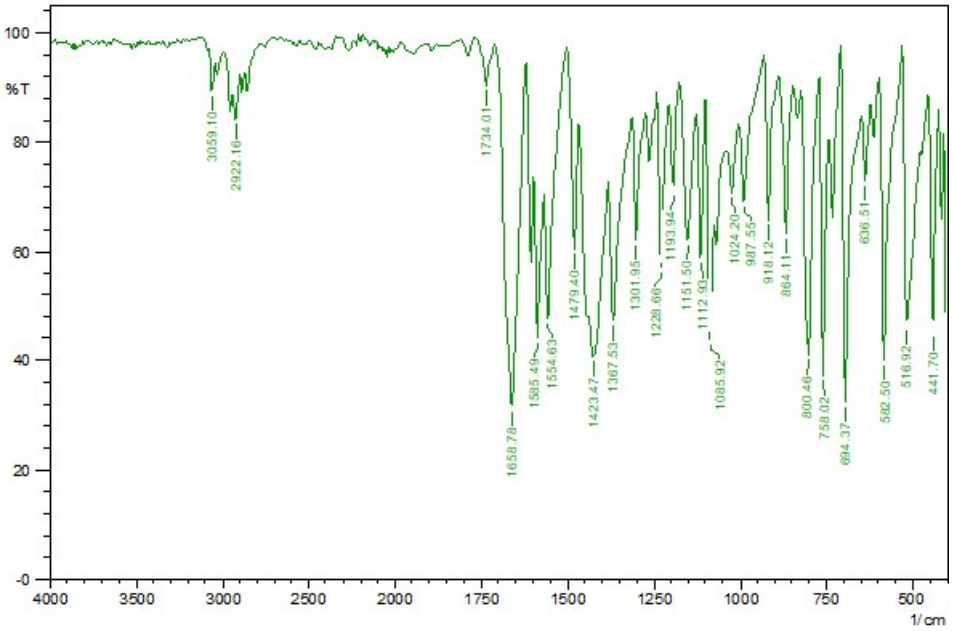
Mass and IR of Compound **4a.**





^{1}H-NMR and ^{13}C-NMR of compound **3b** in $CDCl_3$.





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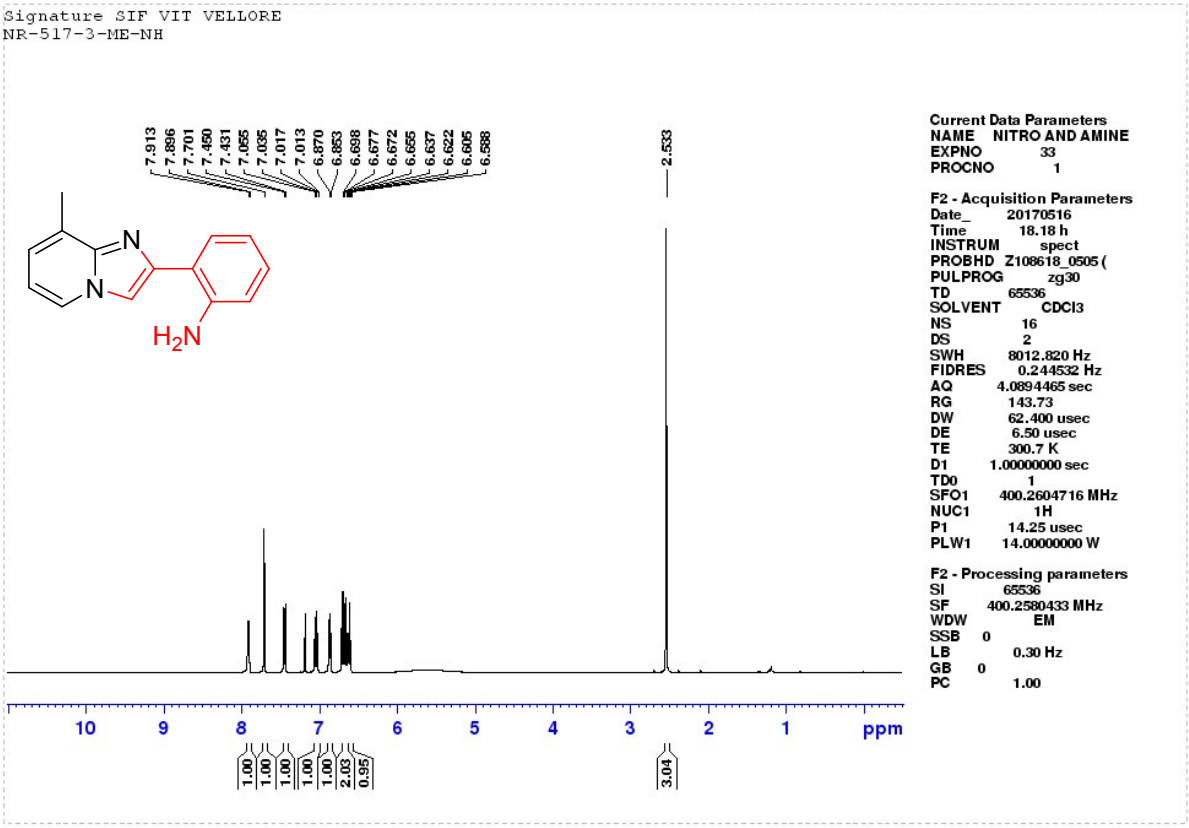
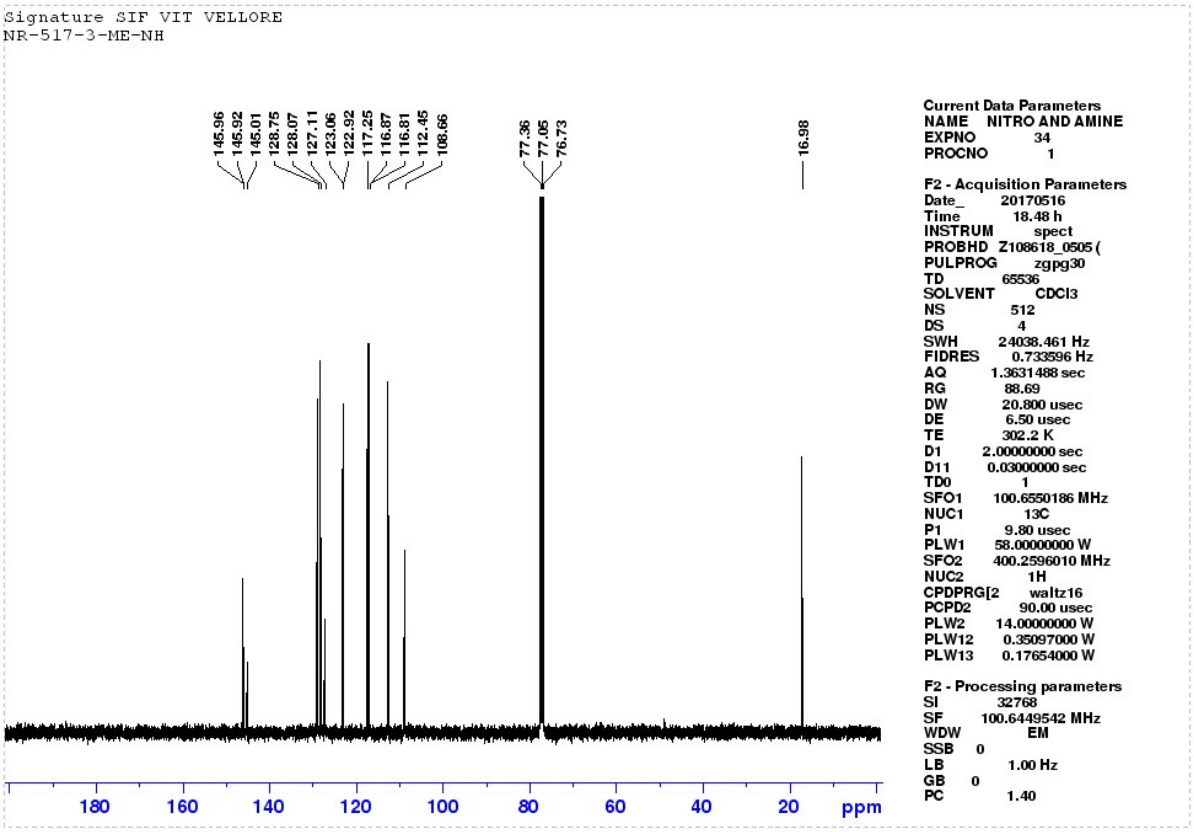
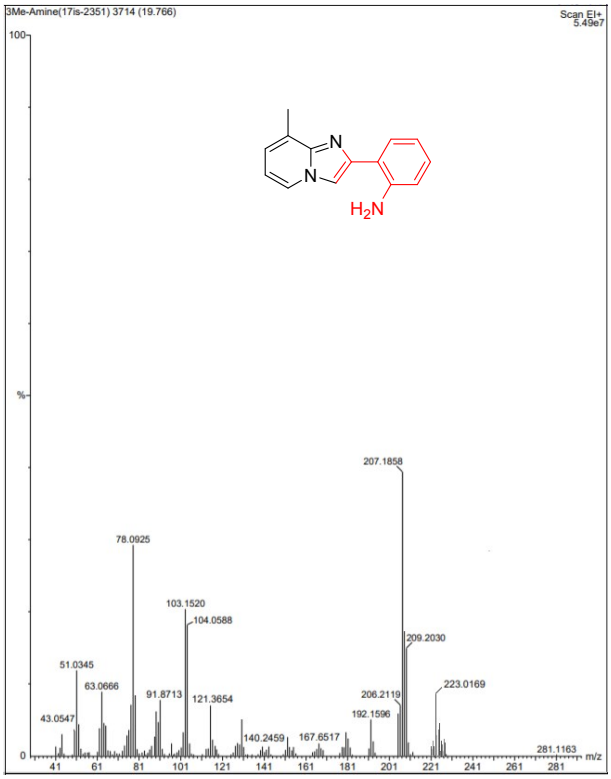
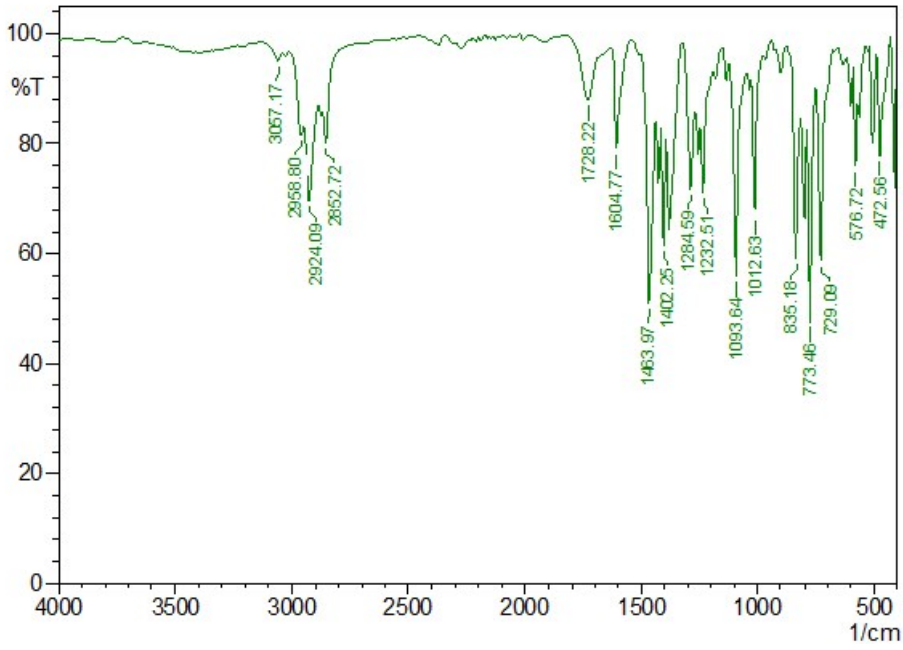


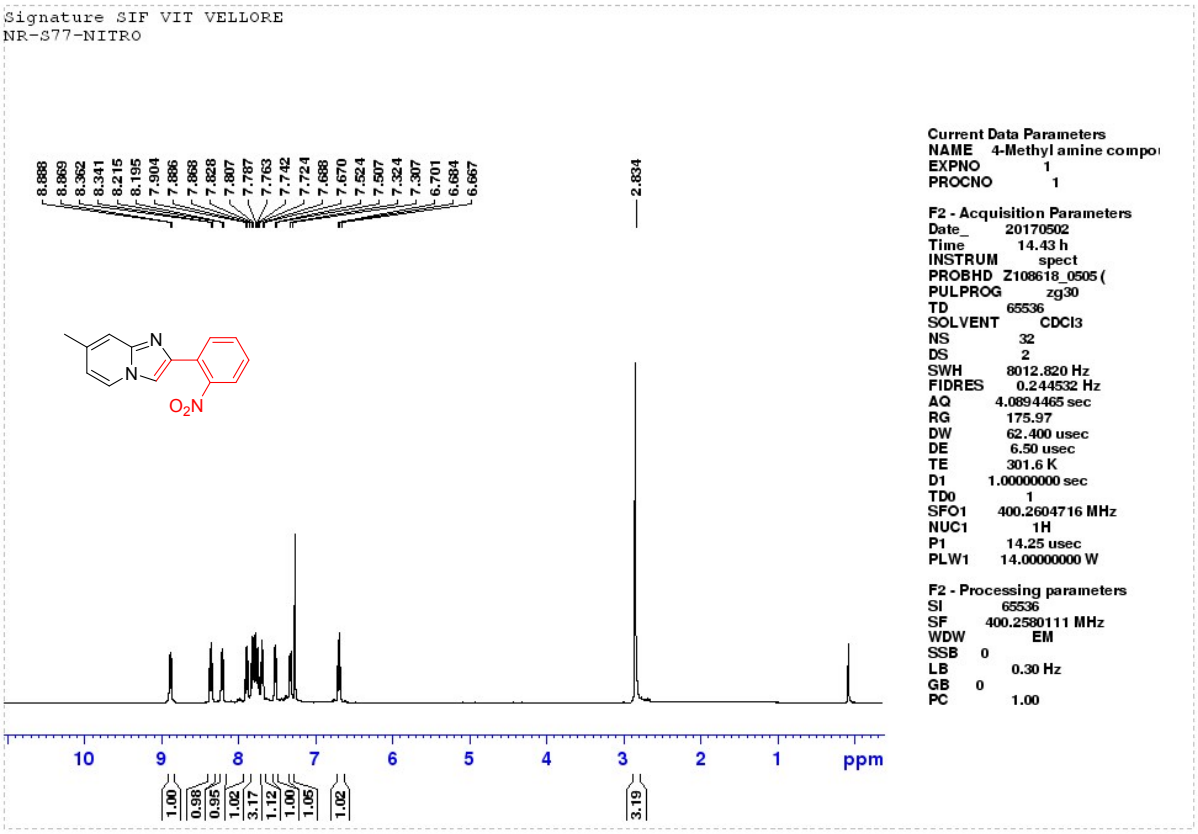


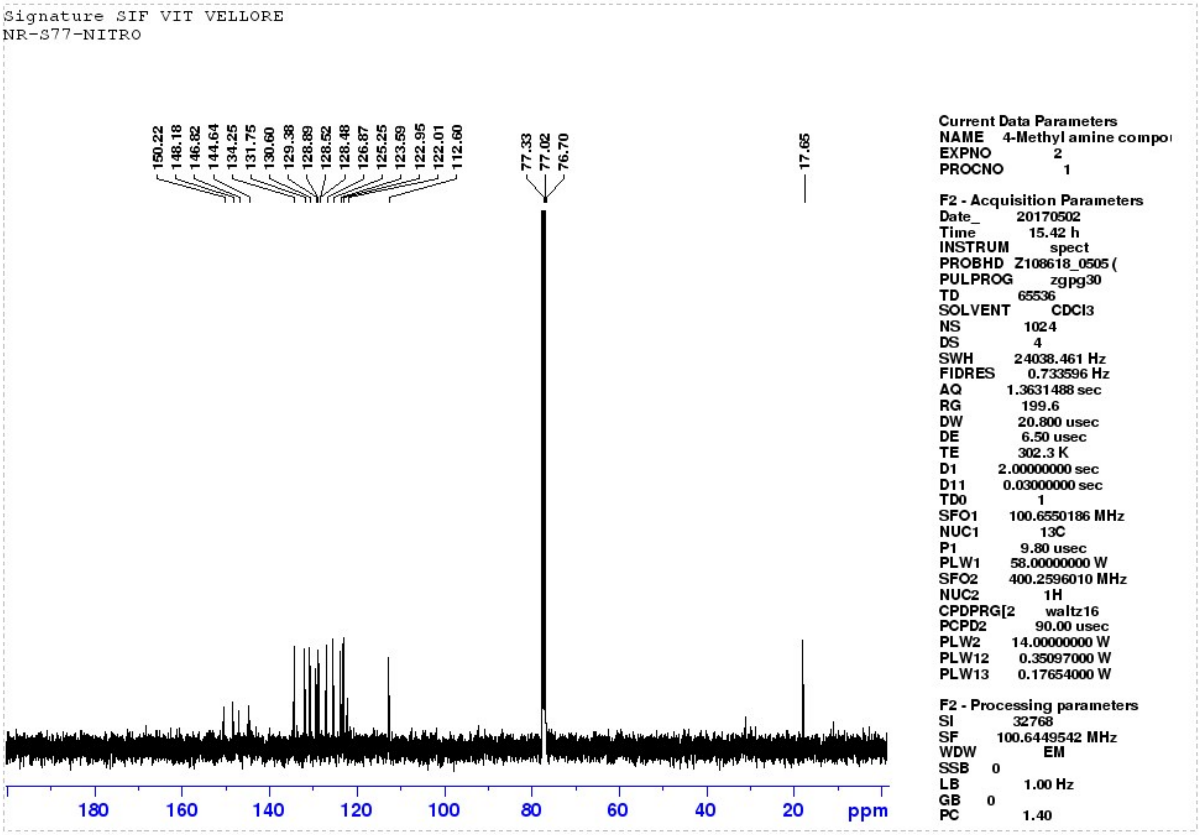
^{1}H-NMR and ^{13}C-NMR of compound **4b** in $CDCl_3$.



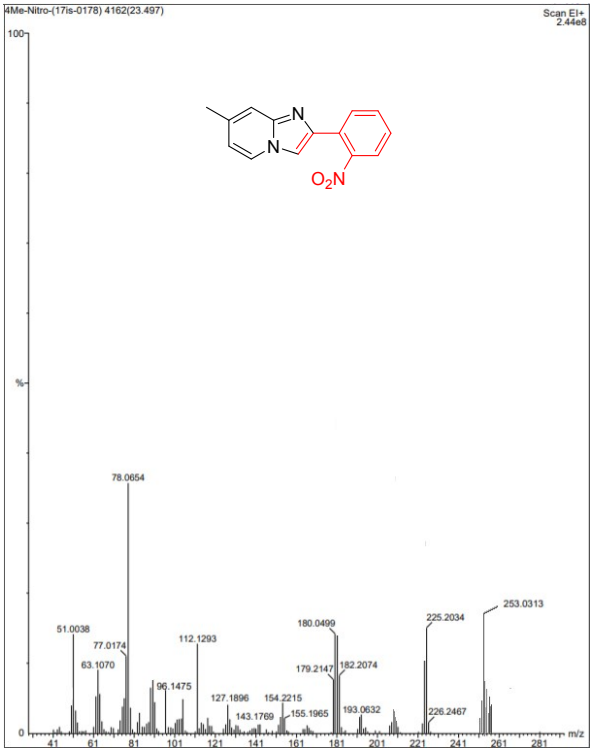


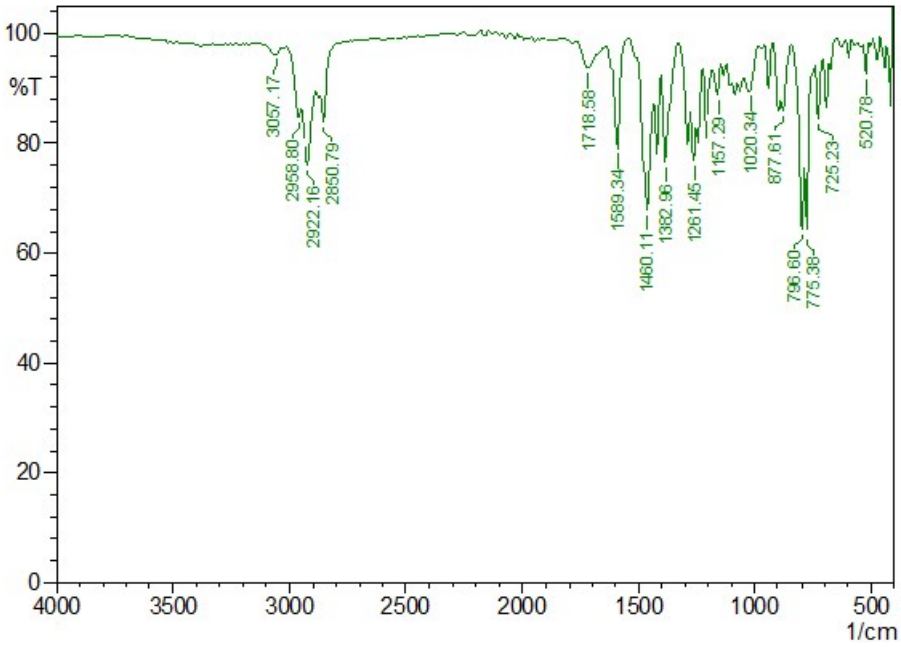
Mass and IR of Compound **4b**





^{1}H-NMR and ^{13}C-NMR of compound **3c** in $CDCl_3$.





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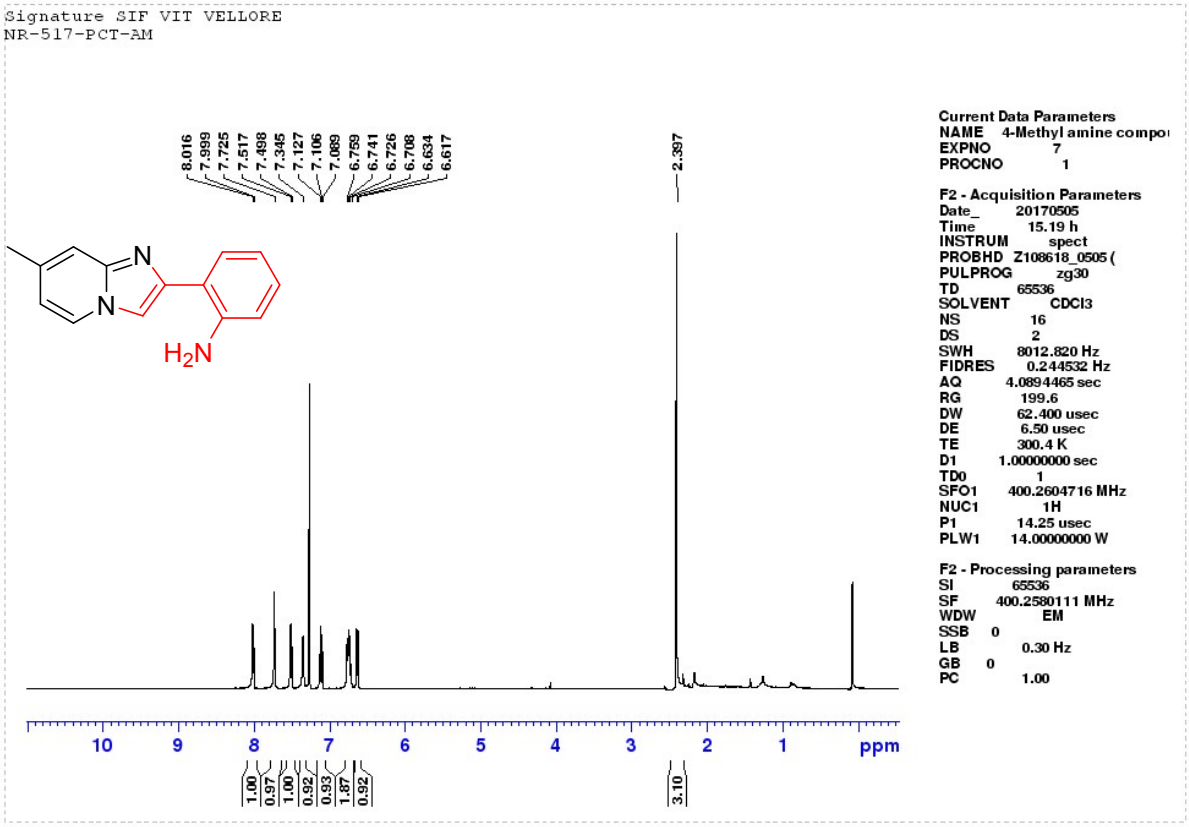
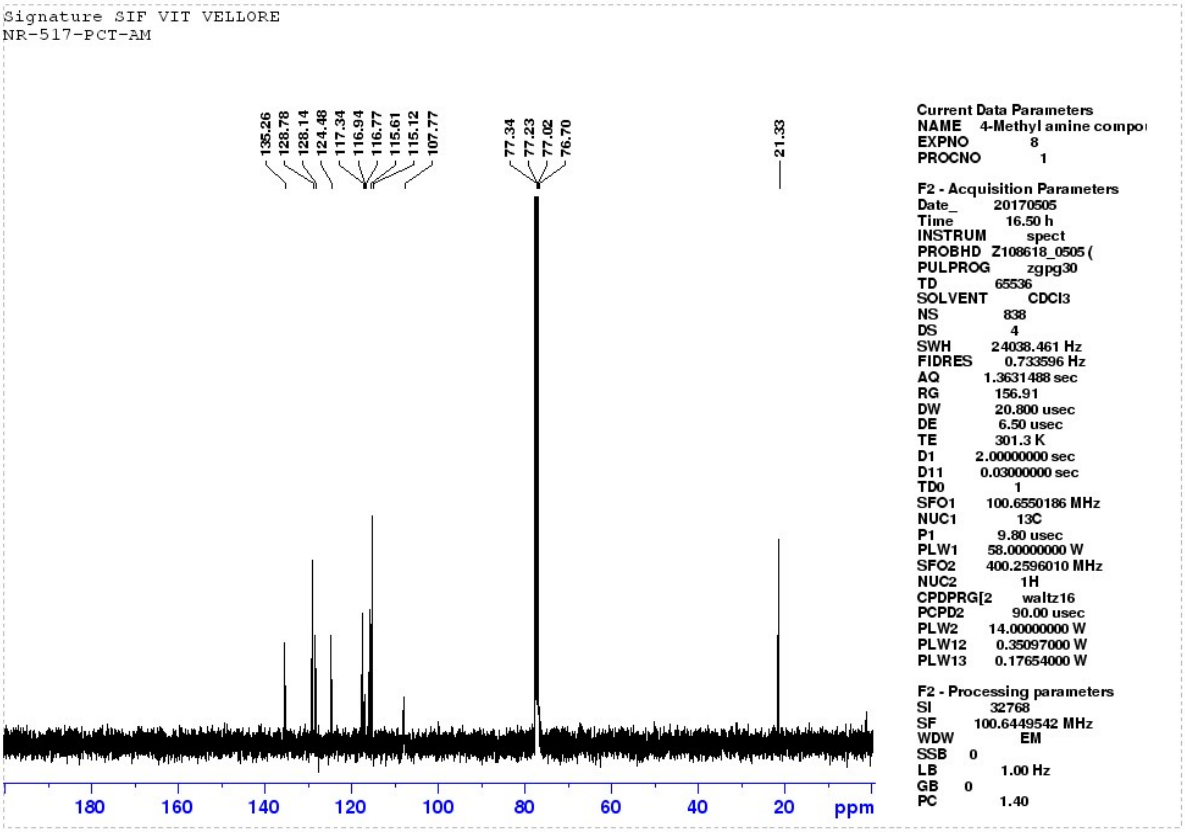
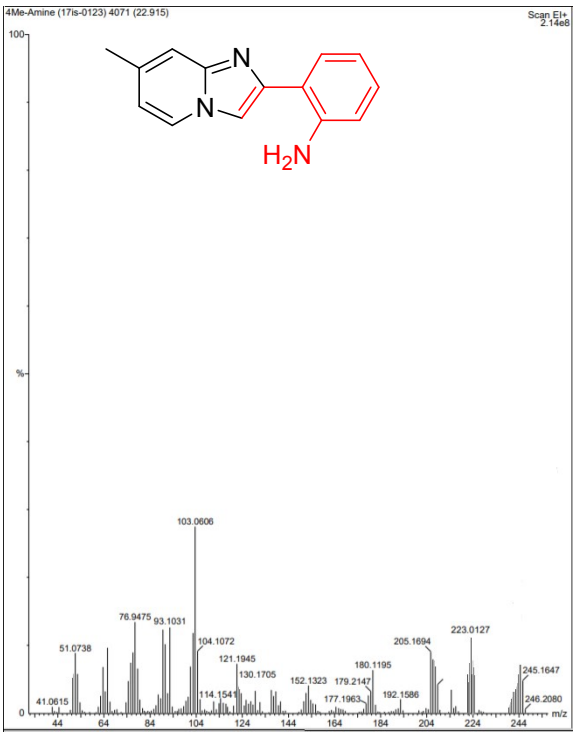
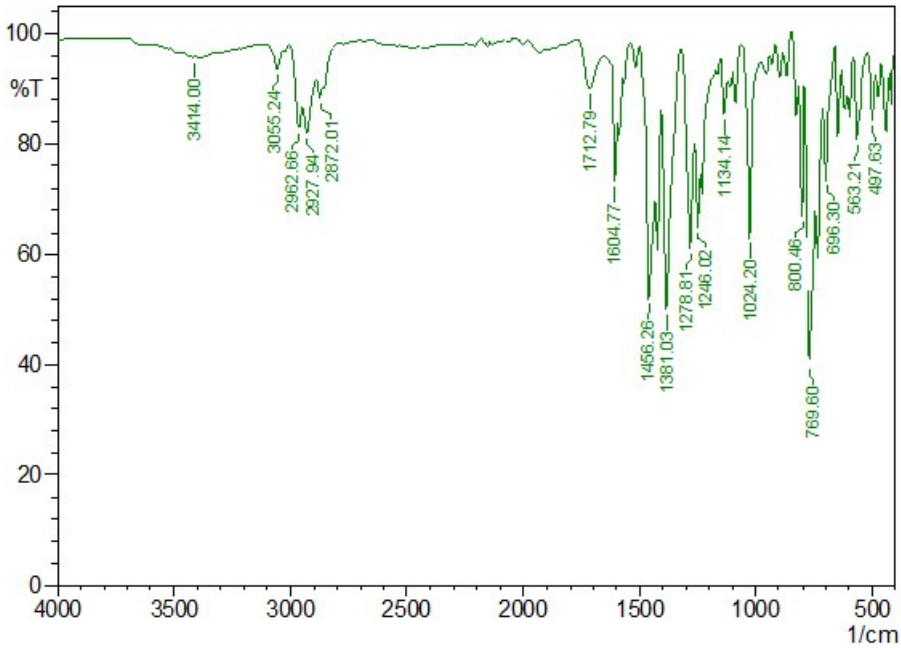


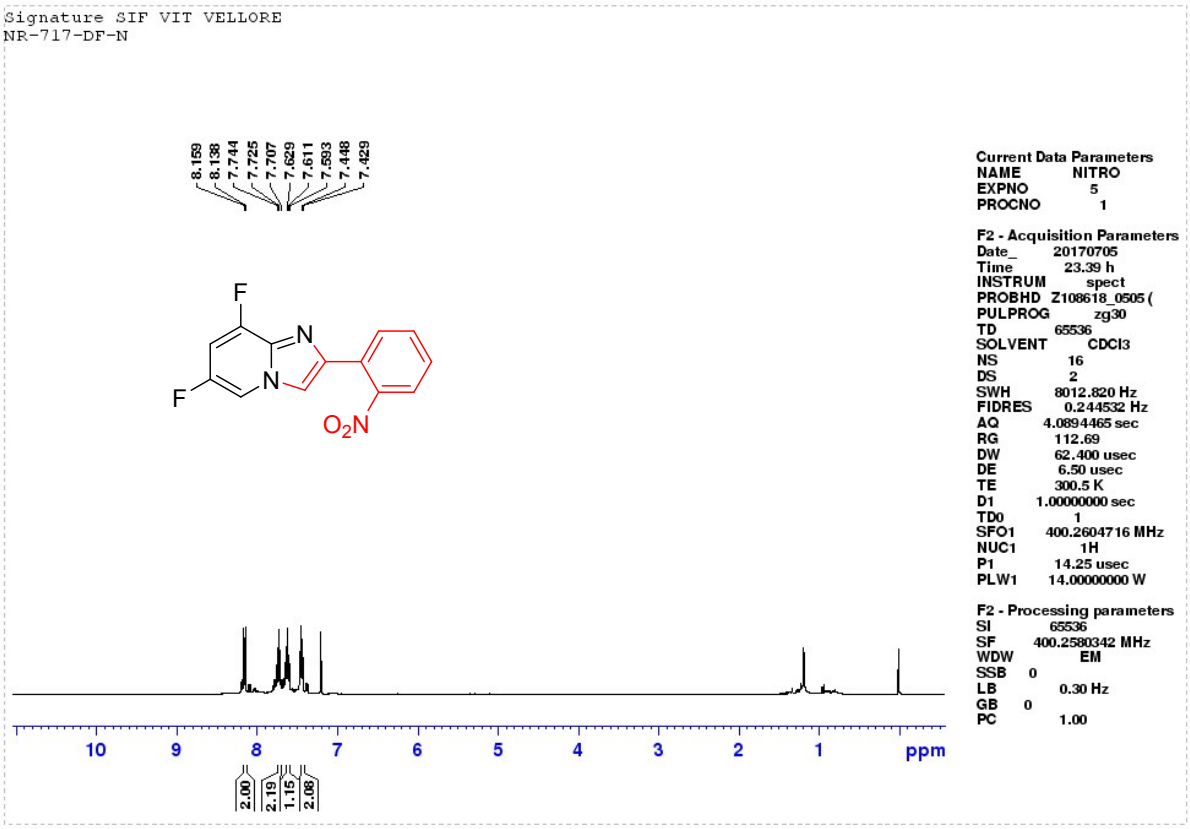


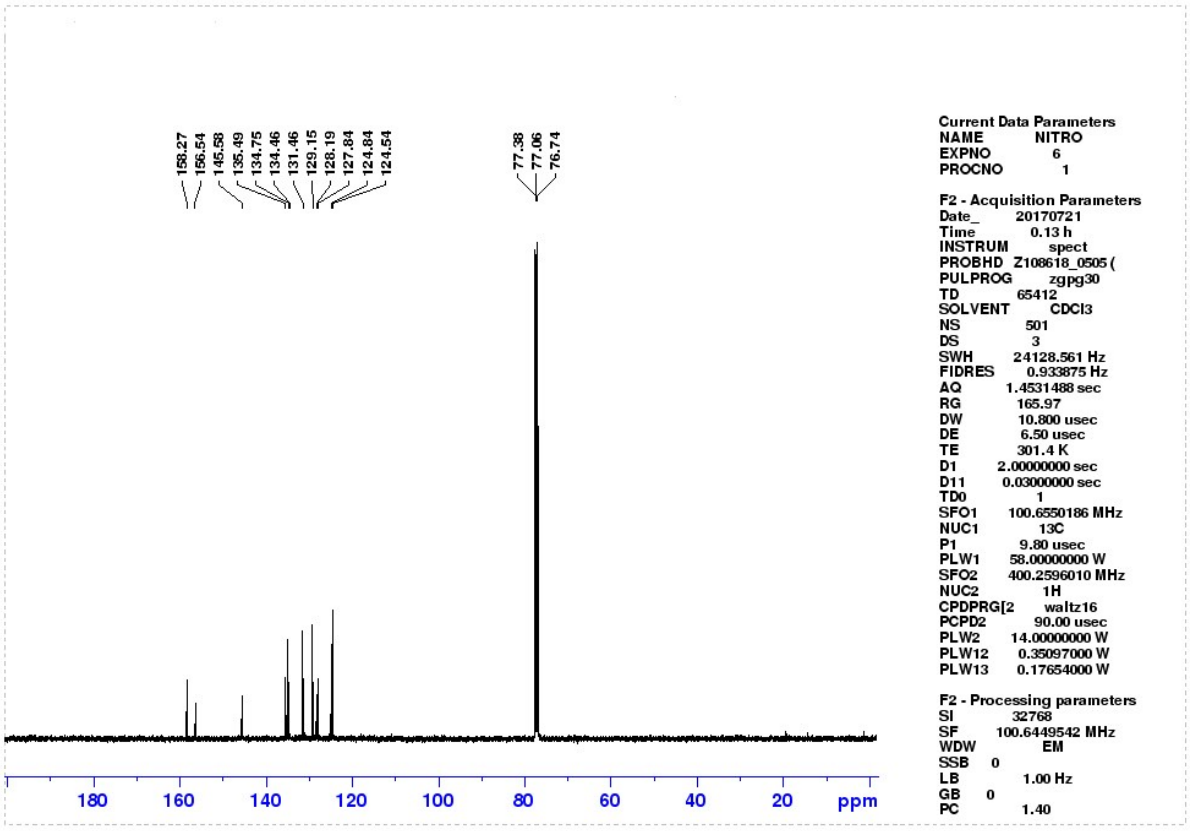
^{1}H-NMR and ^{13}C-NMR of compound **4c** in $CDCl_3$.



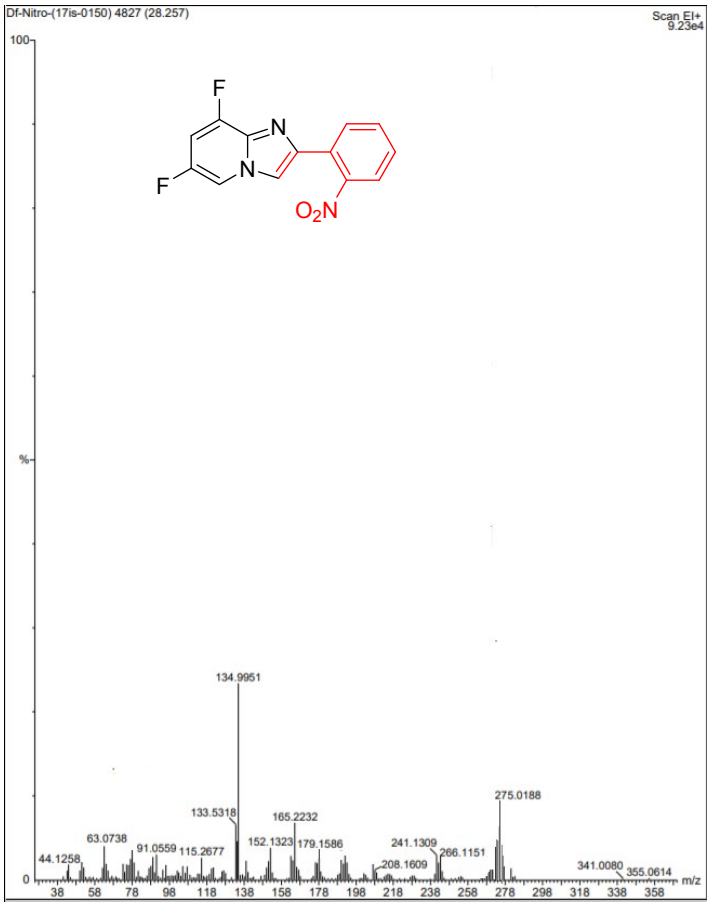


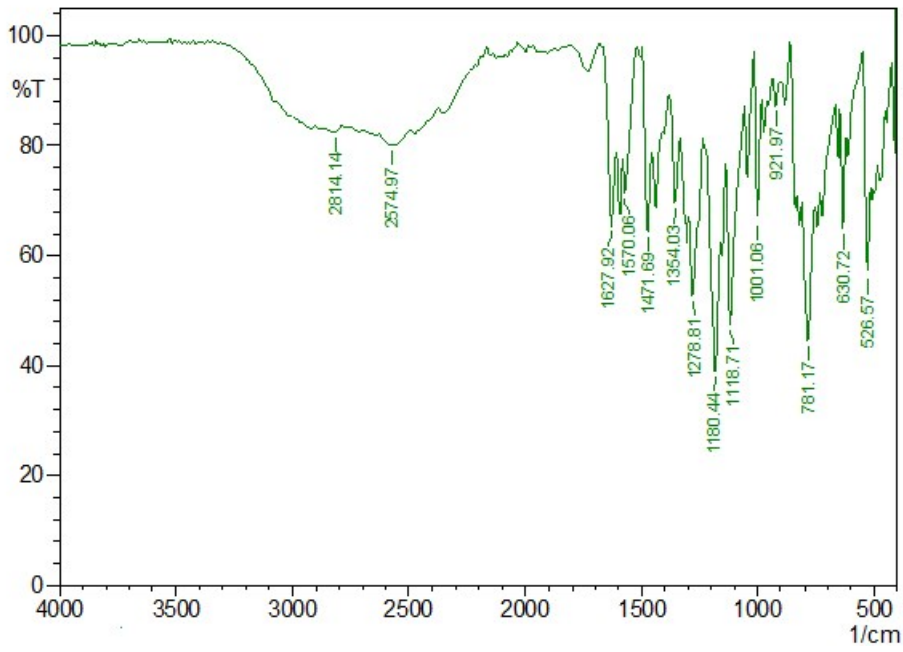
Mass and IR of Compound **4c.**



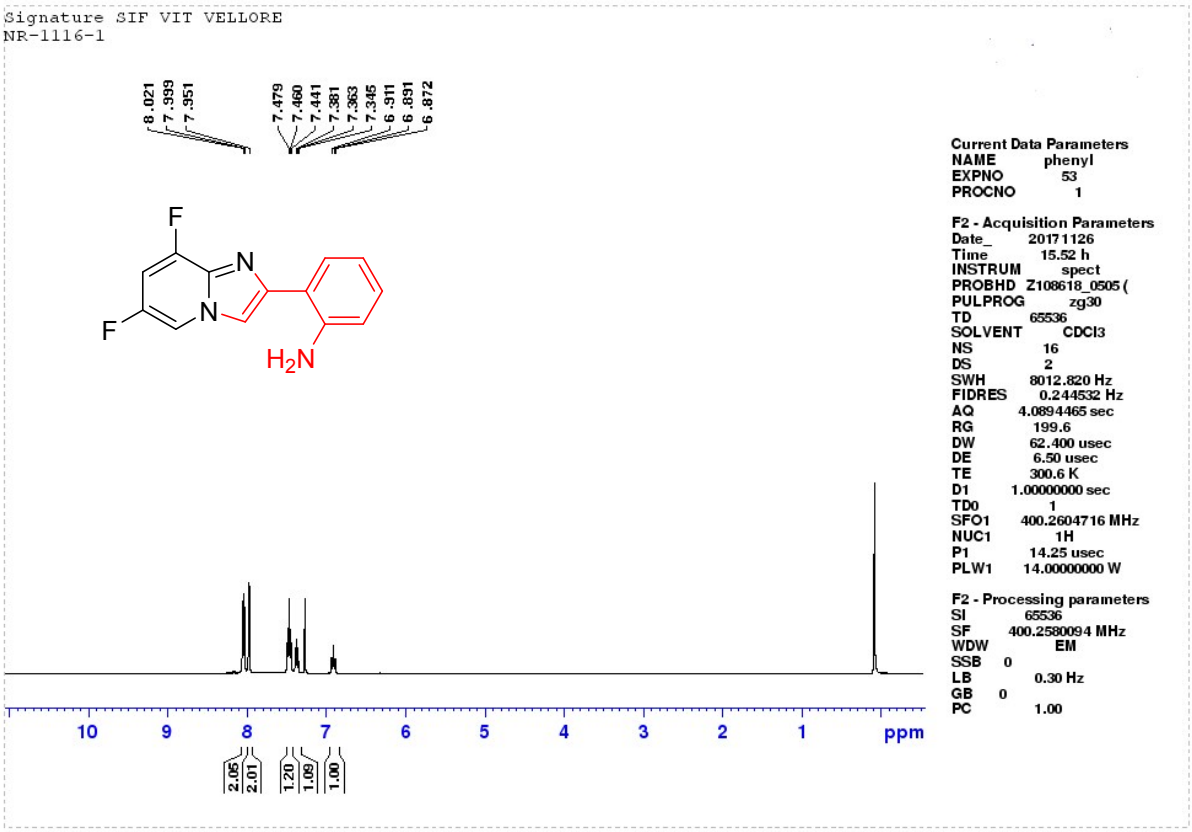


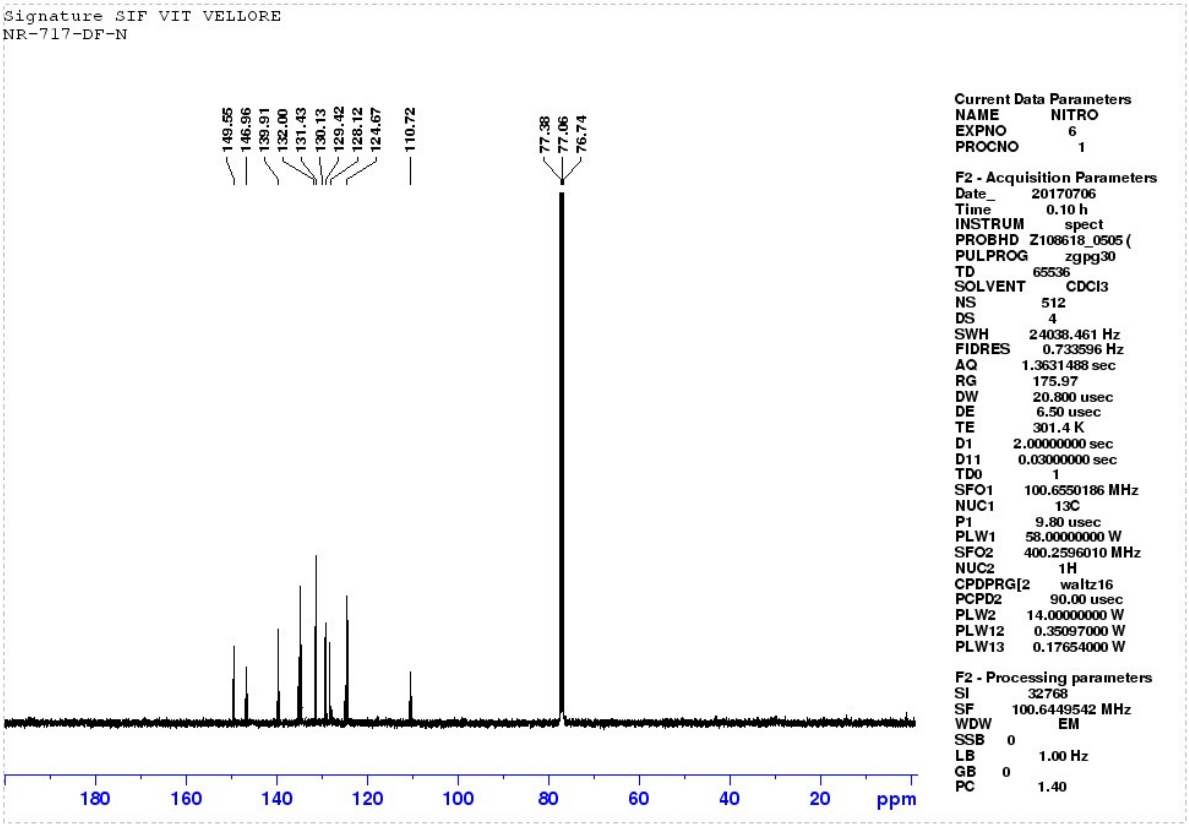
^{1}H-NMR and ^{13}C-NMR of compound **3d** in $CDCl_3$.



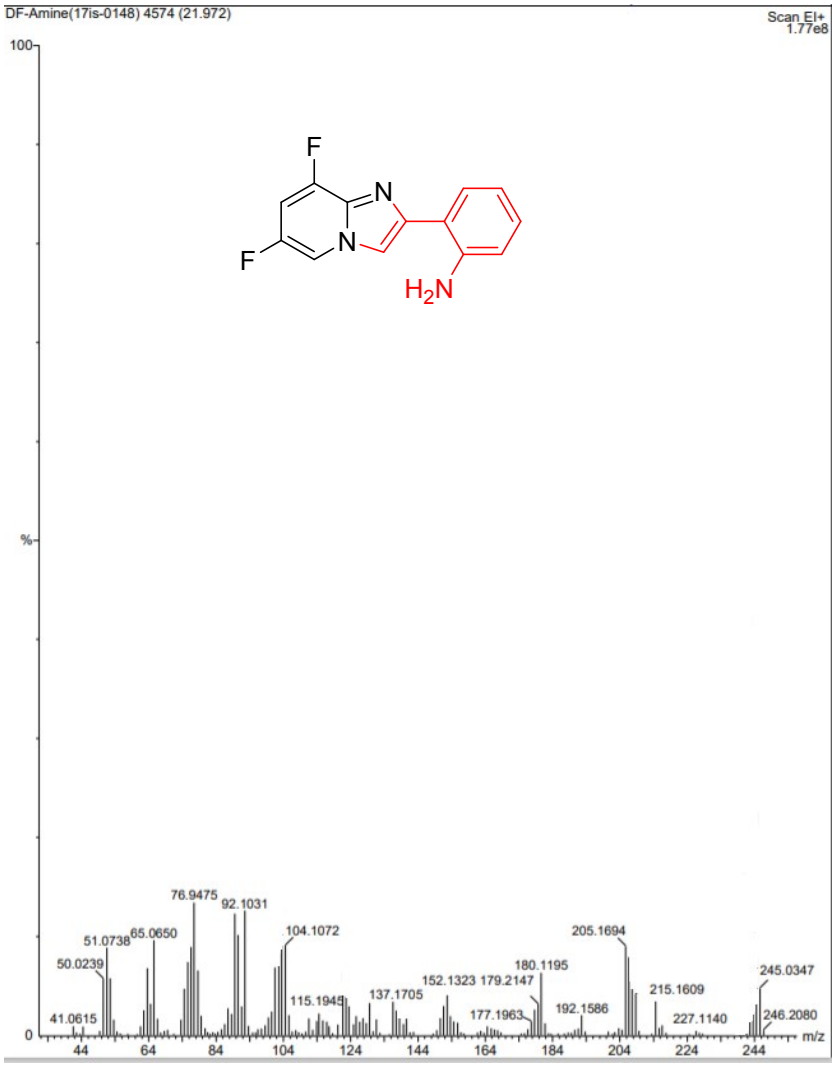


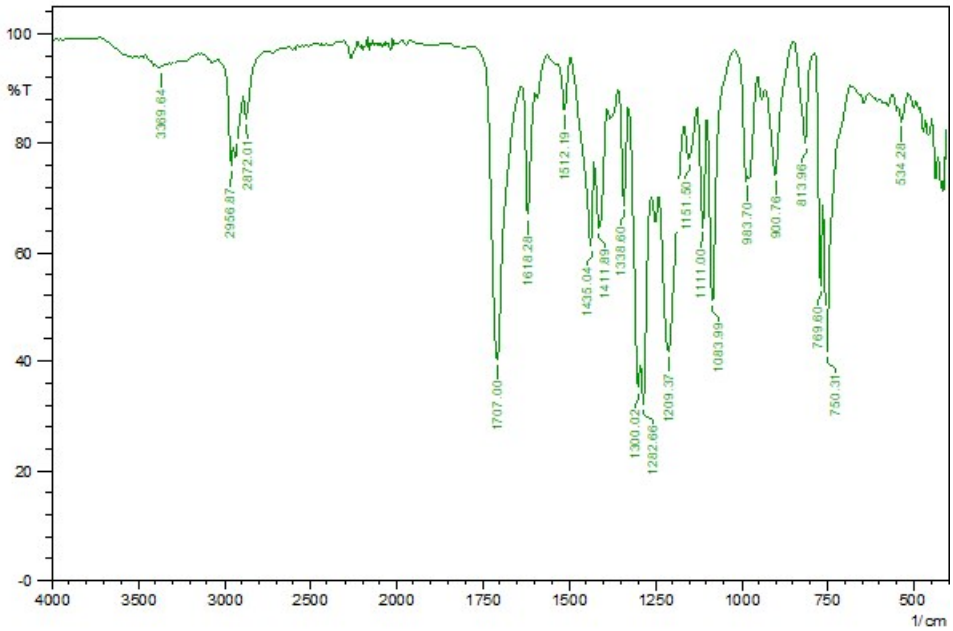
Mass and IR of Compound **3d**.



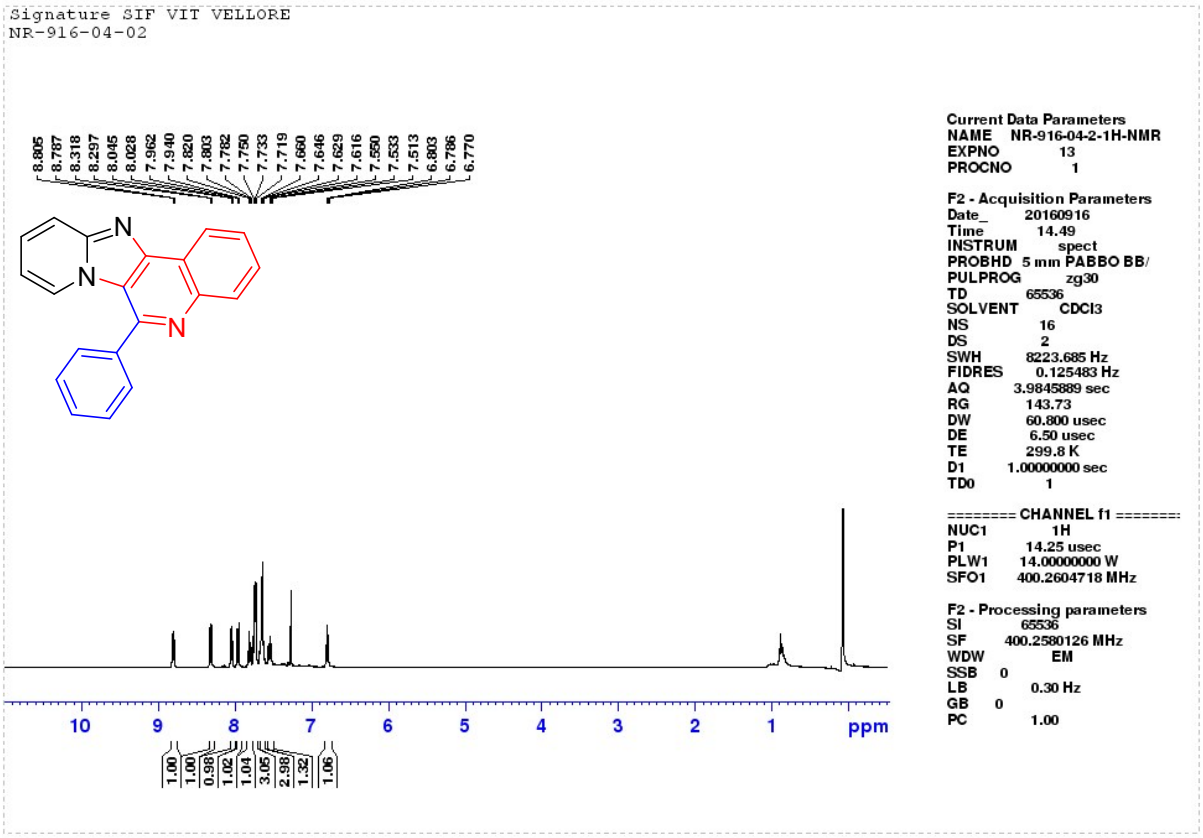


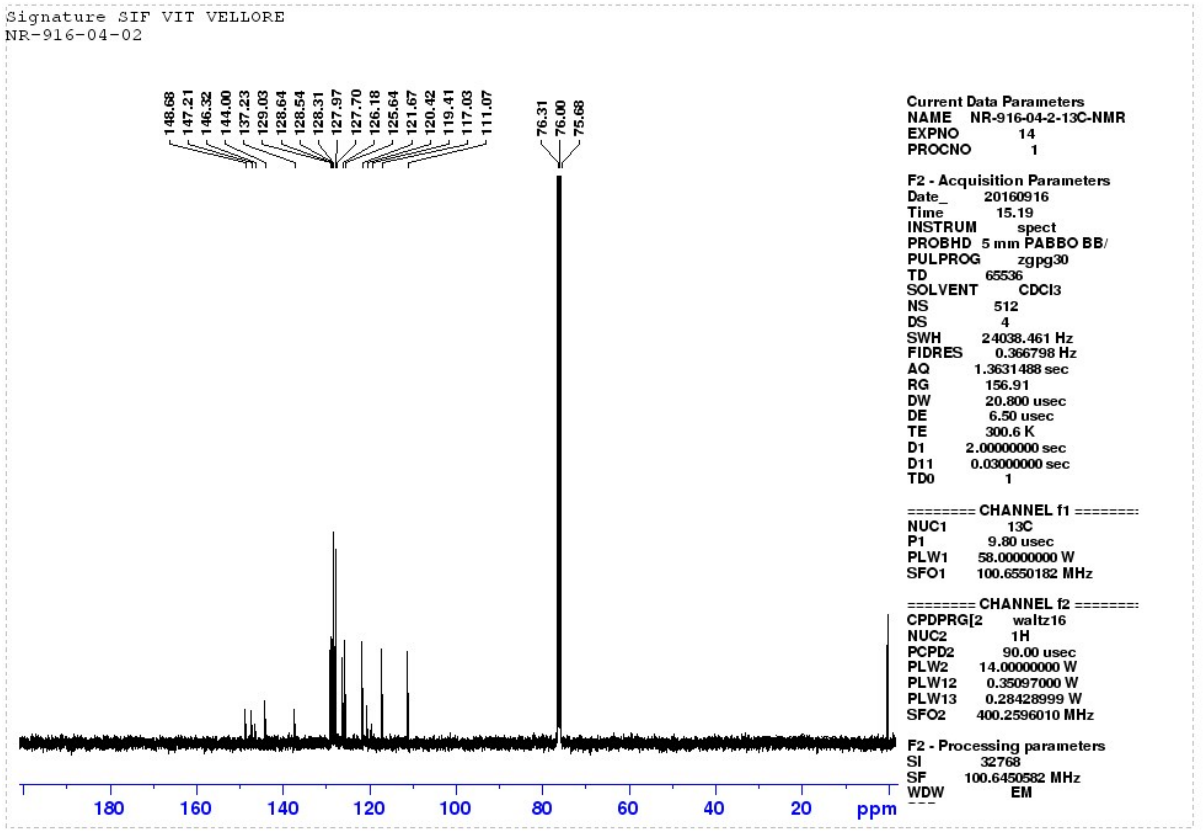
^{1}H-NMR and ^{13}C-NMR of compound **4d** in $CDCl_3$



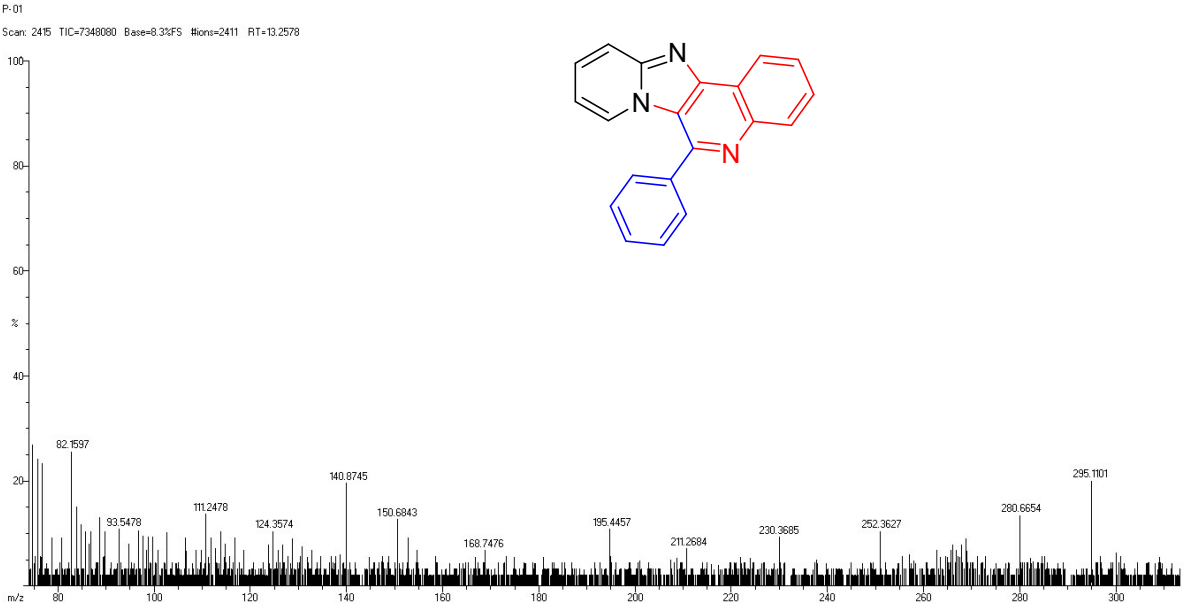


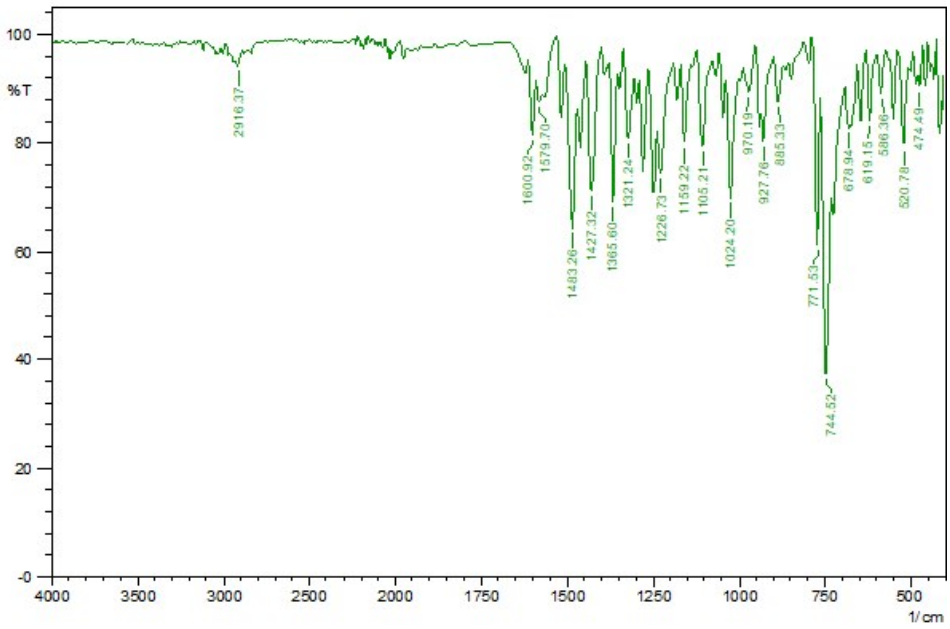
Mass and IR of Compound **4d.**



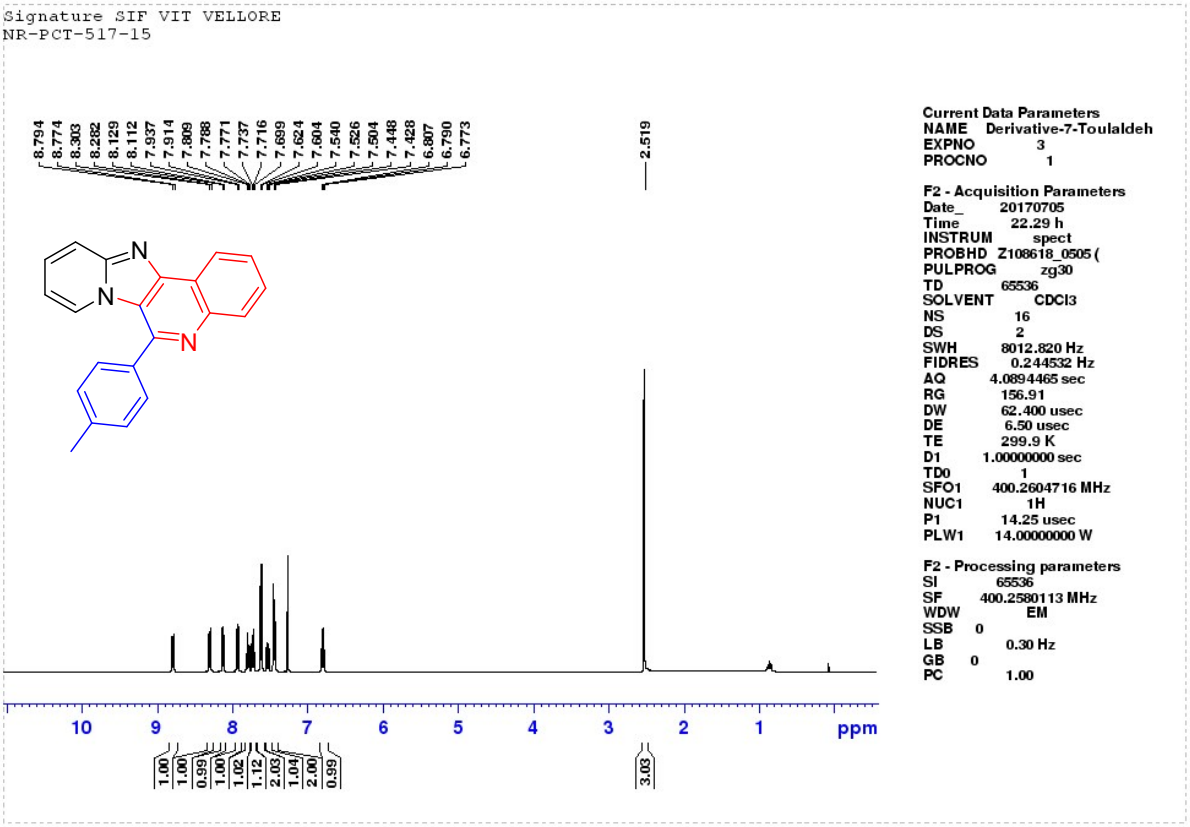


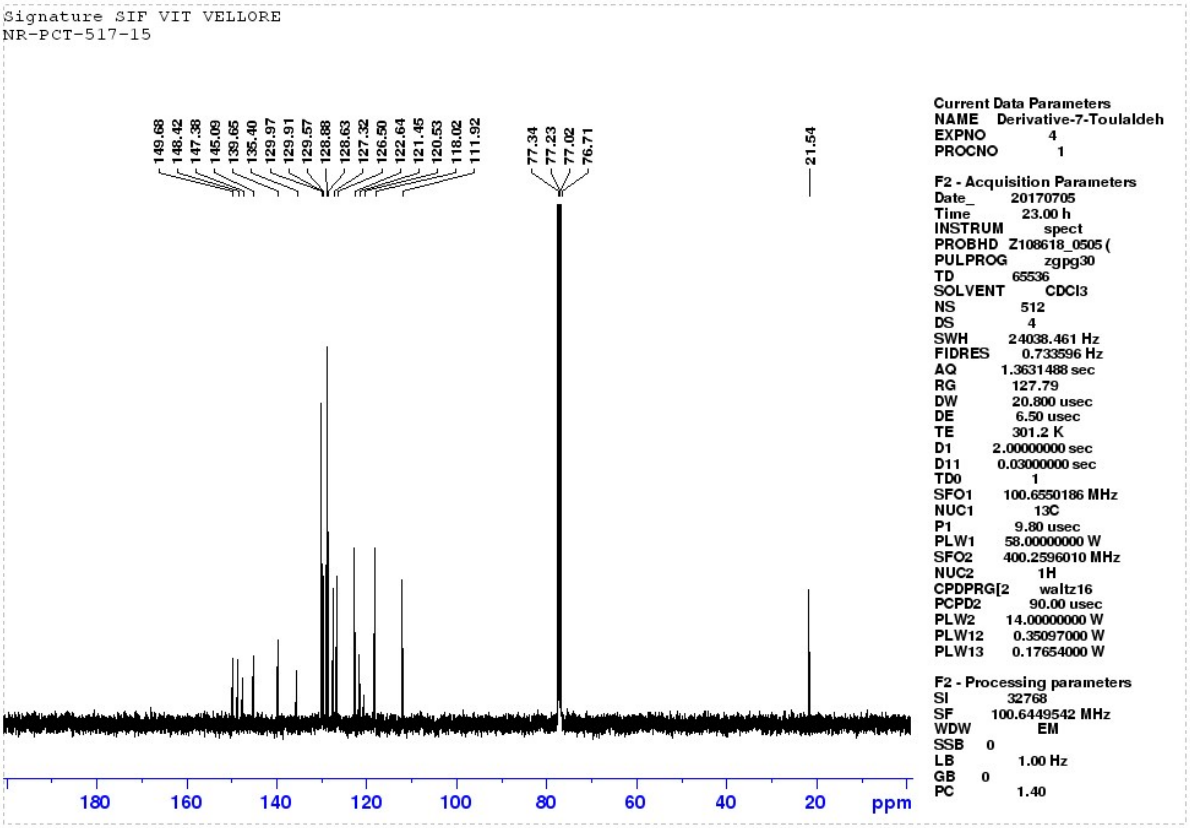
^{1}H-NMR and ^{13}C-NMR of compound **6a** in $CDCl_3$.



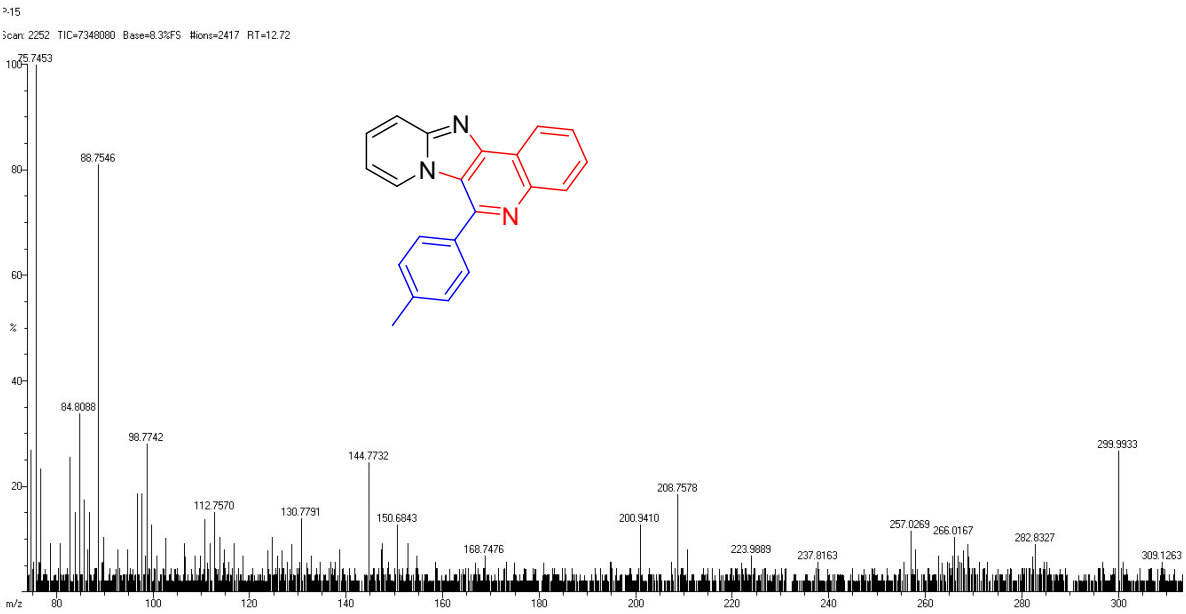


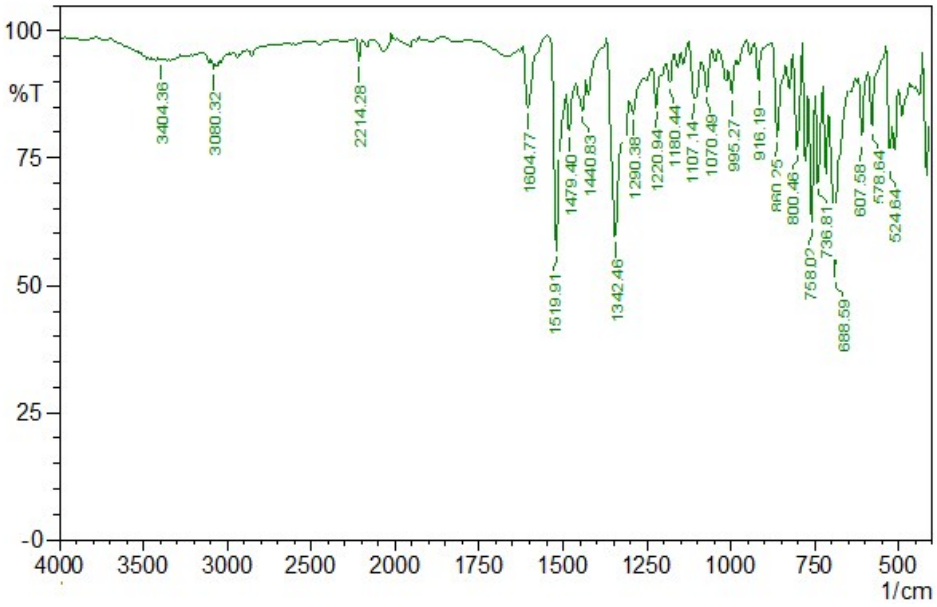
IR and HRMS of compound **6a**



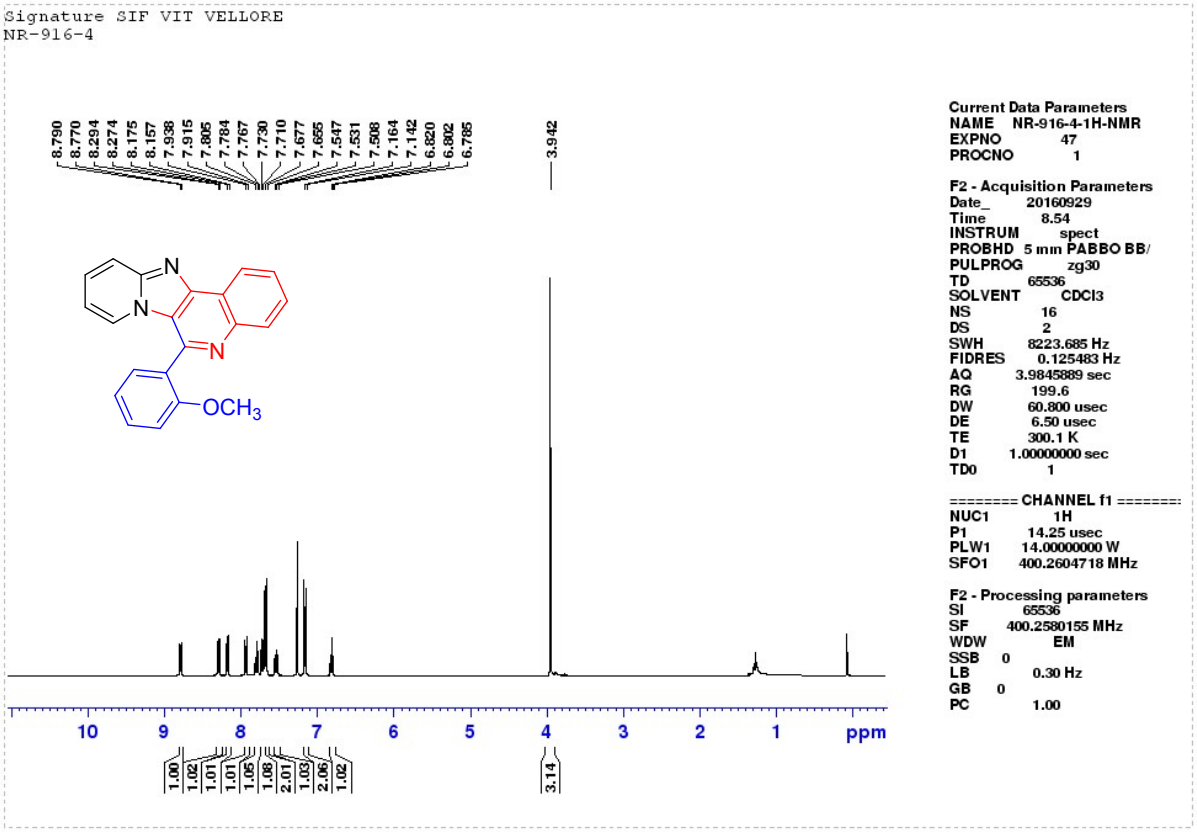


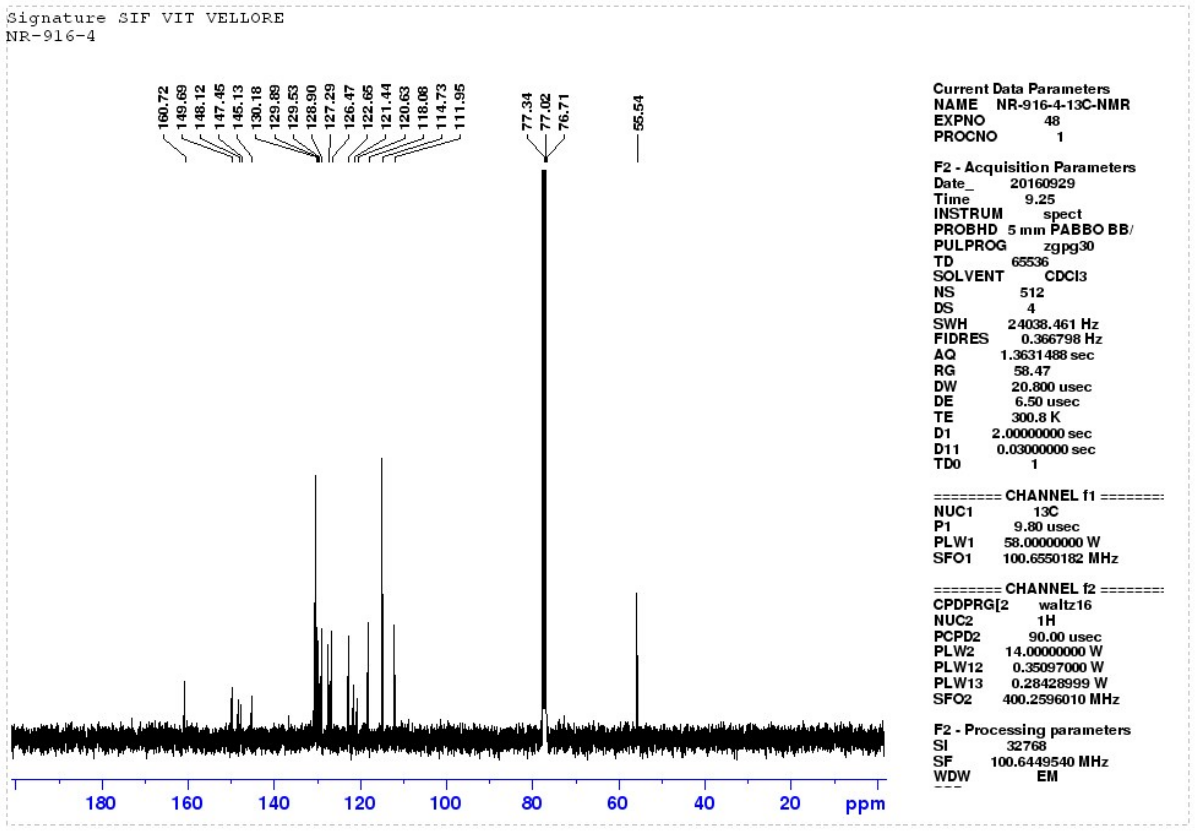
^{1}H-NMR and ^{13}C-NMR of compound **6b** in $CDCl_3$



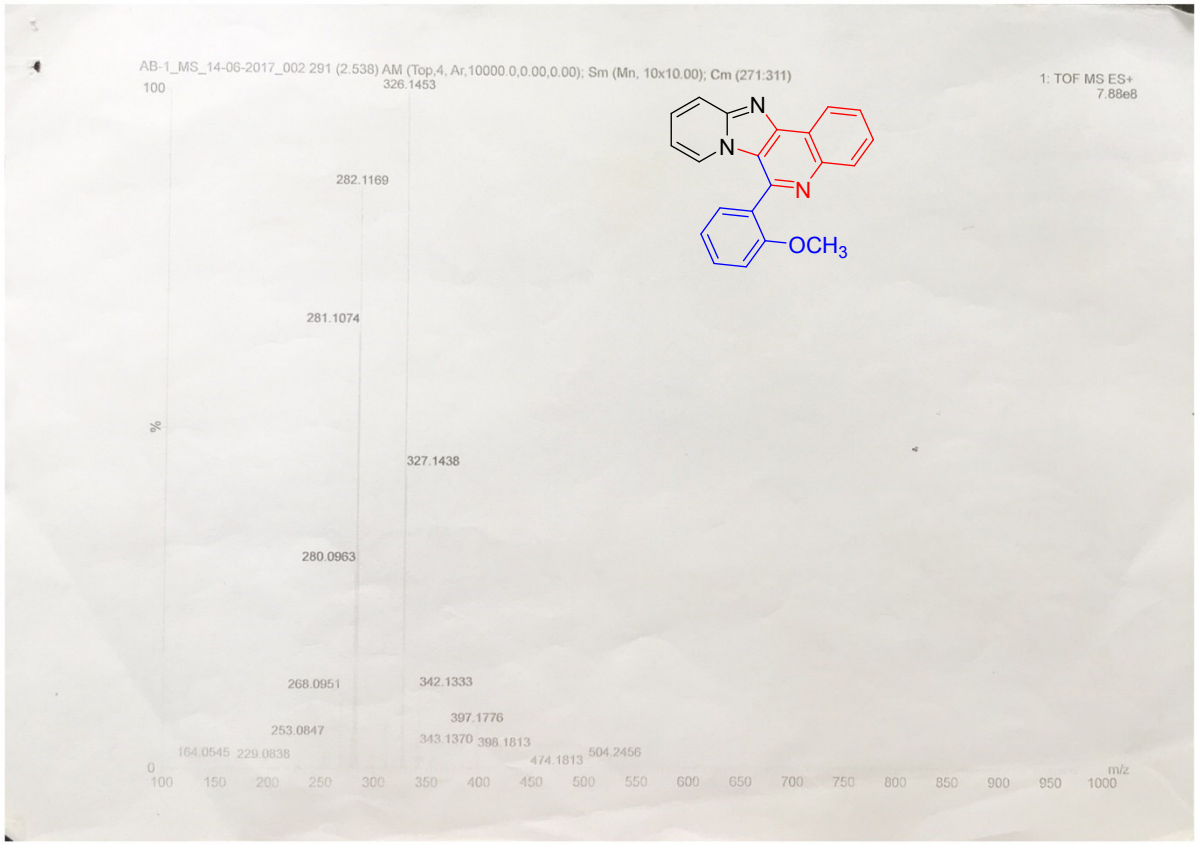


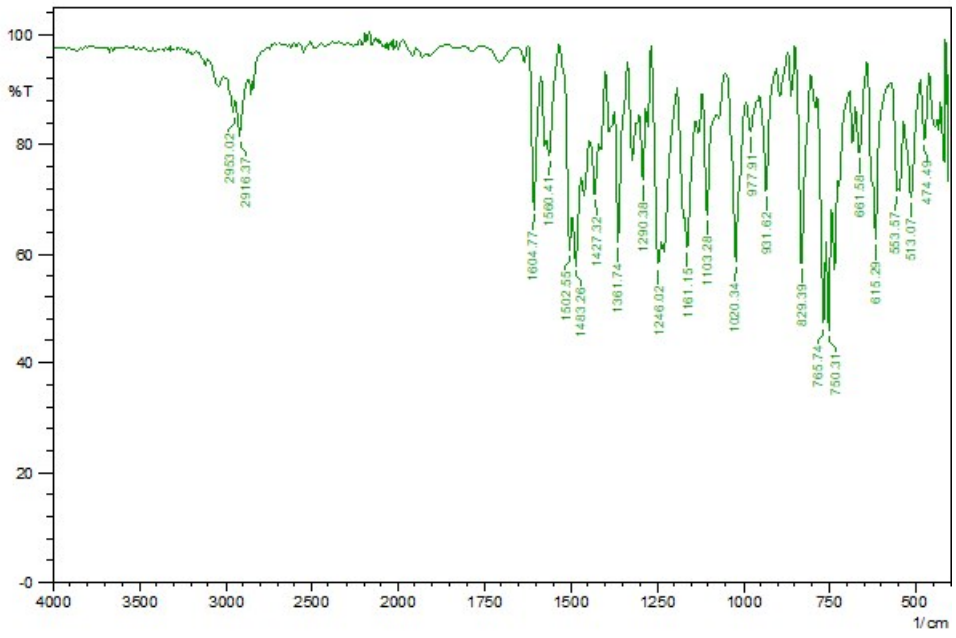
IR and HRMS of compound **6b**



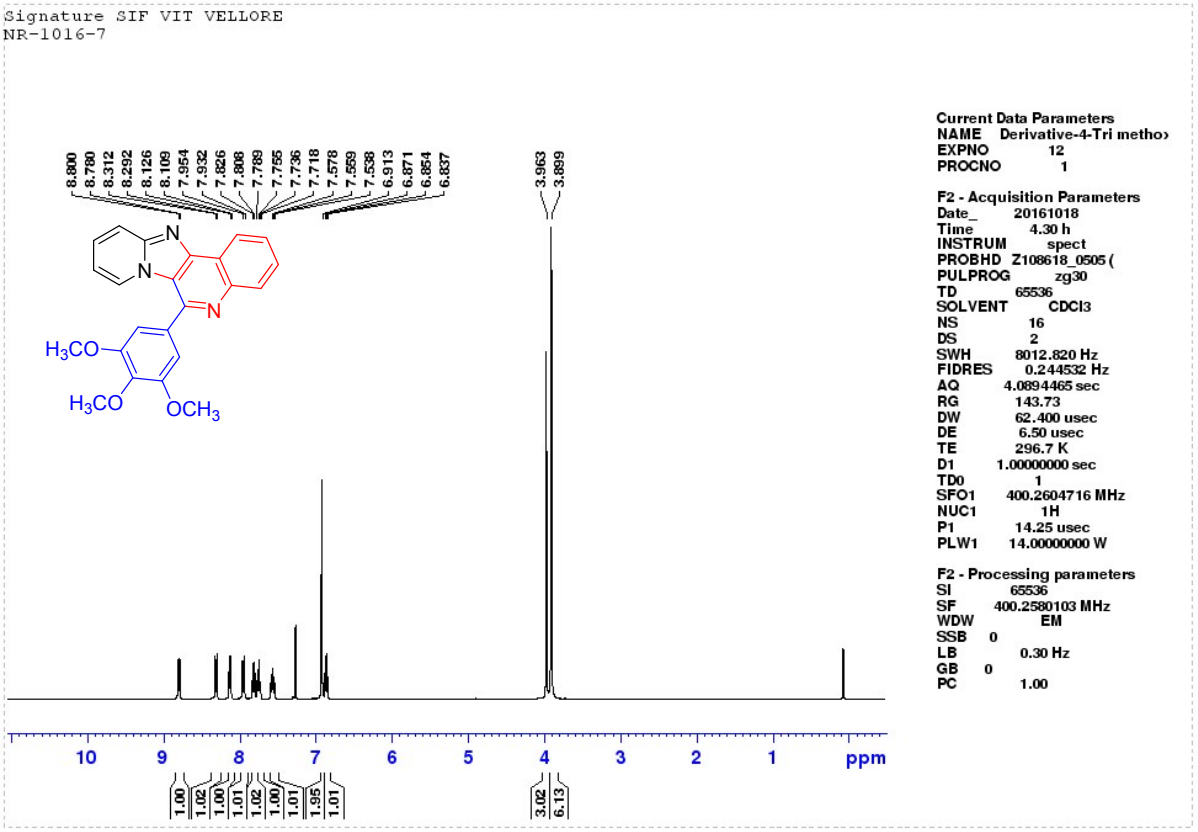


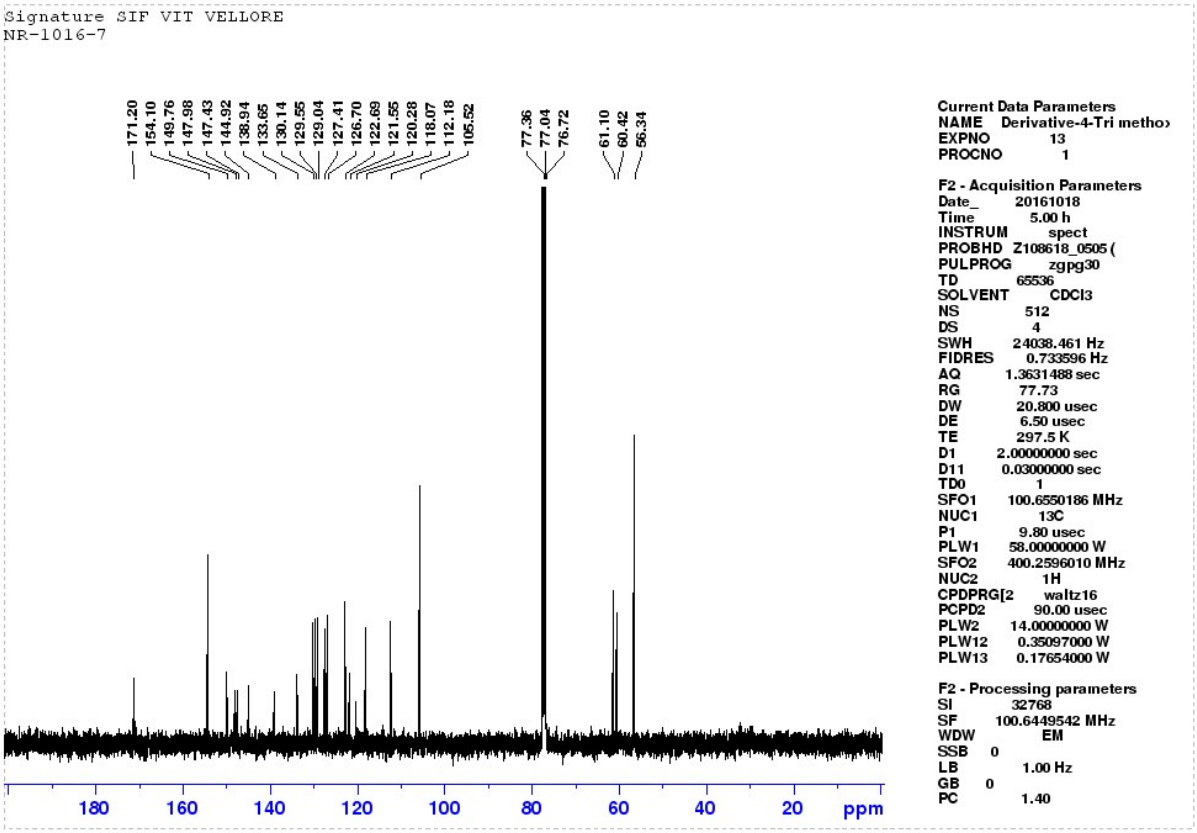
^{1}H-NMR and ^{13}C-NMR of compound **6c** in $CDCl_3$.



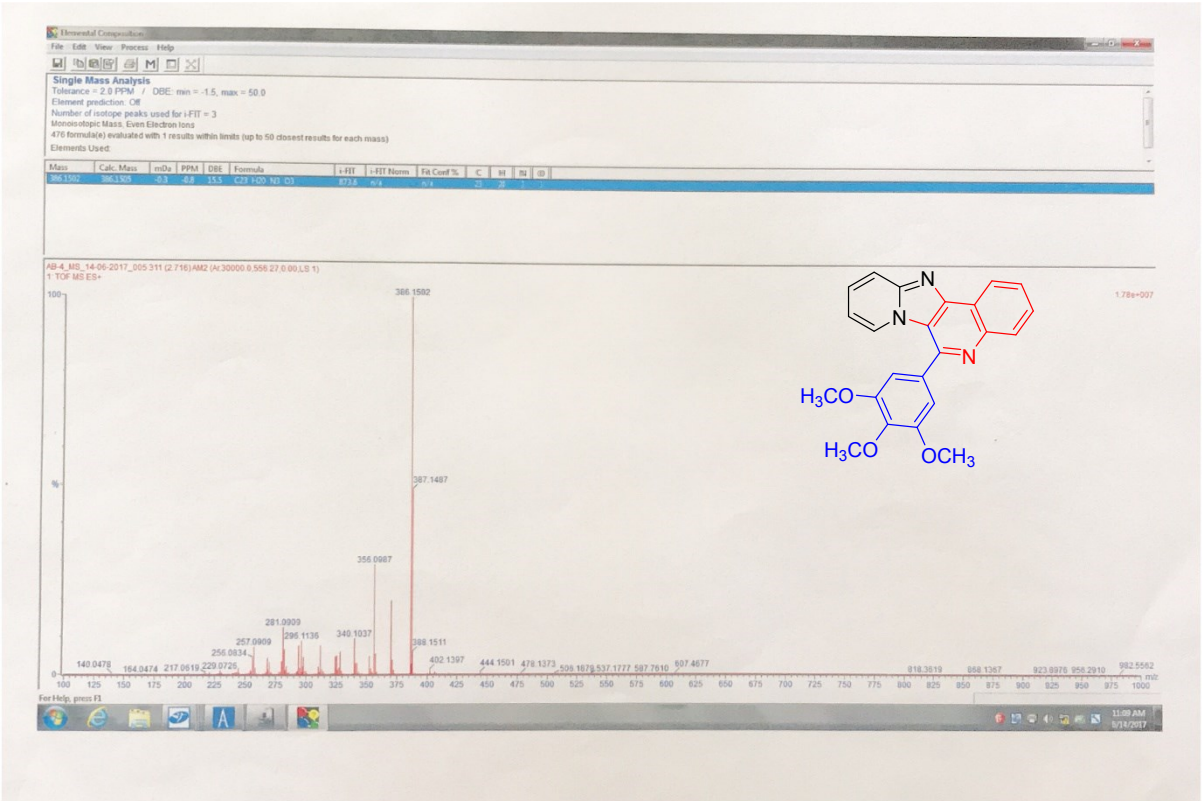


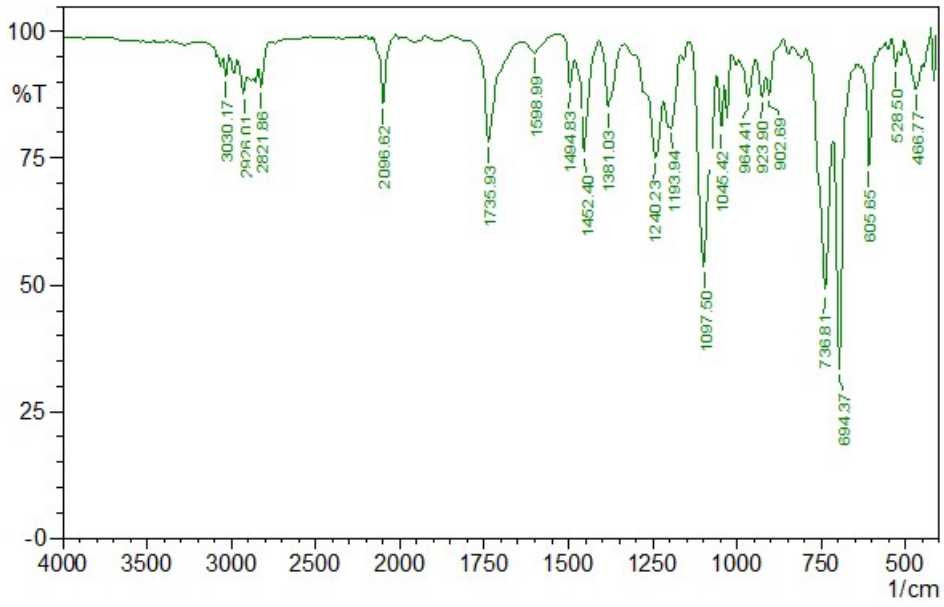
IR and HRMS of compound **6c**



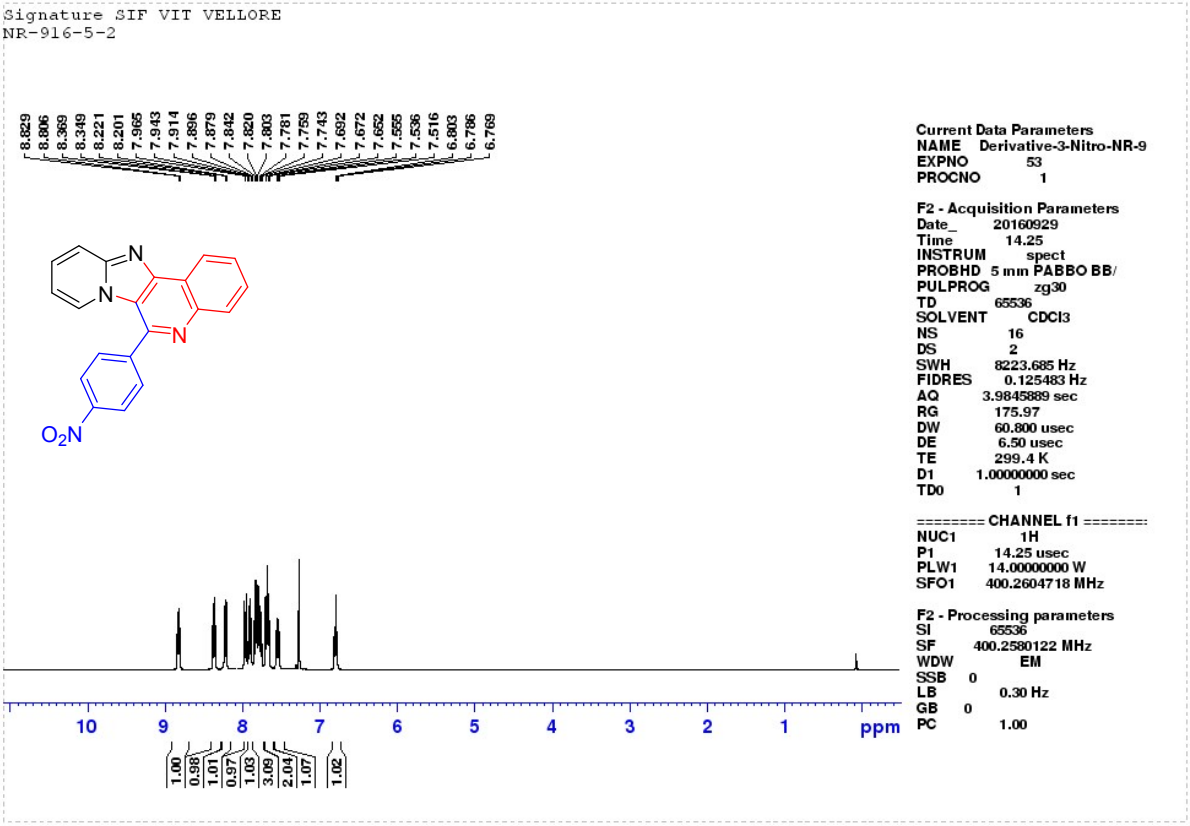


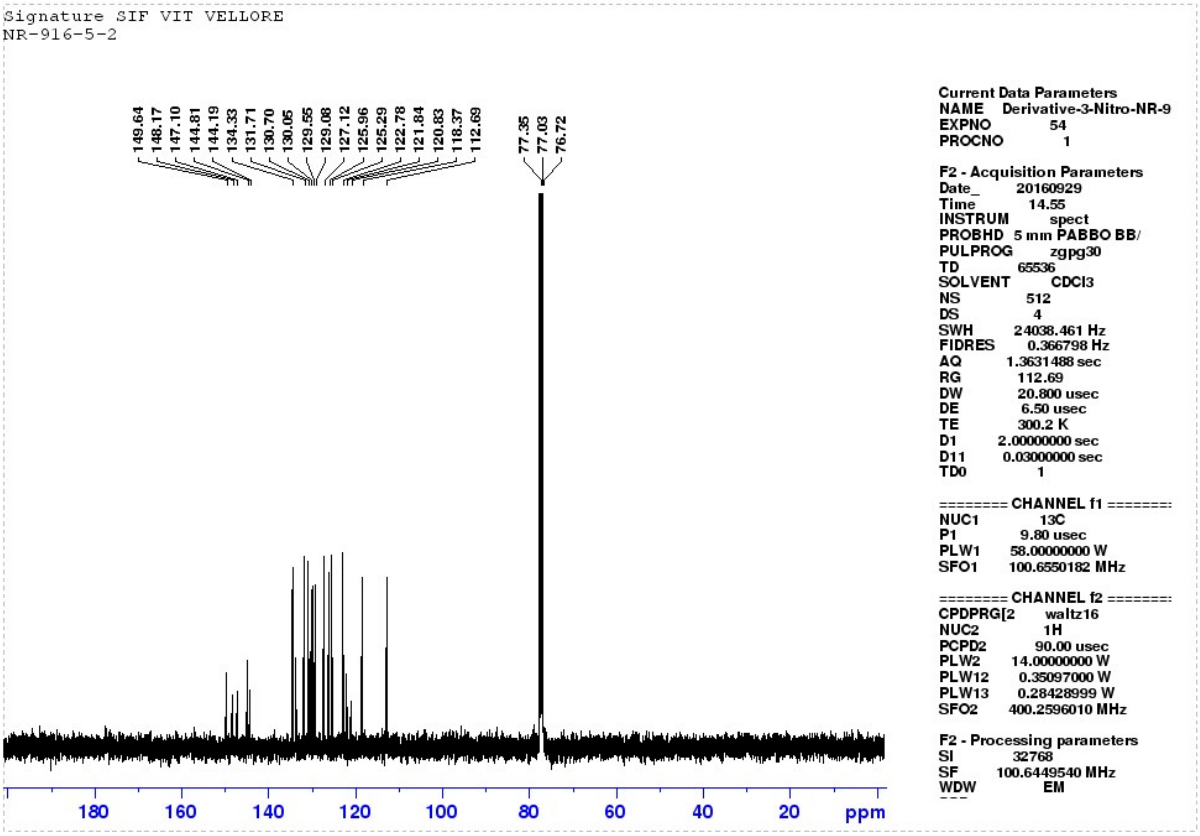
^{1}H-NMR and ^{13}C-NMR of compound **6d** in $CDCl_3$



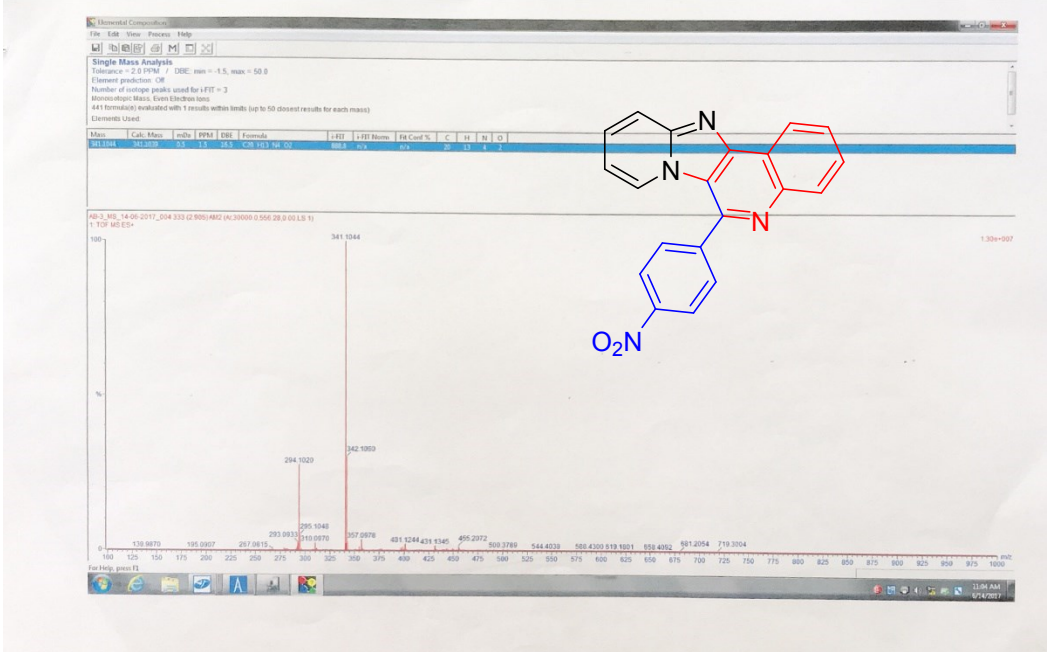


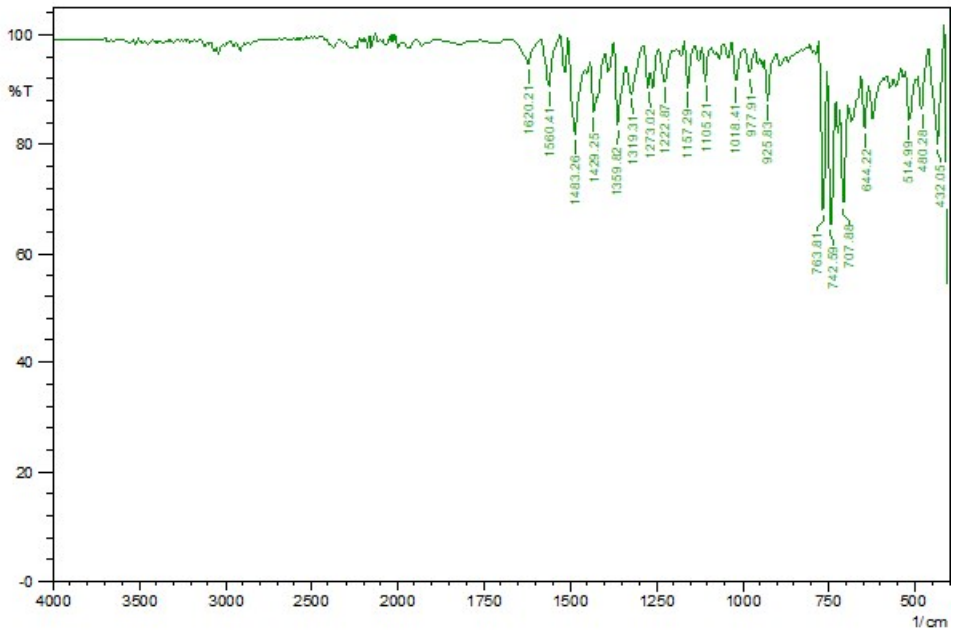
IR and HRMS of compound **6d**



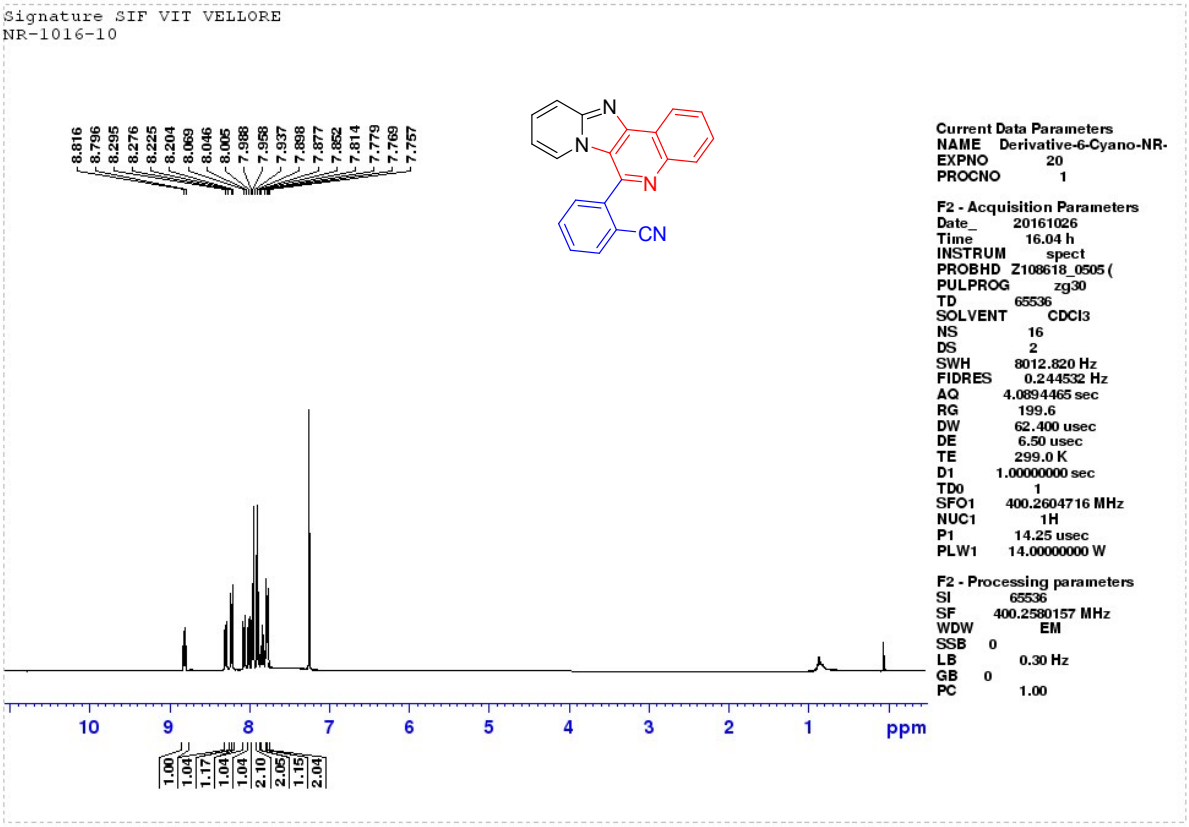


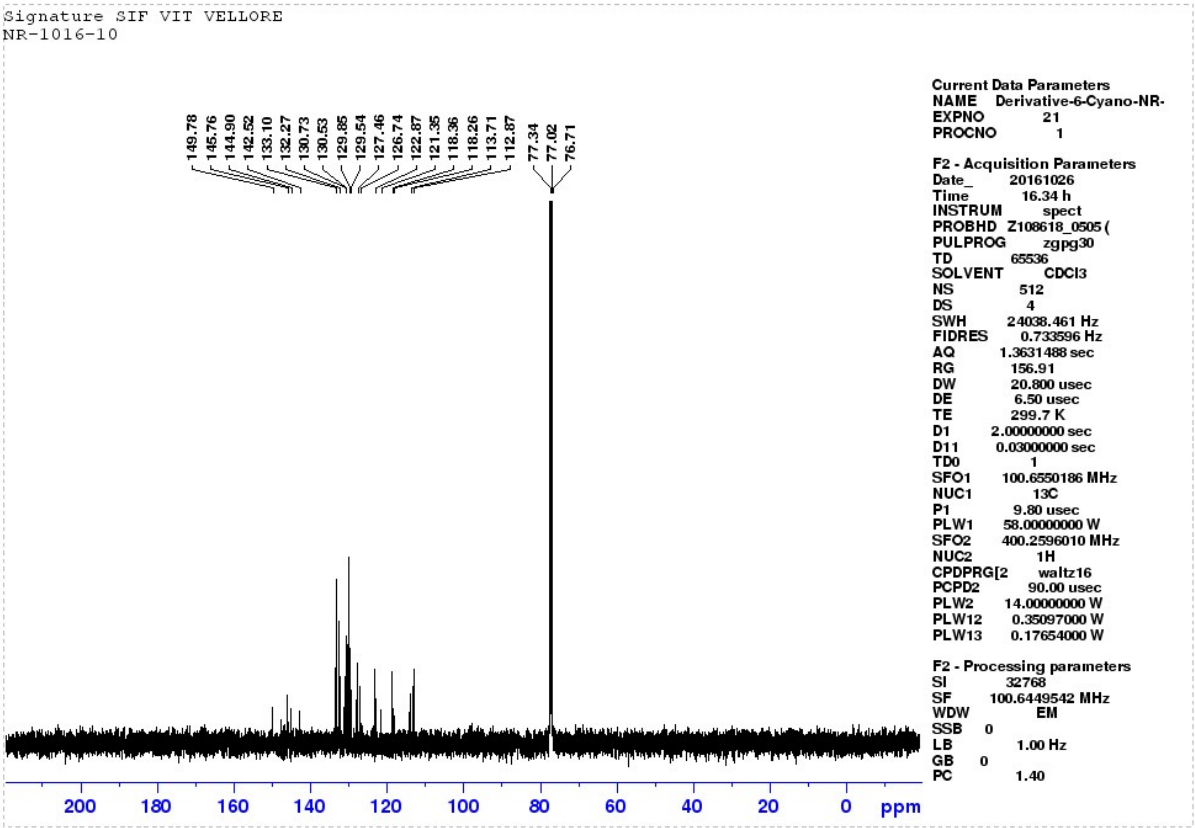
^{1}H-NMR and ^{13}C-NMR of compound **6e** in $CDCl_3$



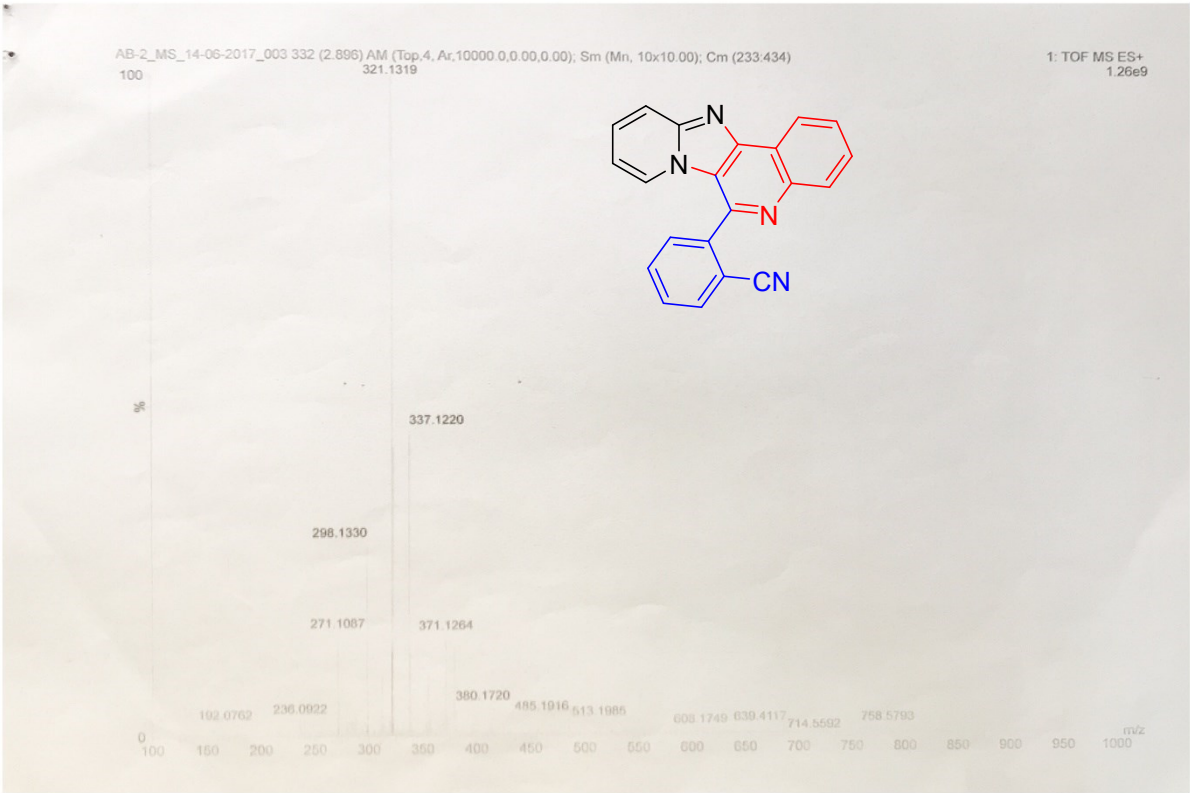


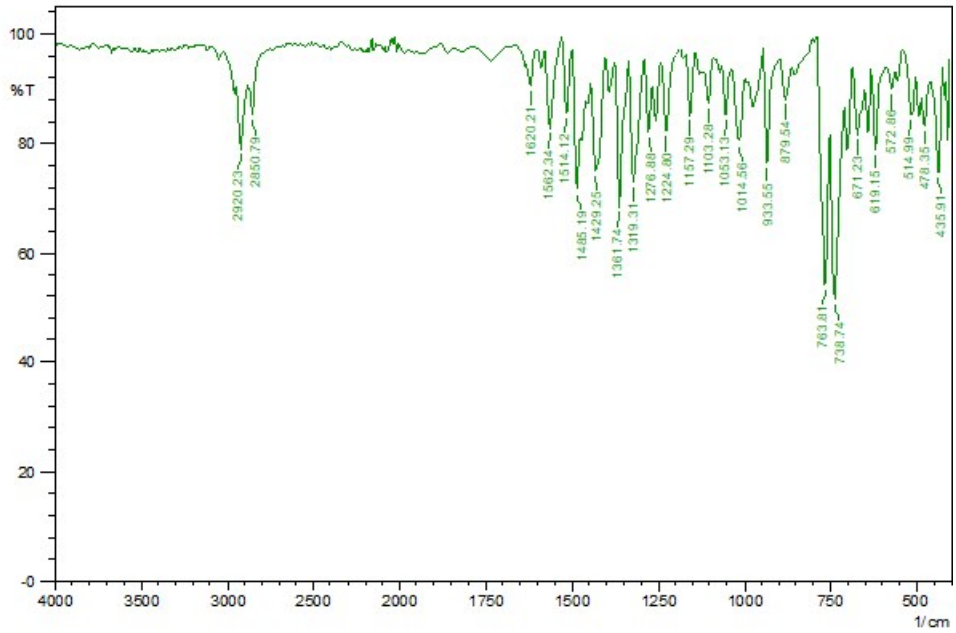
IR and HRMS of compound **6e**



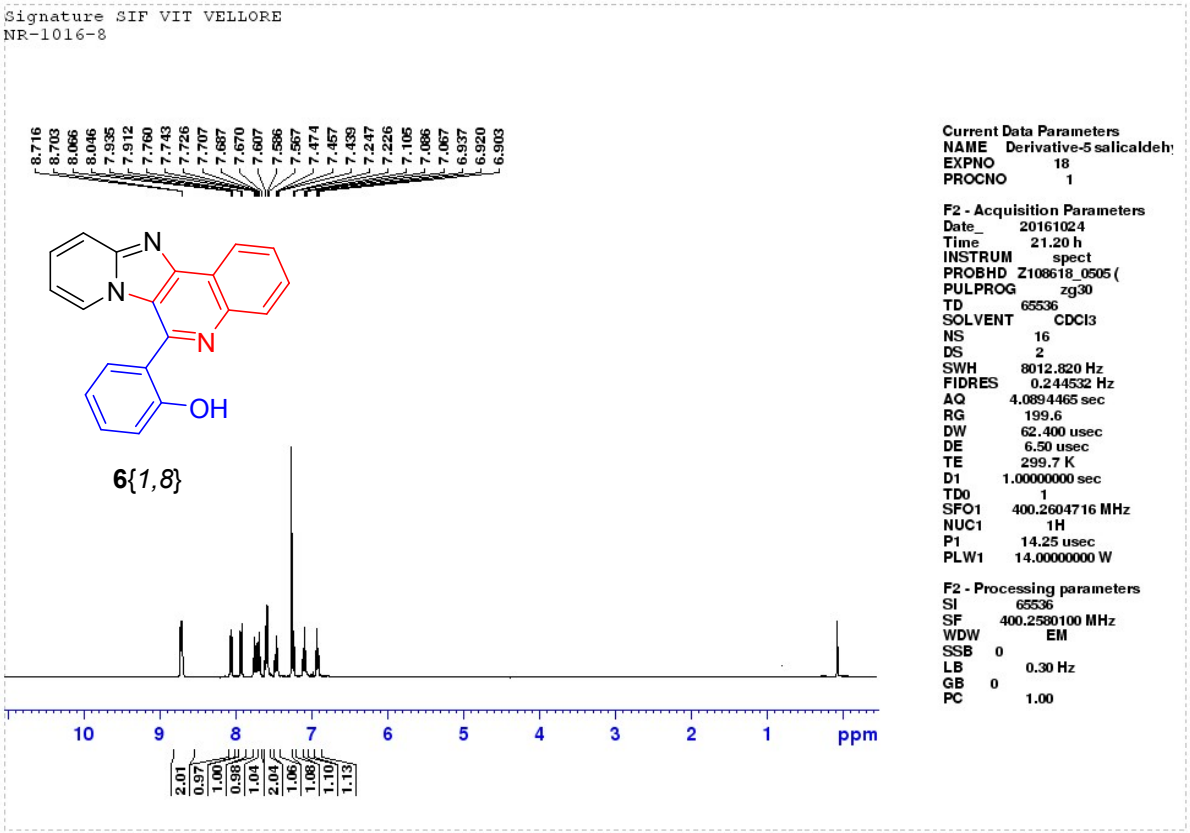


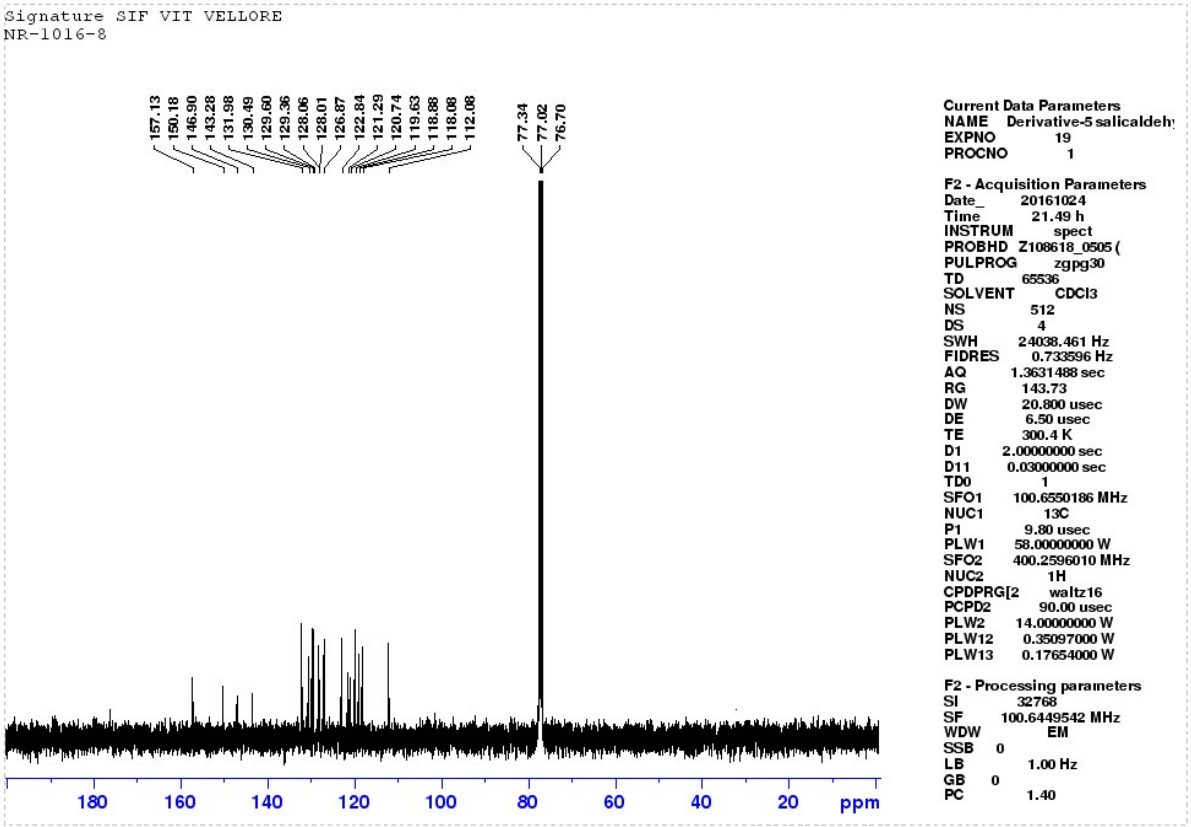
^{1}H-NMR and ^{13}C-NMR of compound **6f** in $CDCl_3$



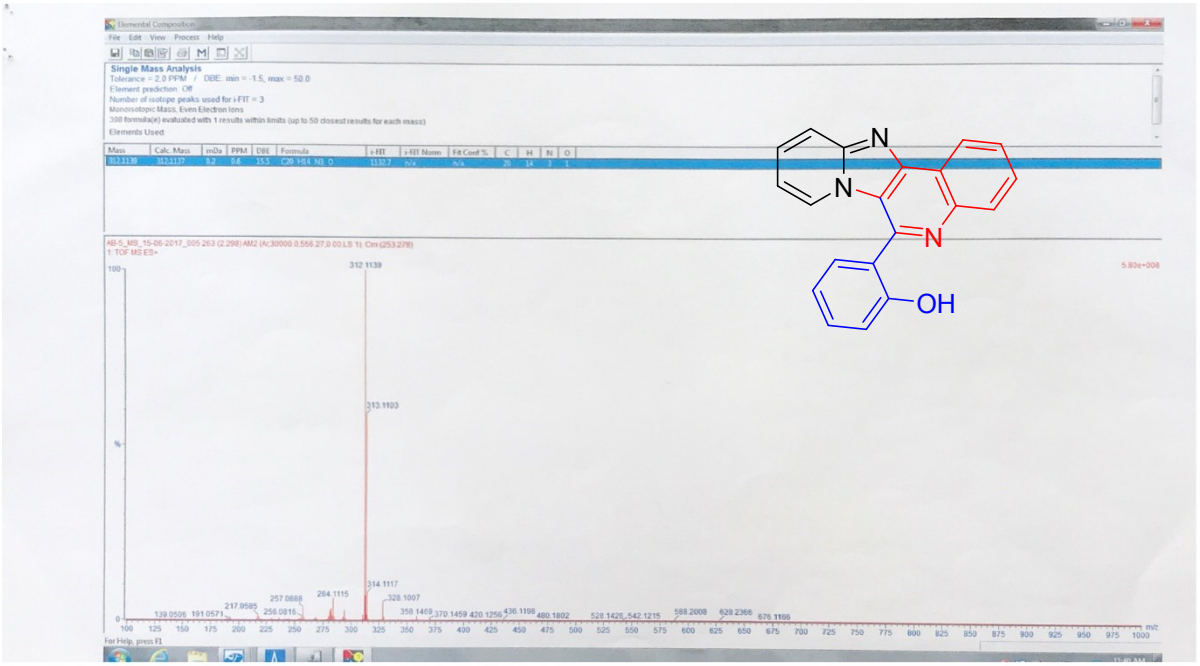


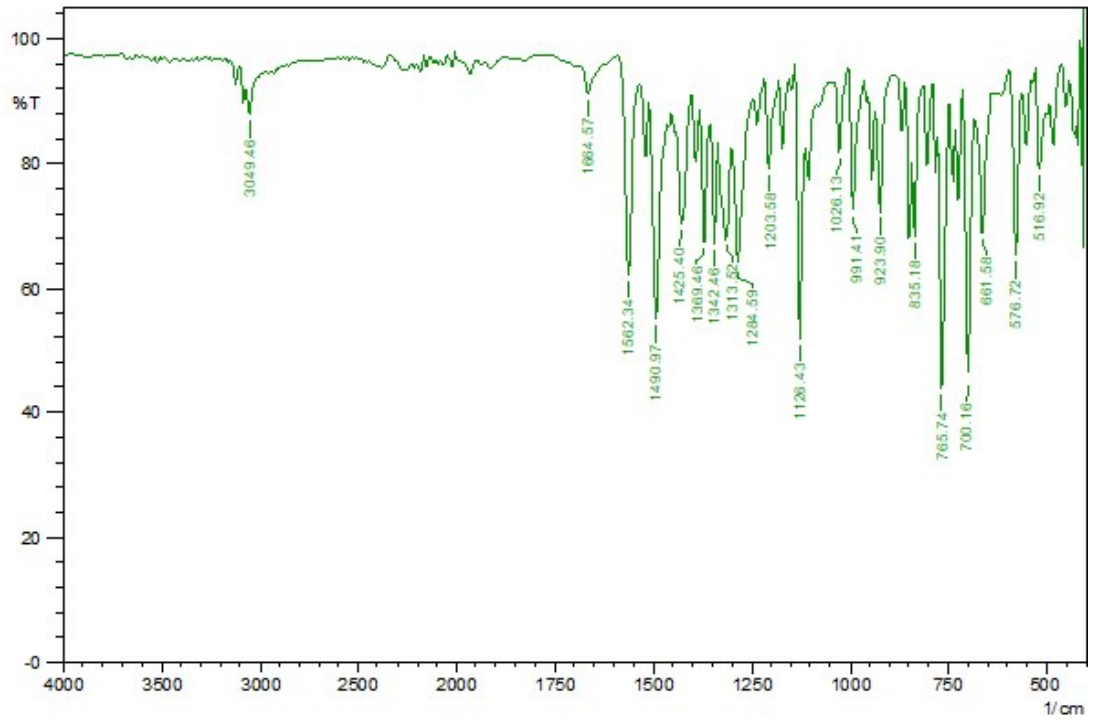
IR and HRMS of compound **6f**



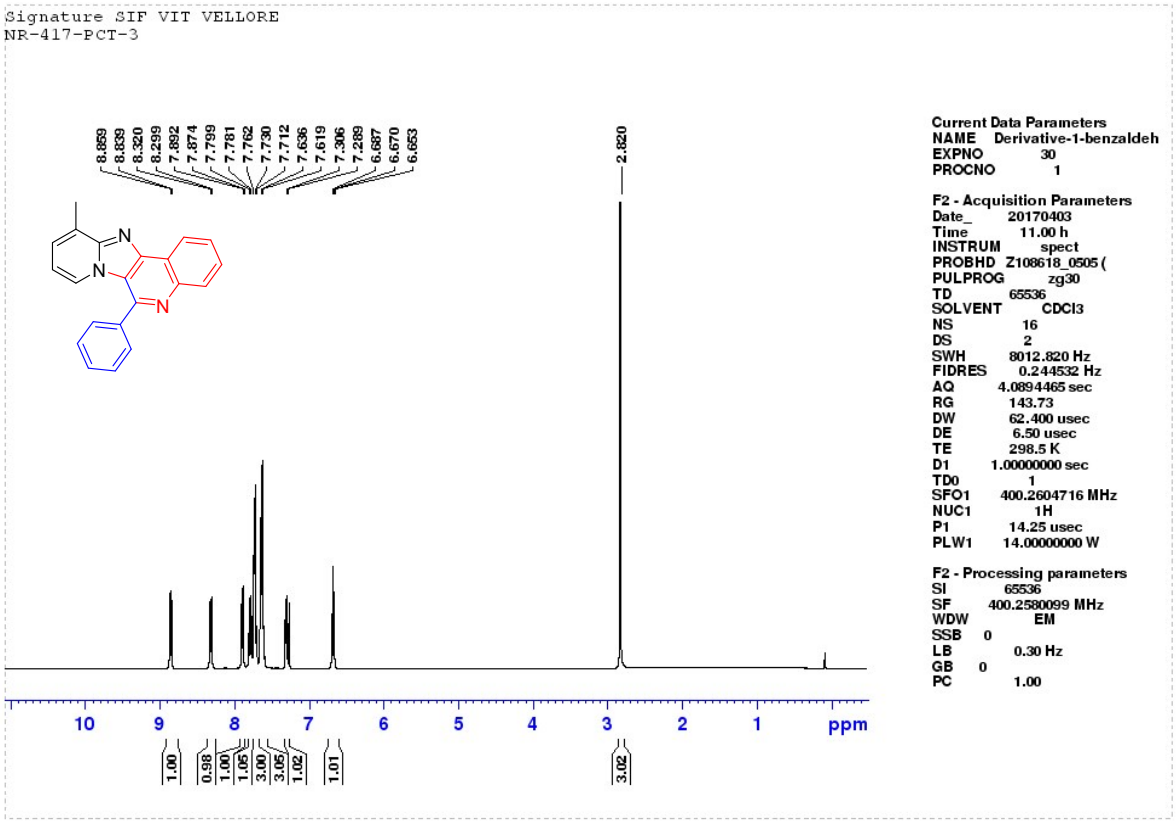


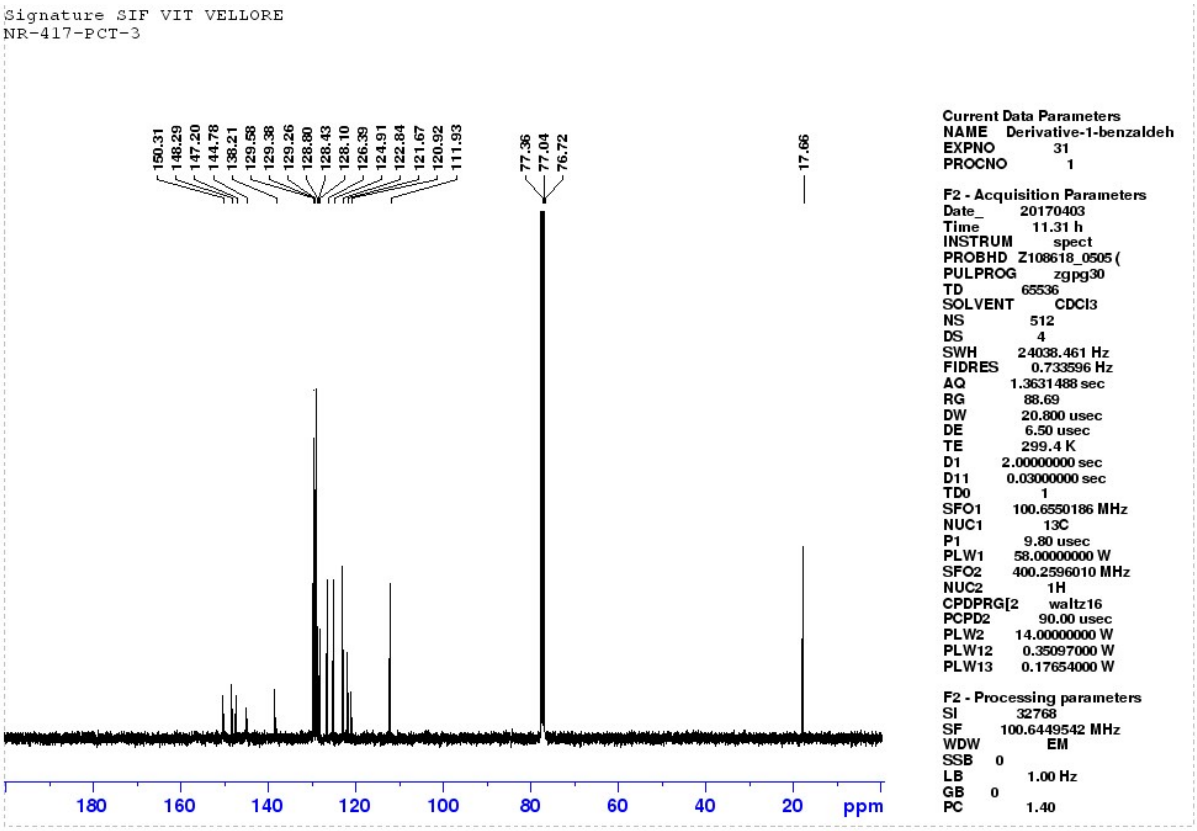
^{1}H-NMR and ^{13}C-NMR of compound **6g** in $CDCl_3$



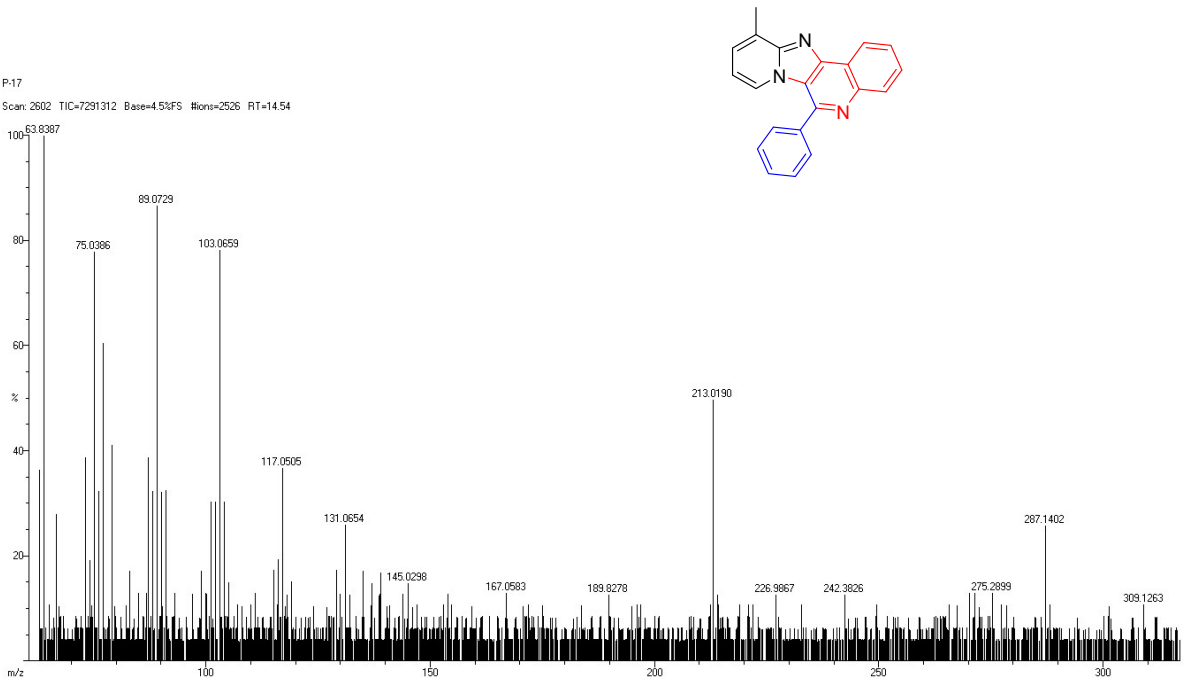


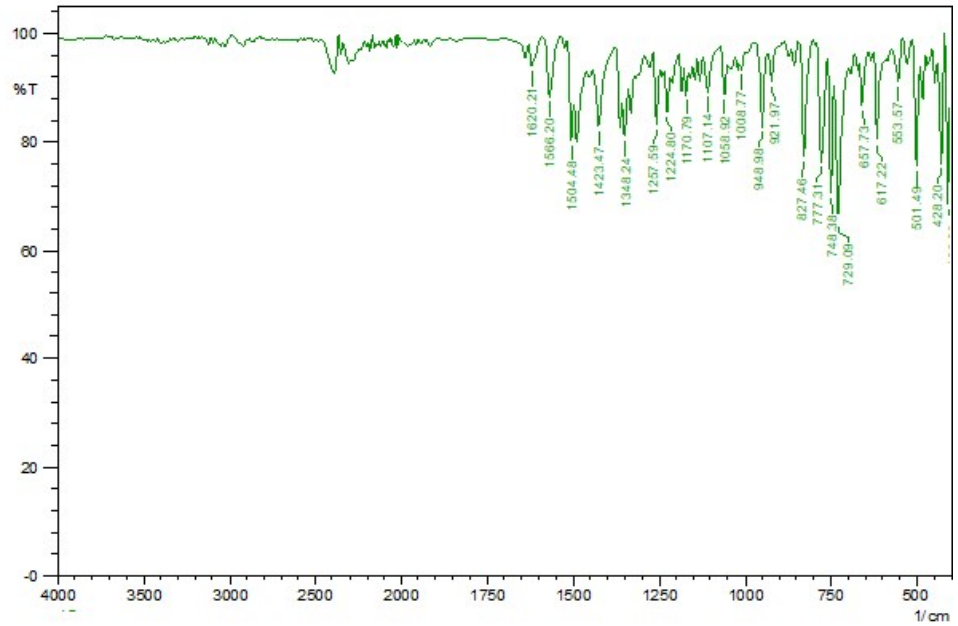
IR and HRMS of compound **6g**



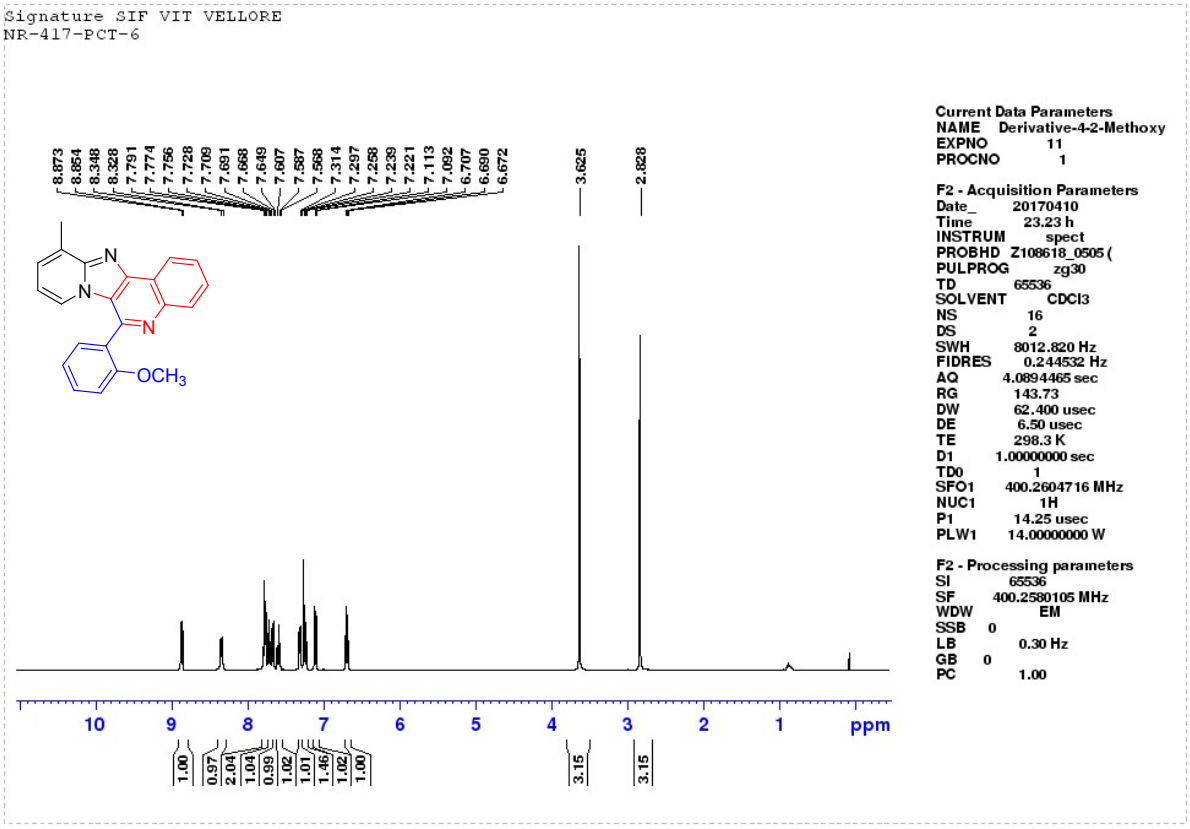


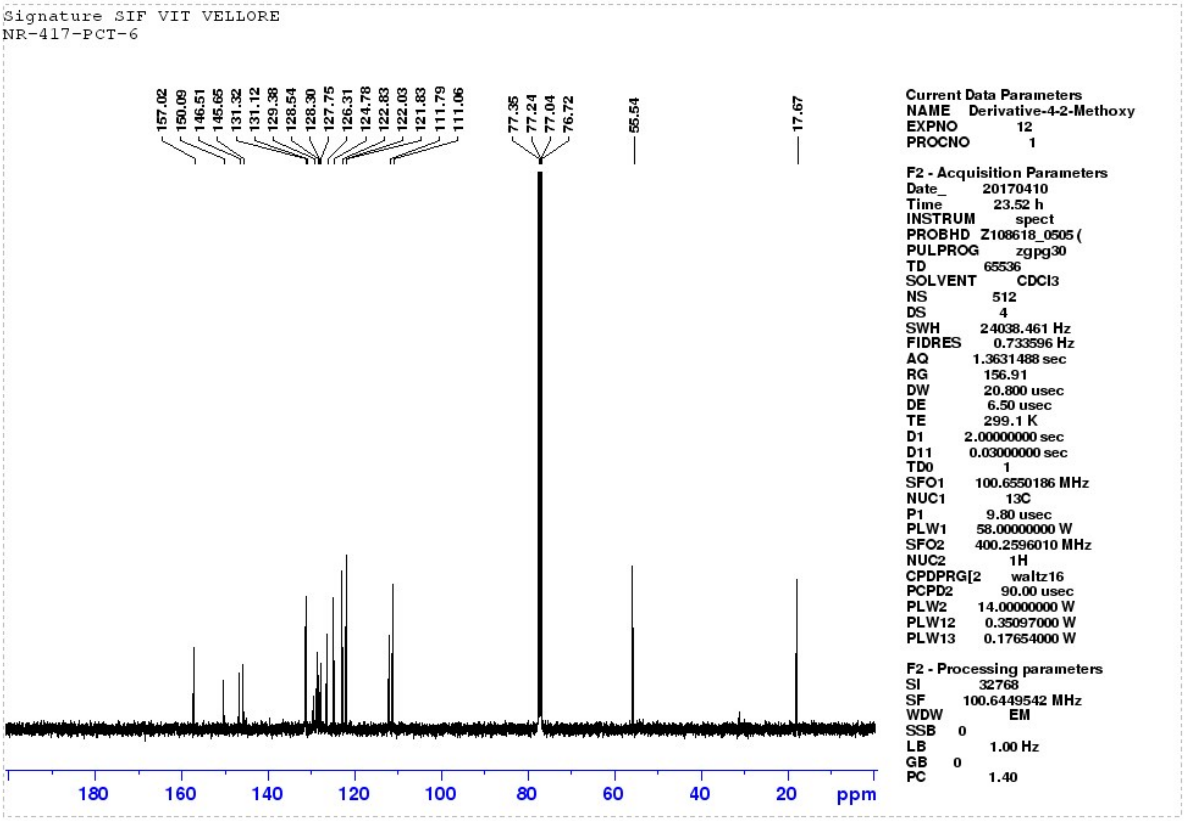
^{1}H-NMR and ^{13}C-NMR of compound **6h** in $CDCl_3$.



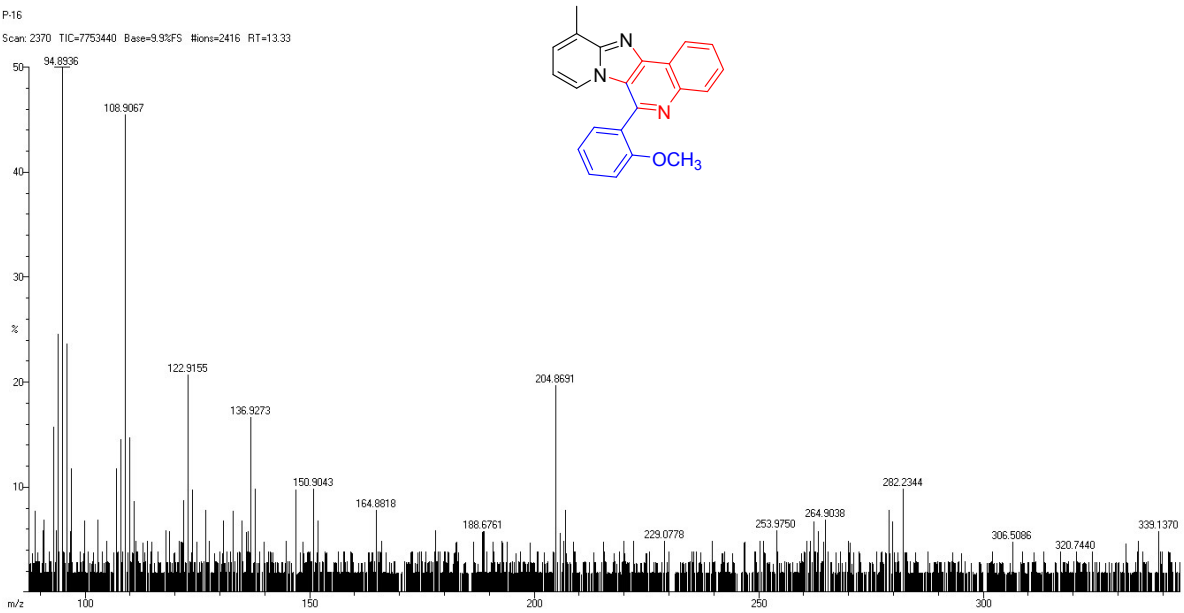


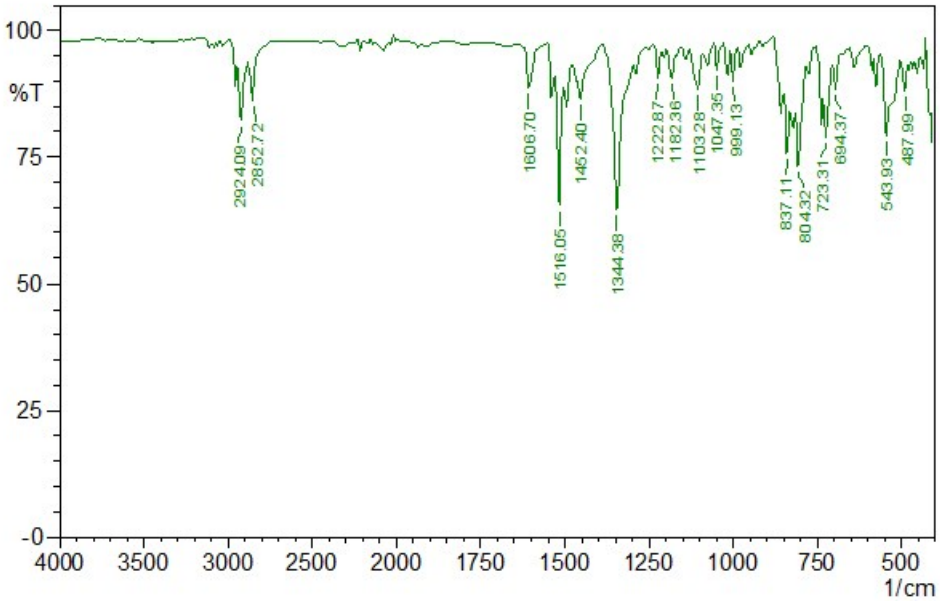
HRMS and IR of compound **6h**.



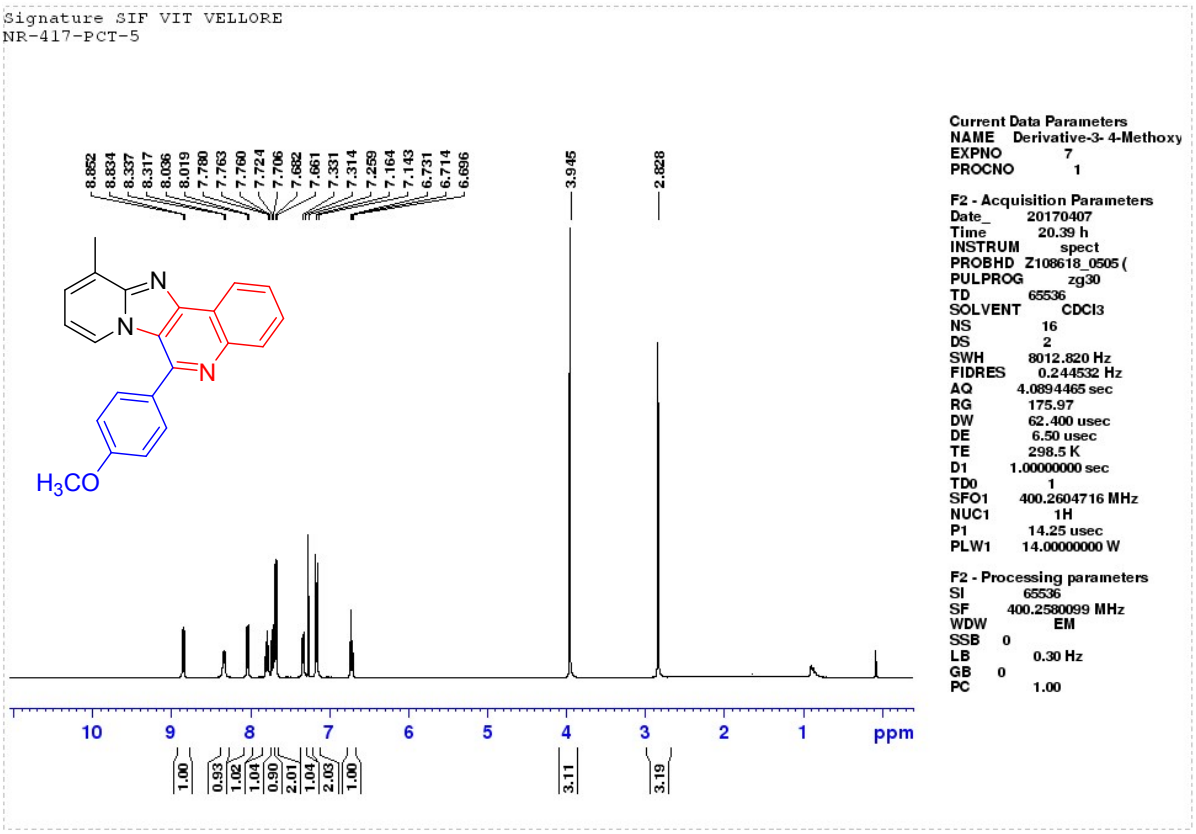


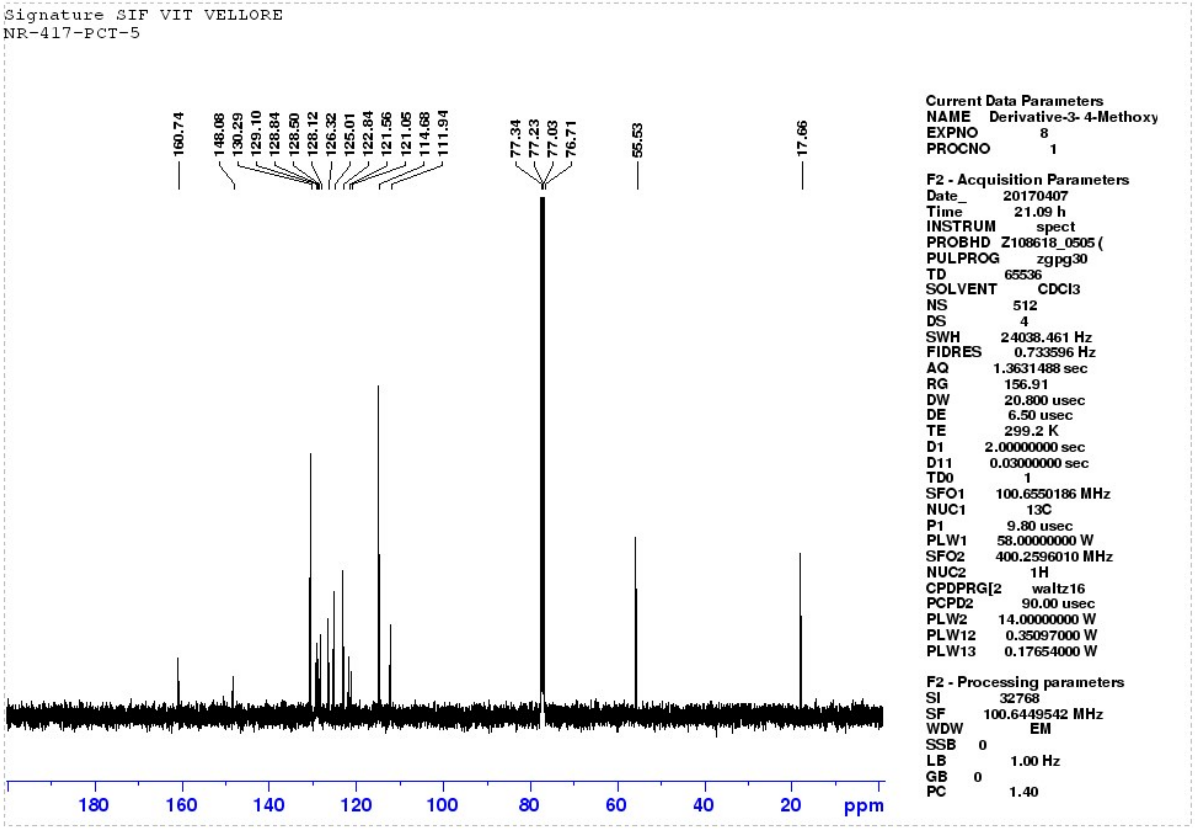
^{1}H-NMR and ^{13}C-NMR of compound **6i** in $CDCl_3$



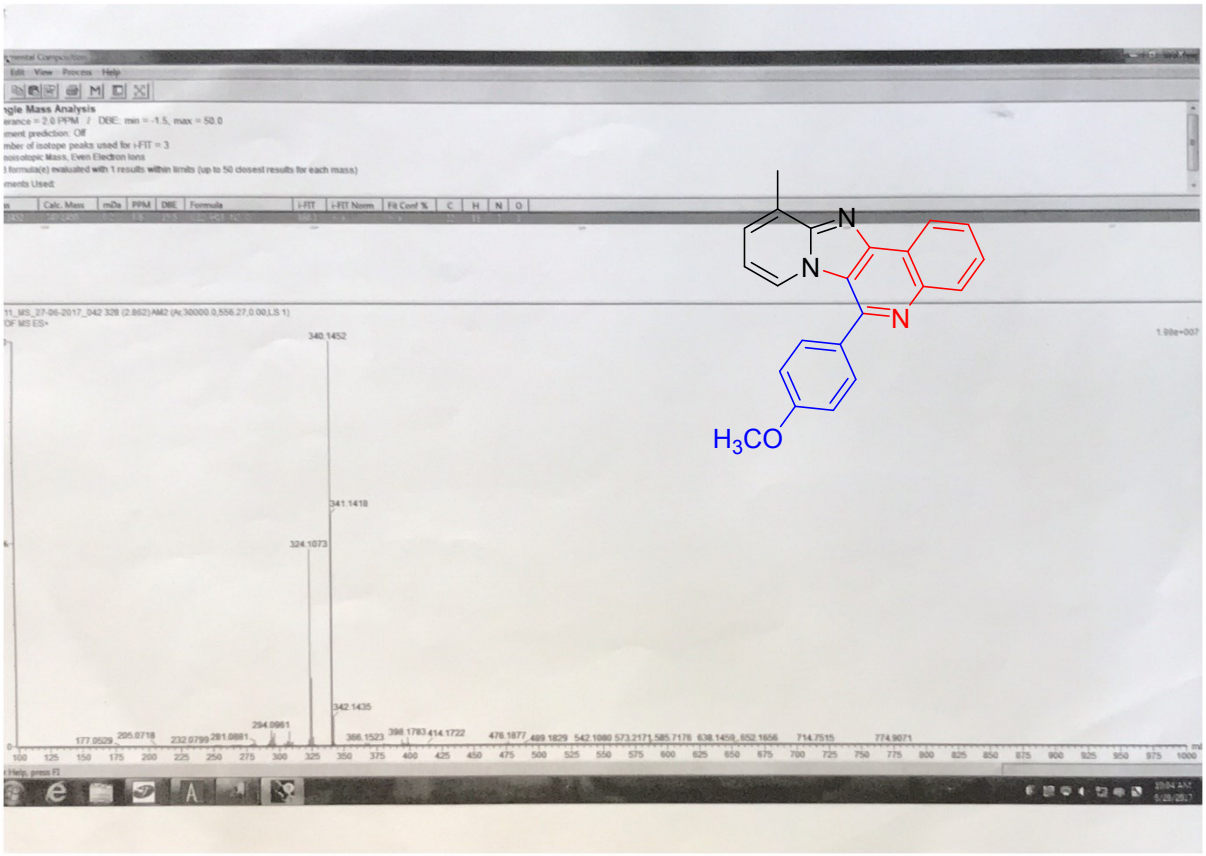


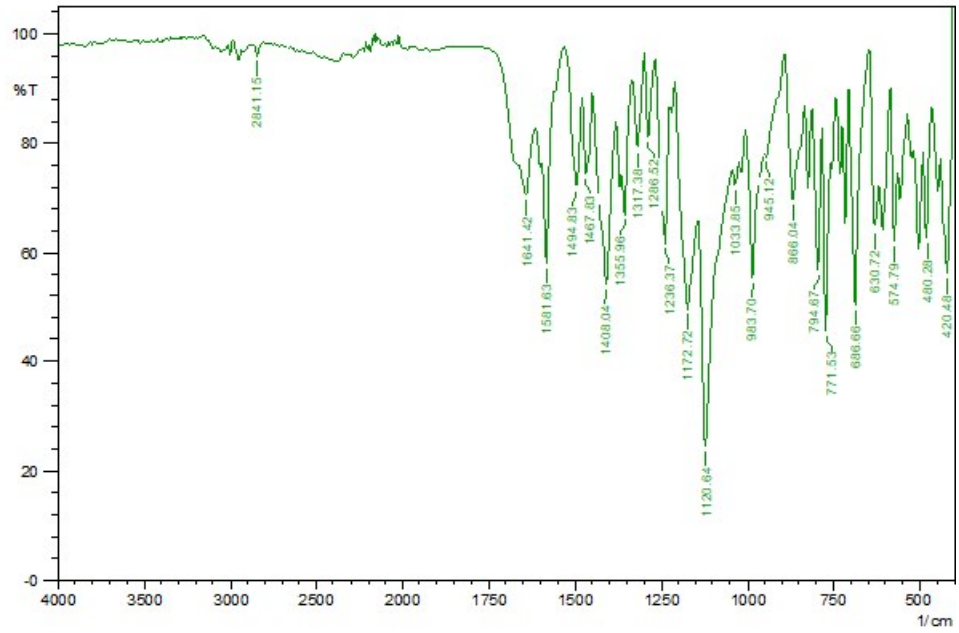
HRMS and IR of compound **6i**



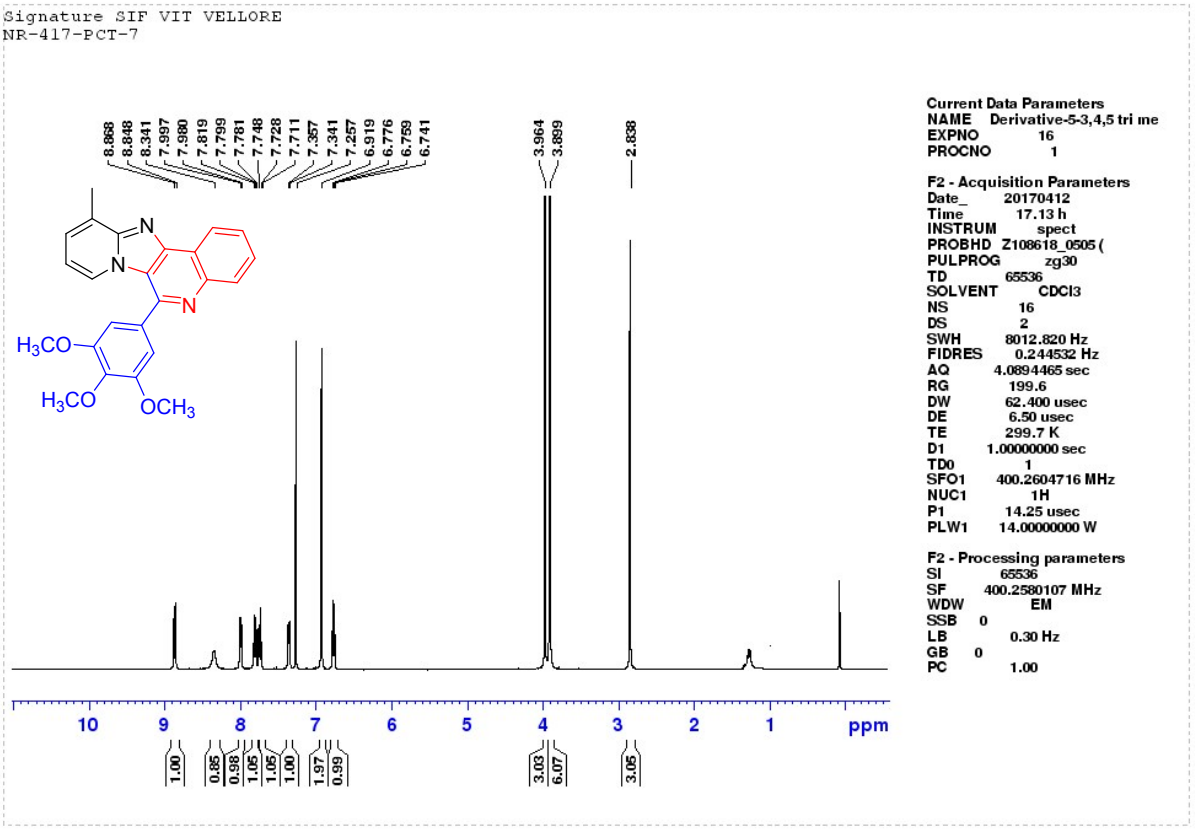


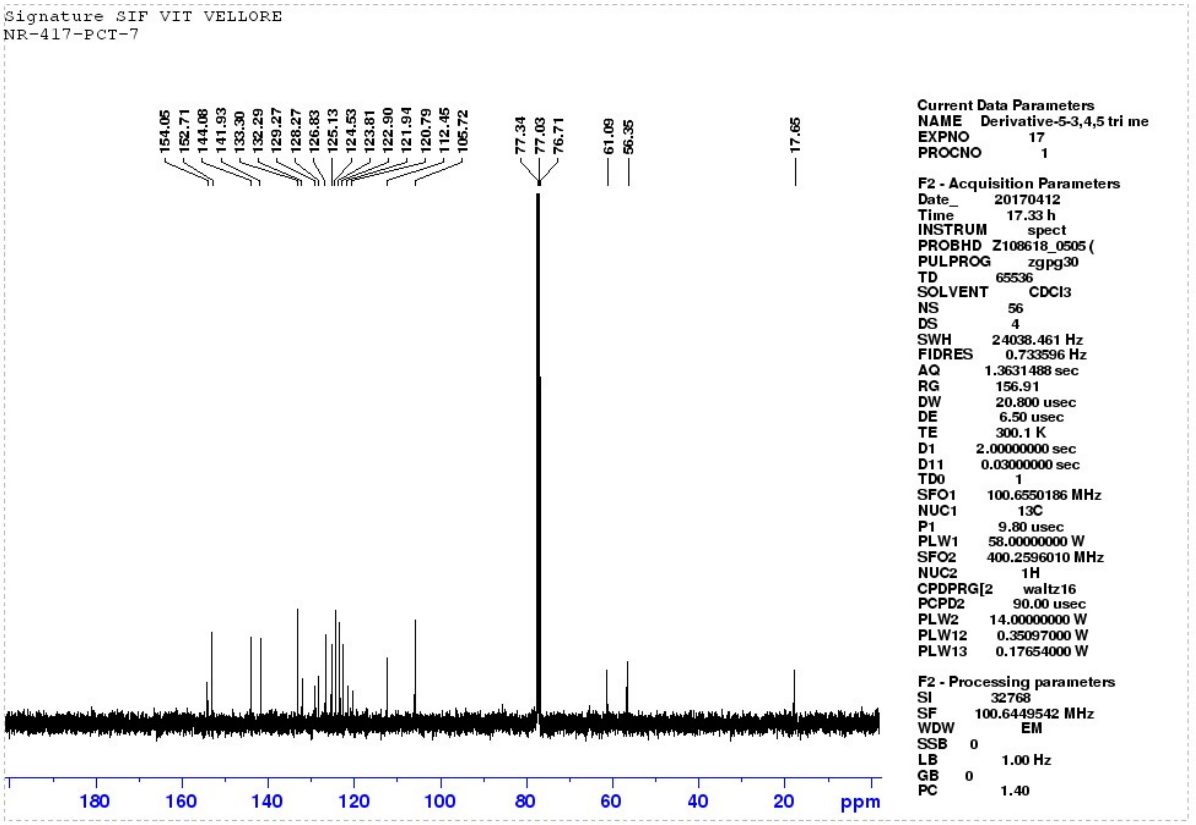
^{1}H-NMR and ^{13}C-NMR of compound **6j**in $CDCl_3$



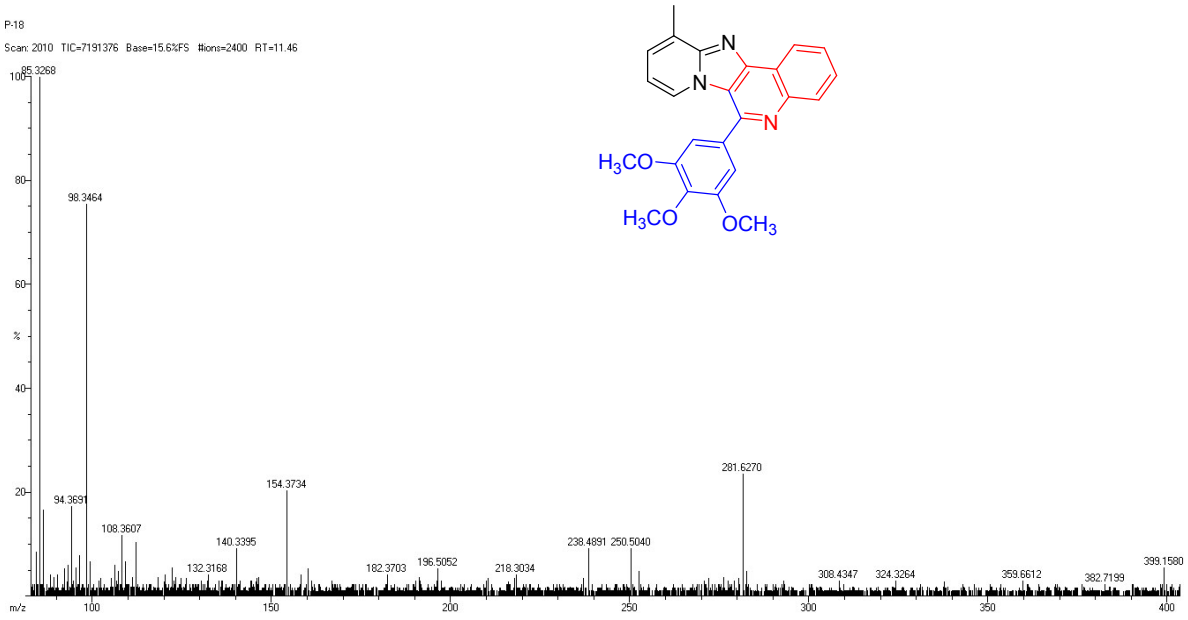


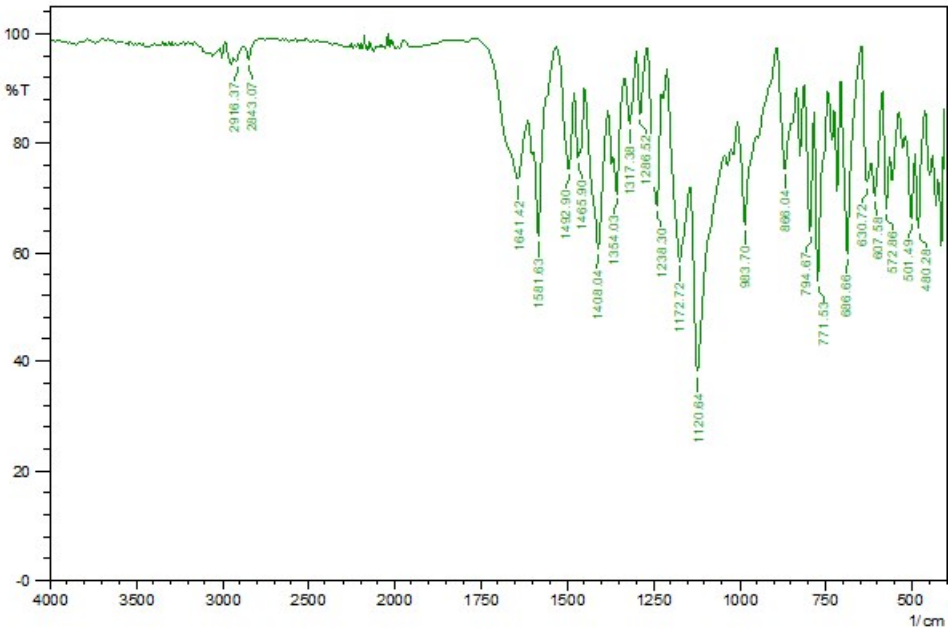
HRMS and IR of compound **6j**.



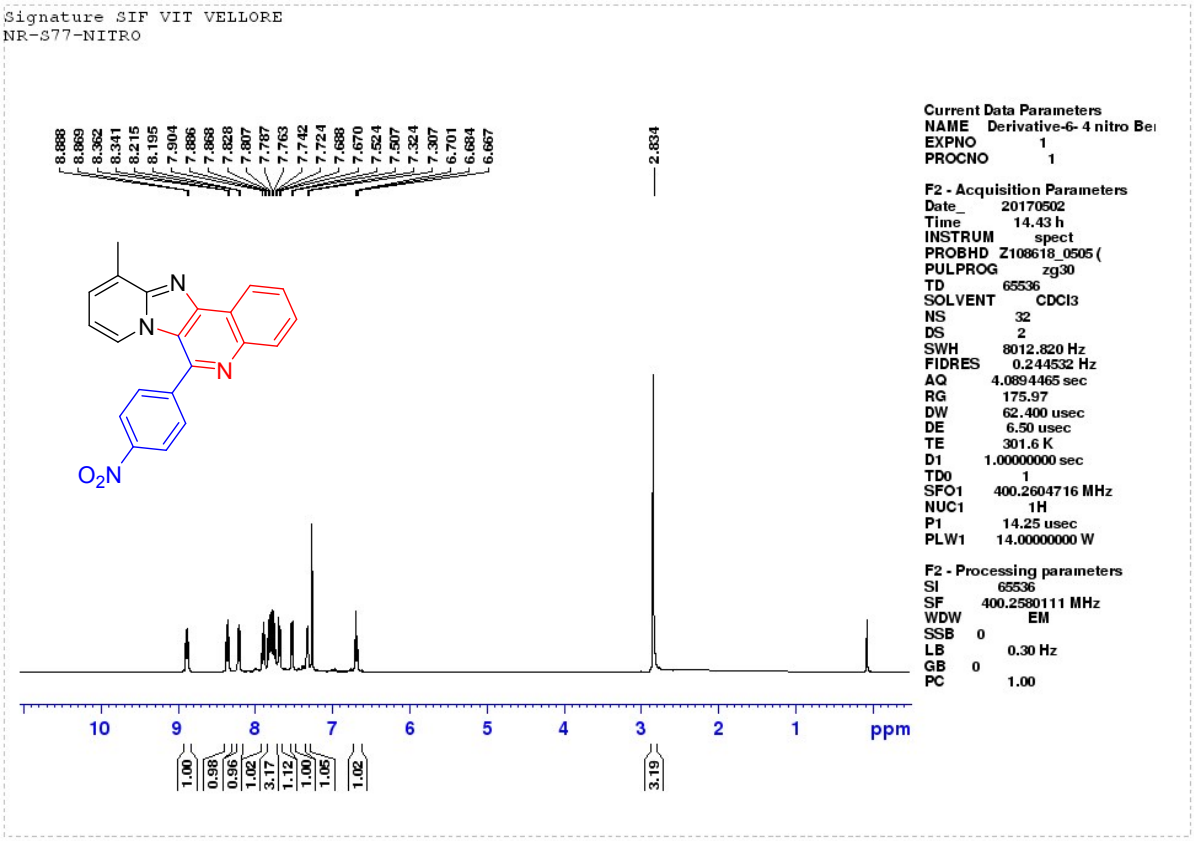


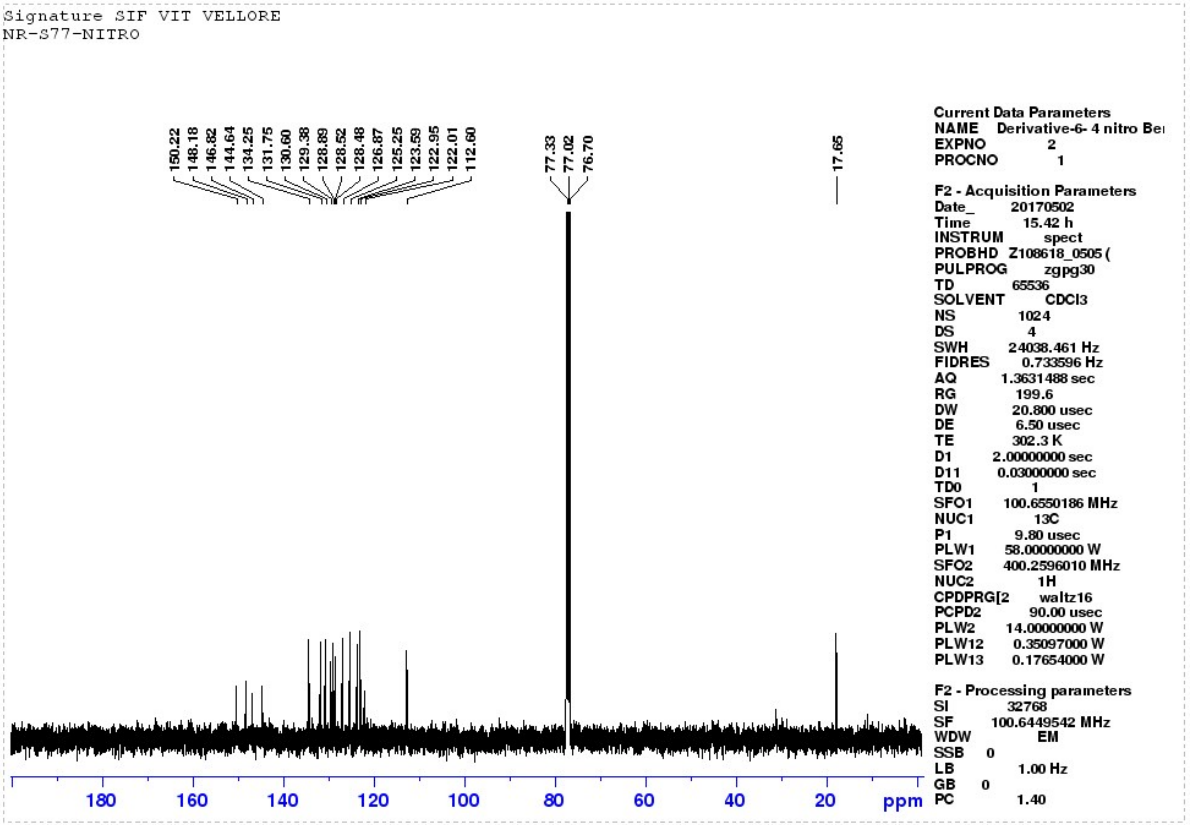
^{1}H-NMR and ^{13}C-NMR of compound **6k** in $CDCl_3$



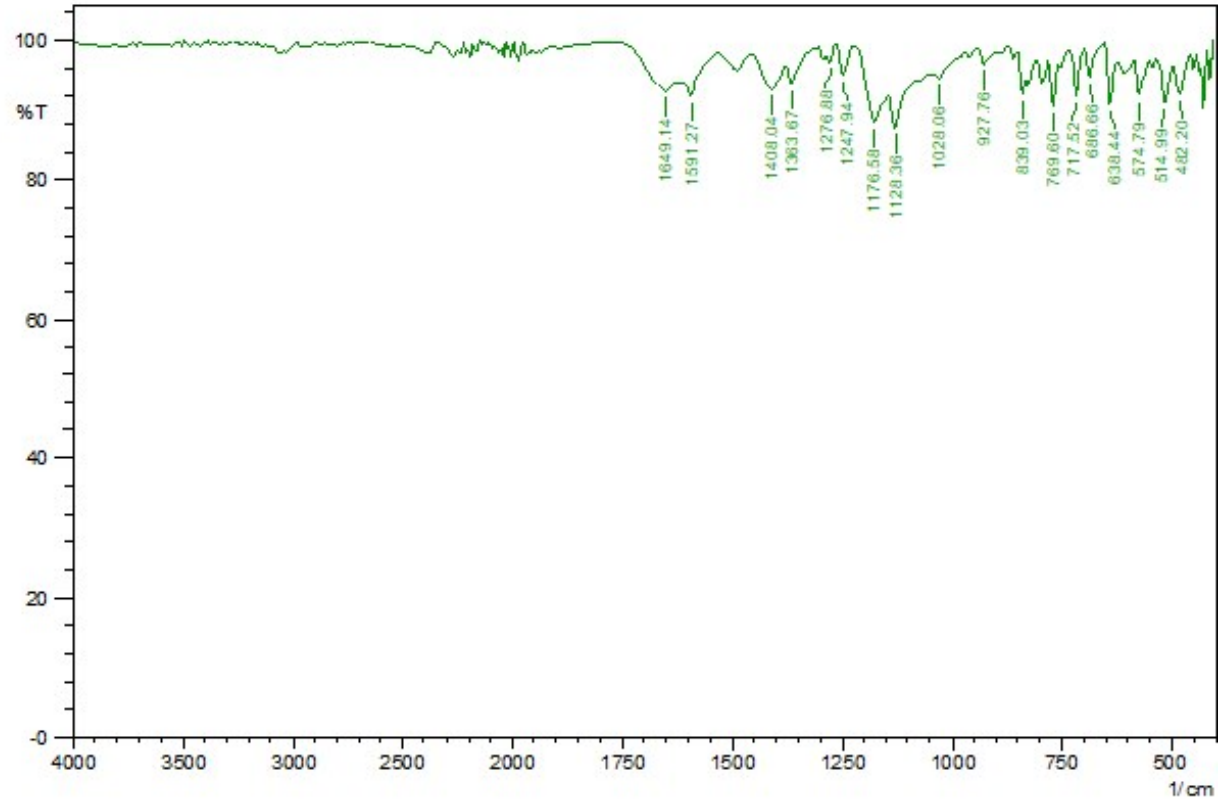


HRMS and IR of compound **6k**

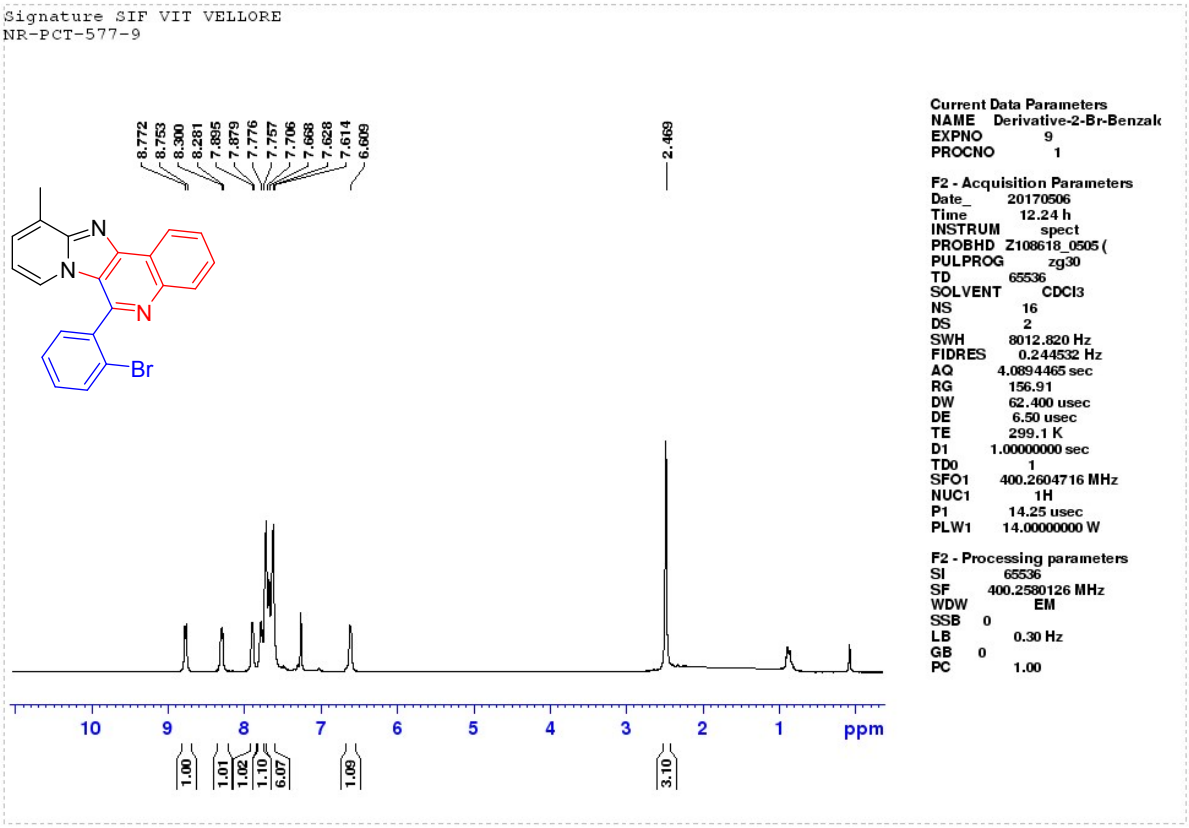


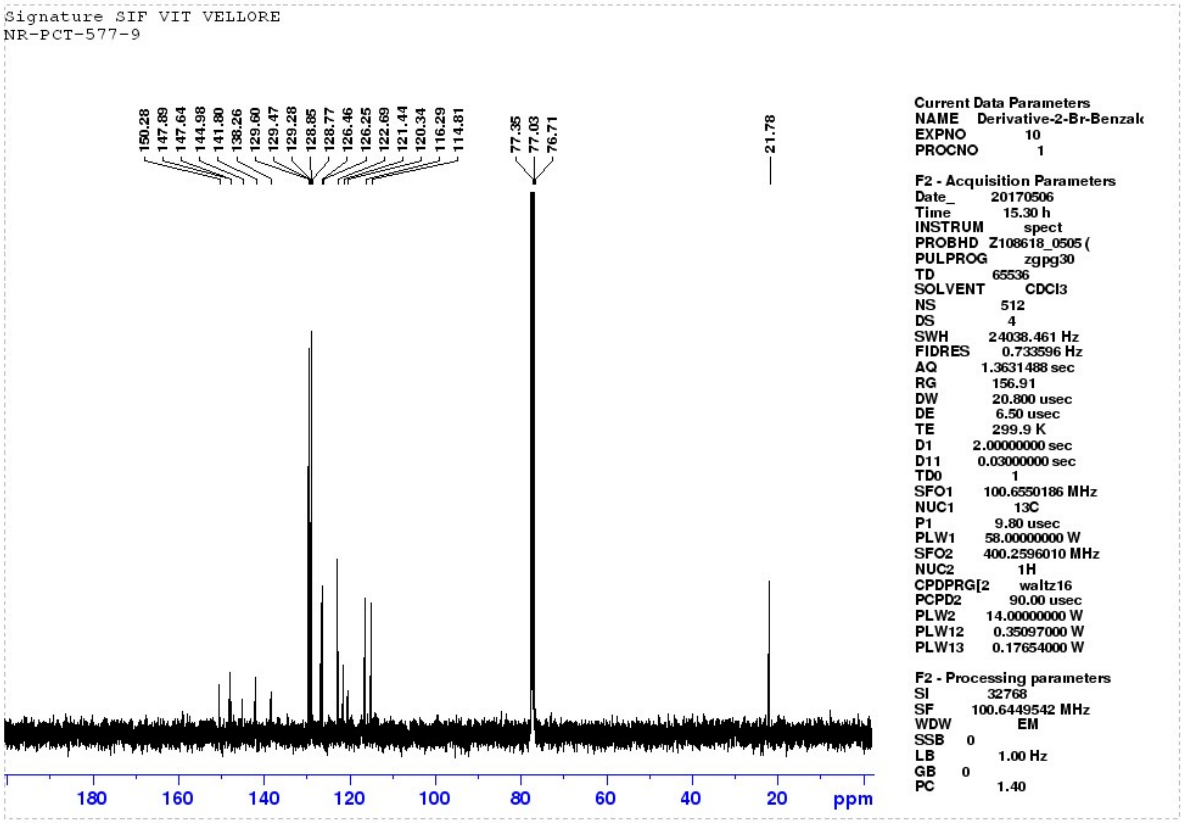


^{1}H-NMR and ^{13}C-NMR of compound **6l** in $CDCl_3$.

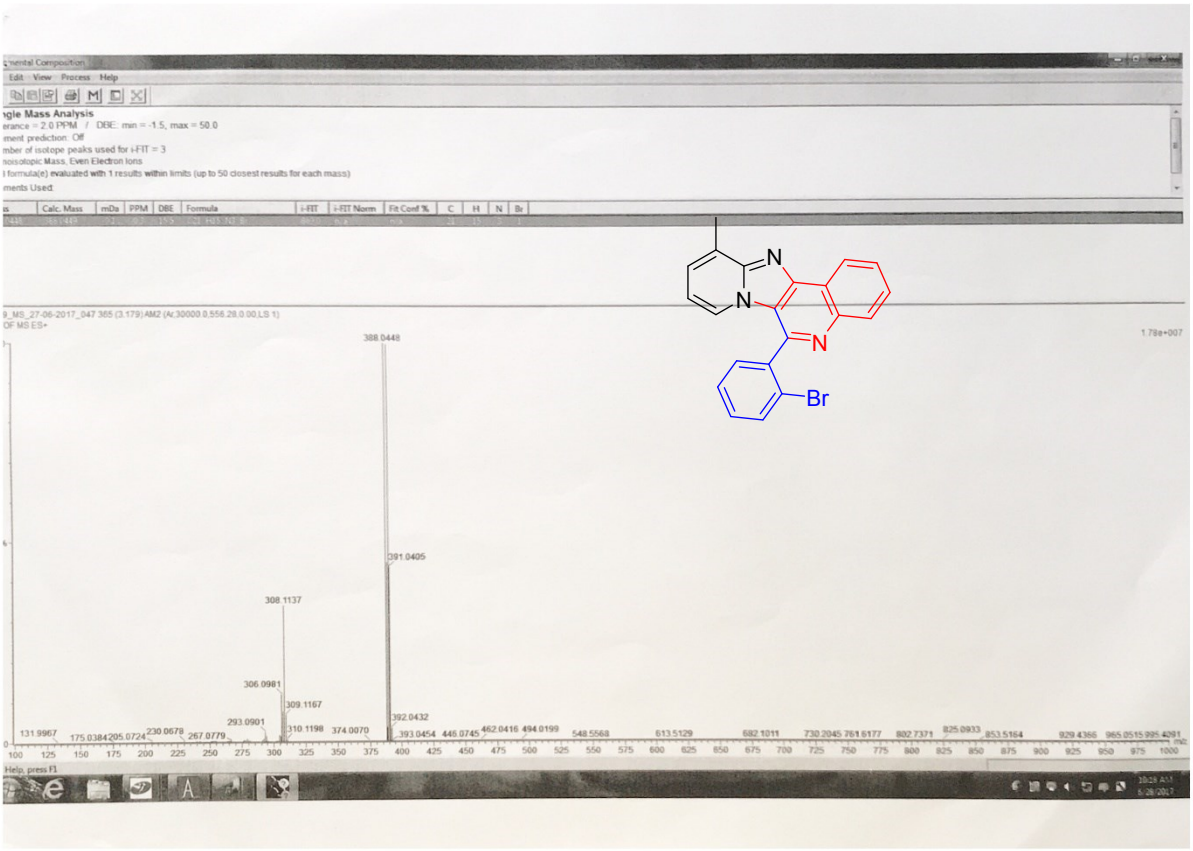


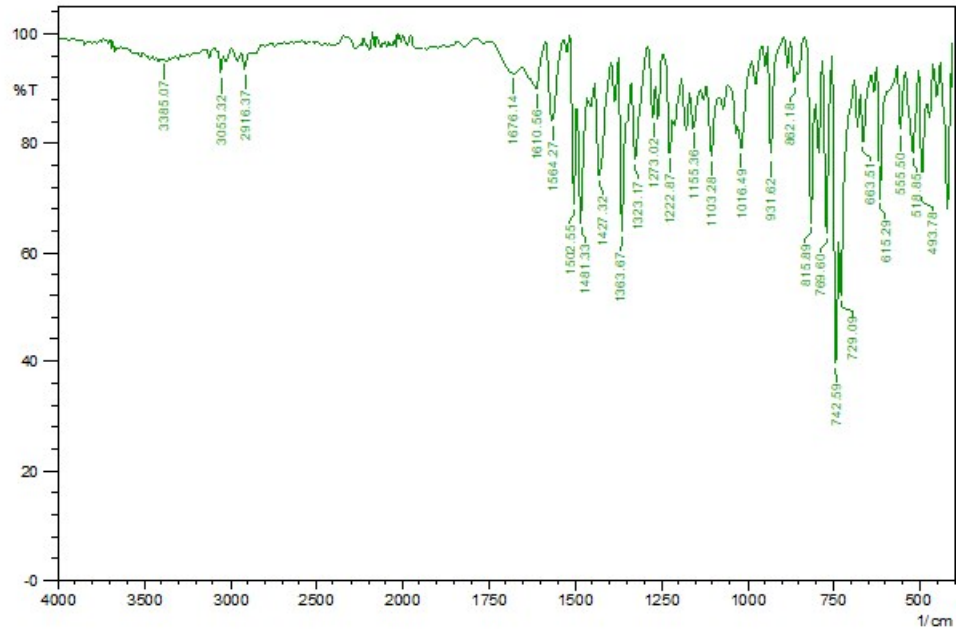
HRMS and IR of compound **6l**



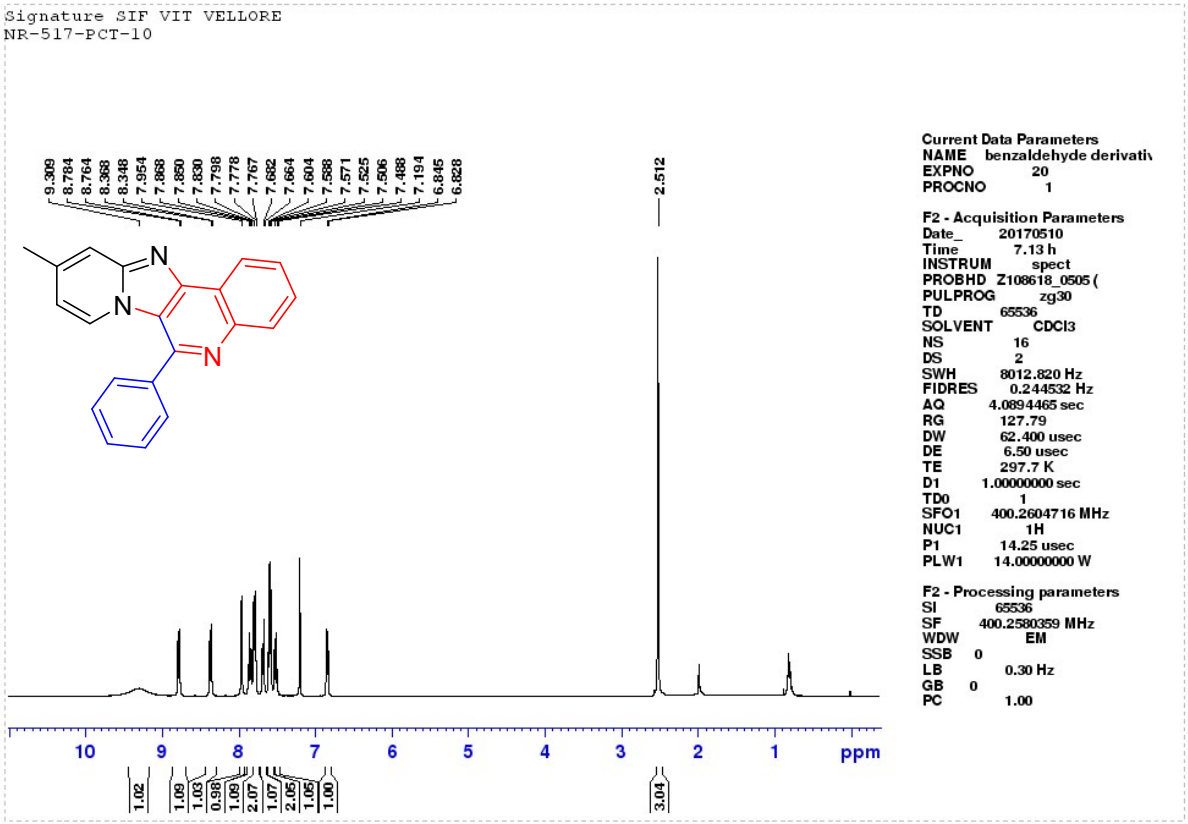


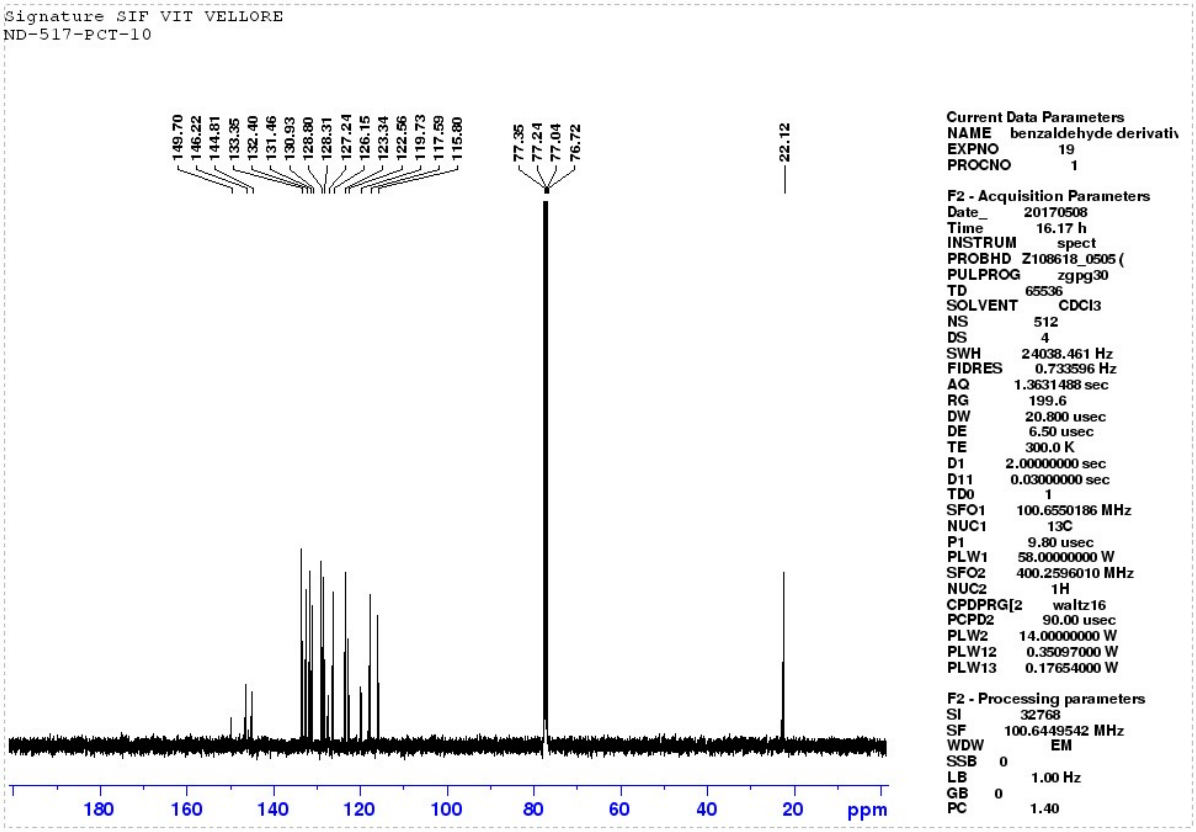
^{1}H-NMR and ^{13}C-NMR of compound **6m** in $CDCl_3$.



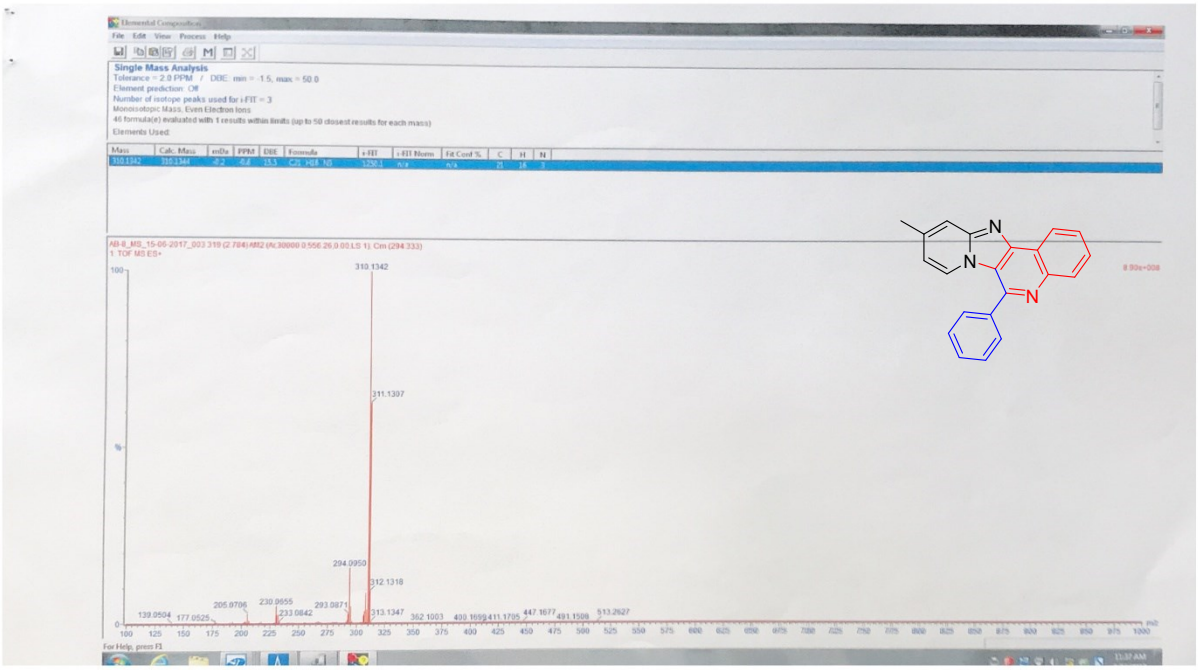


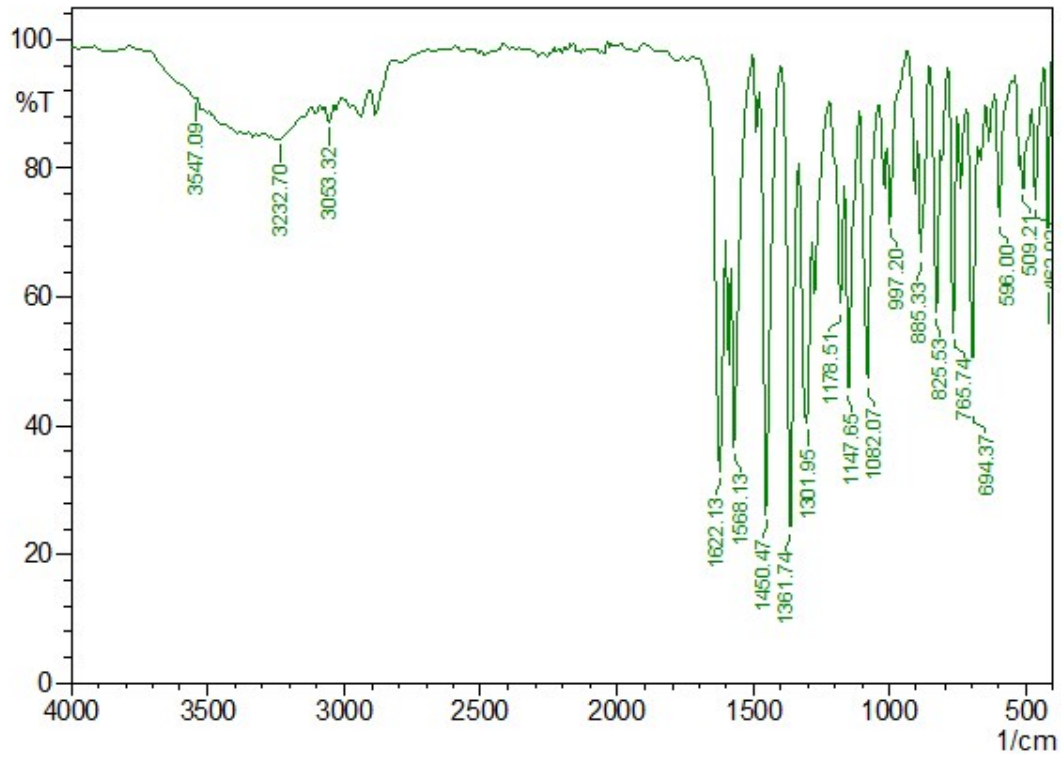
HRMS and IR of compound **6m.**



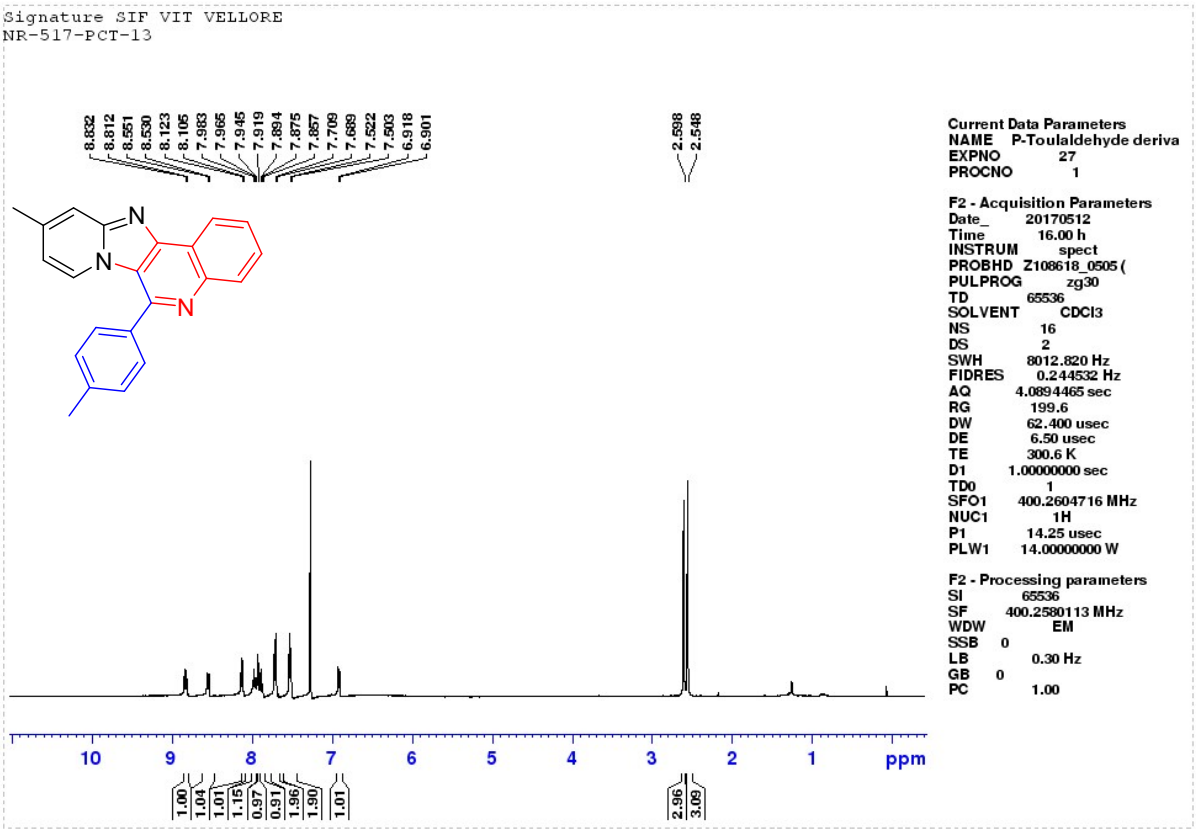


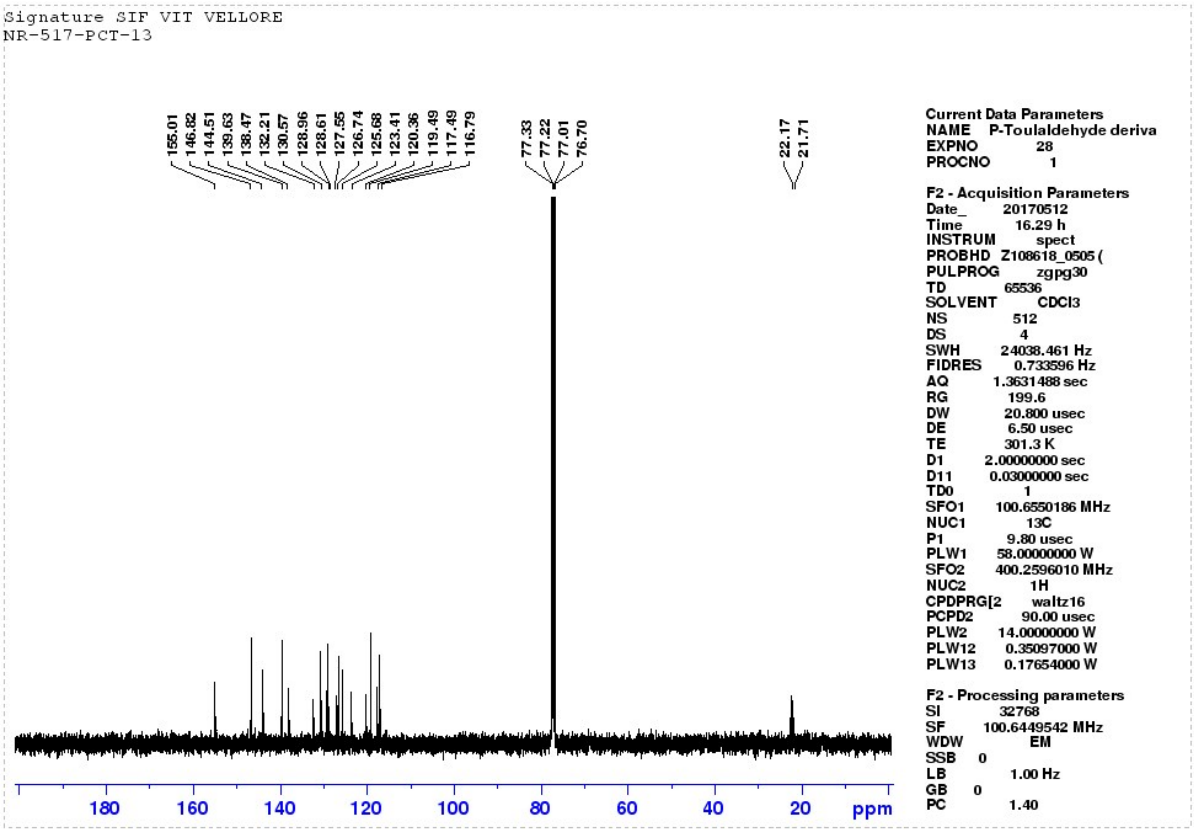
^{1}H-NMR and ^{13}C-NMR of compound **6n** in $CDCl_3$.



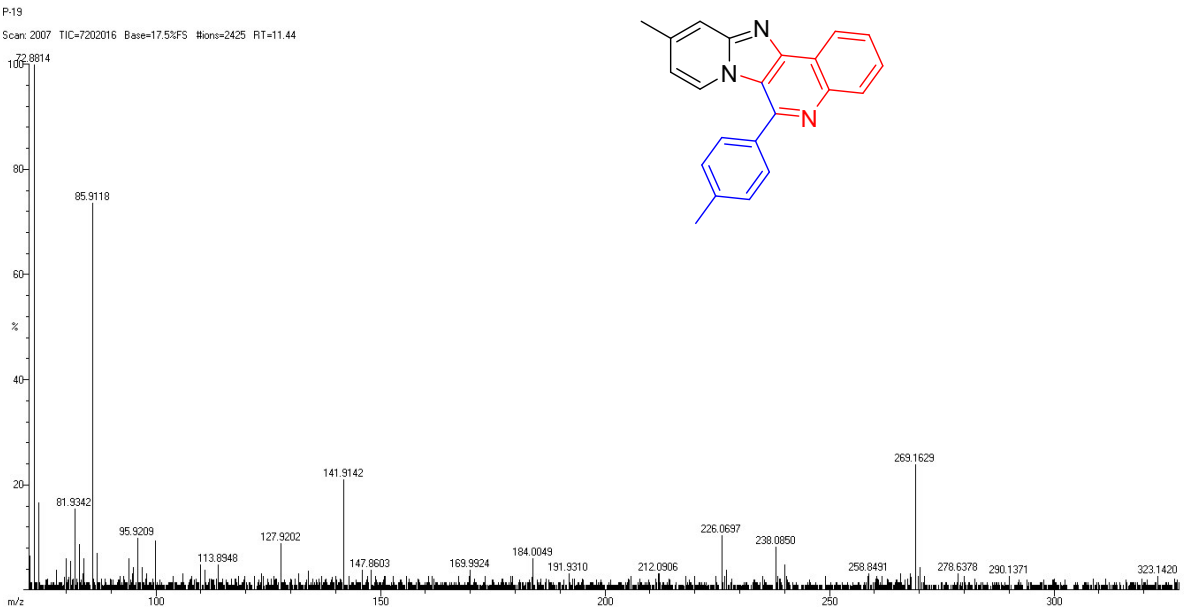


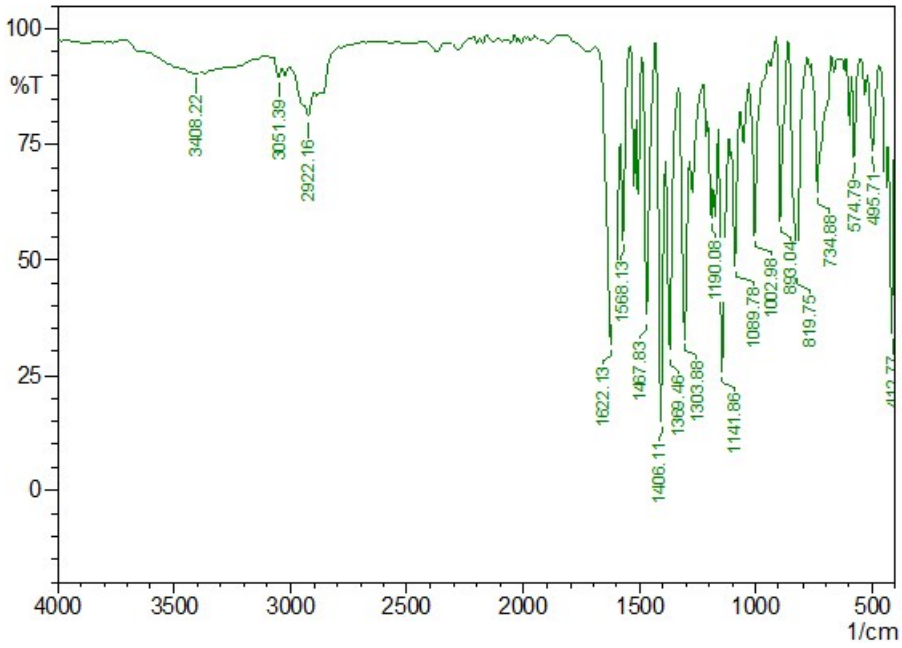
HRMS and IR of compound **6n.**



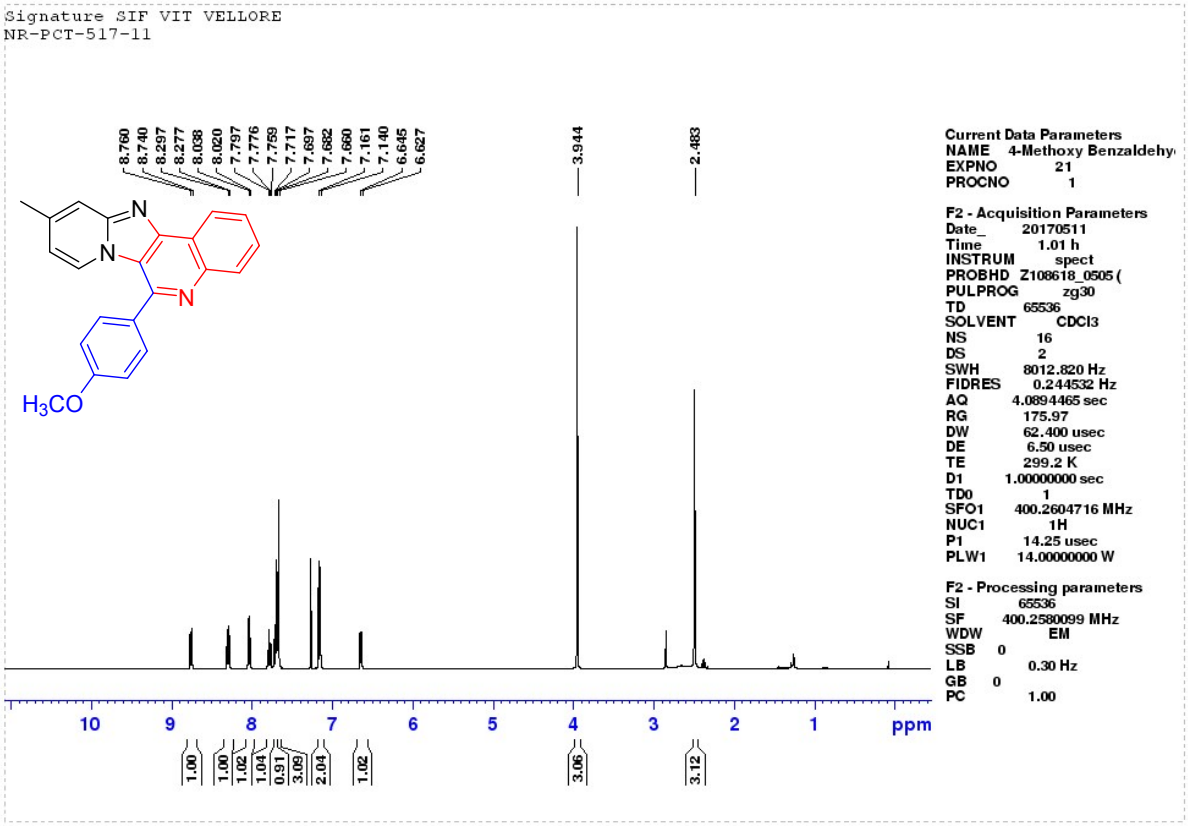


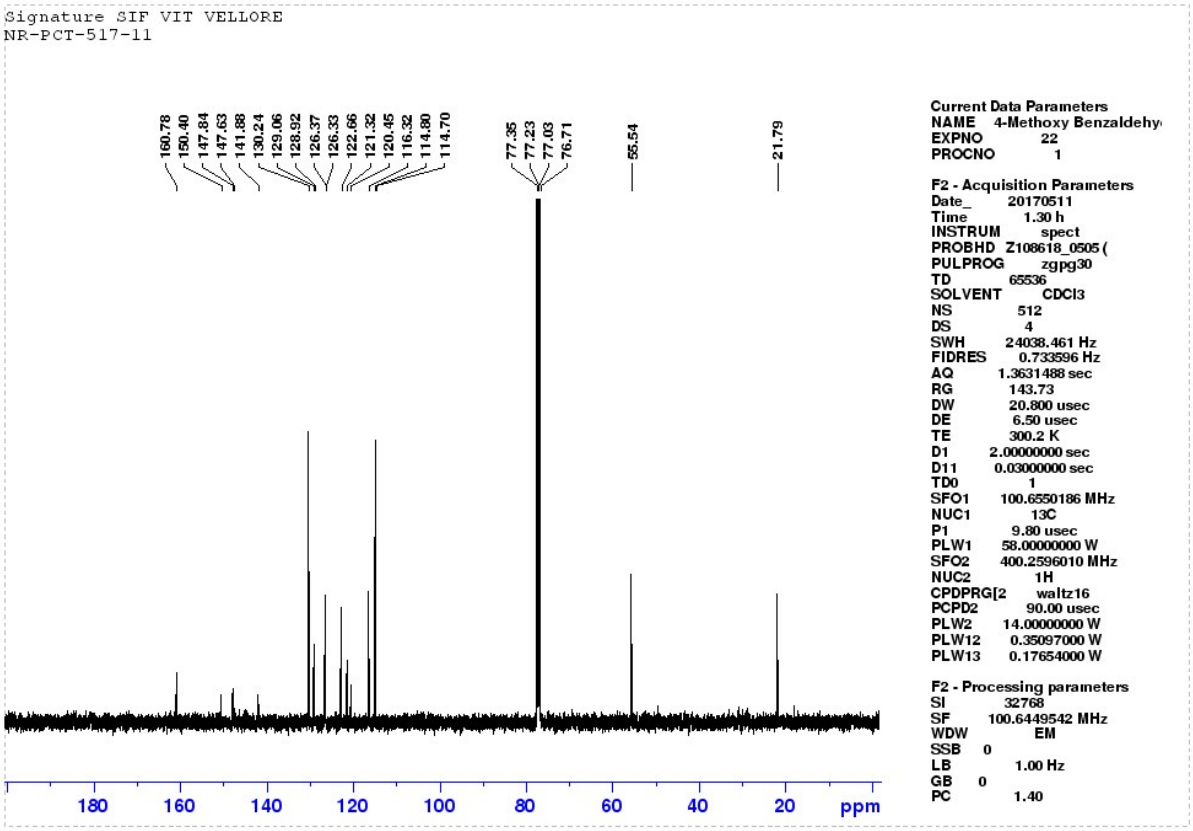
^{1}H-NMR and ^{13}C-NMR of compound **6o** in $CDCl_3$.



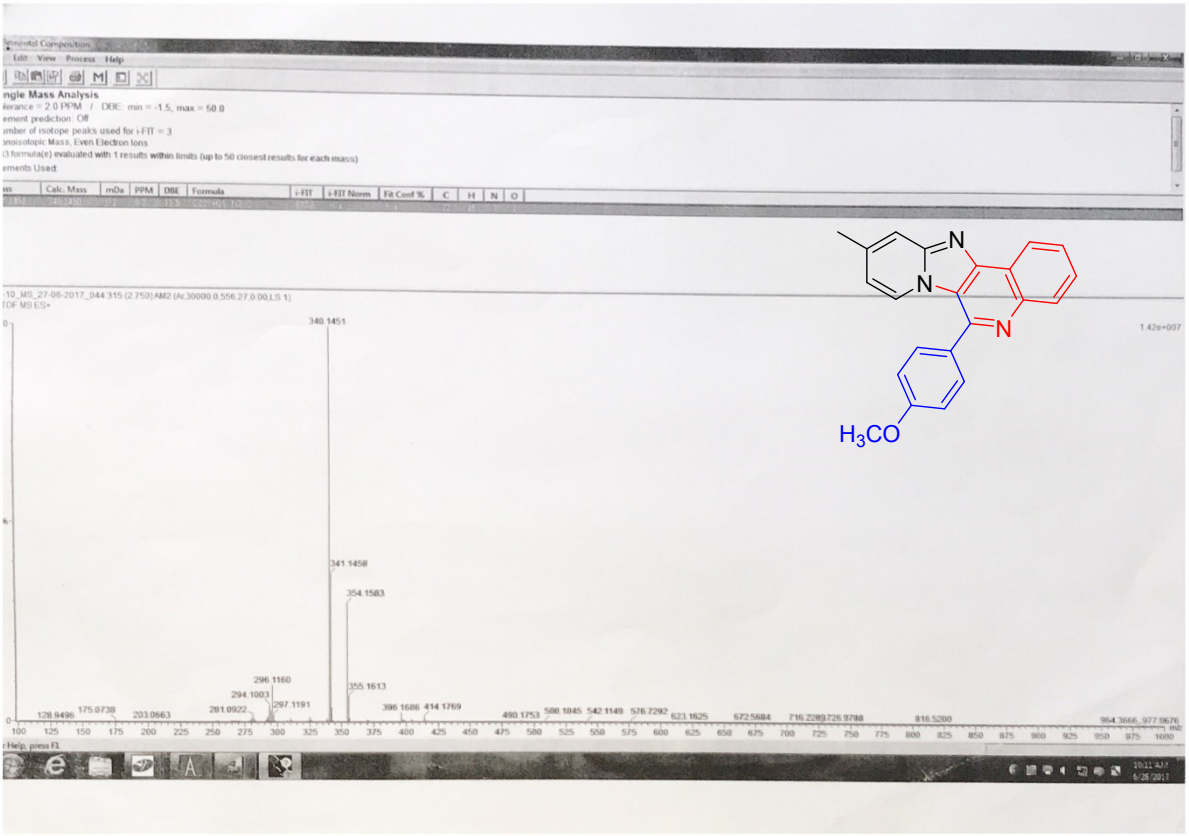


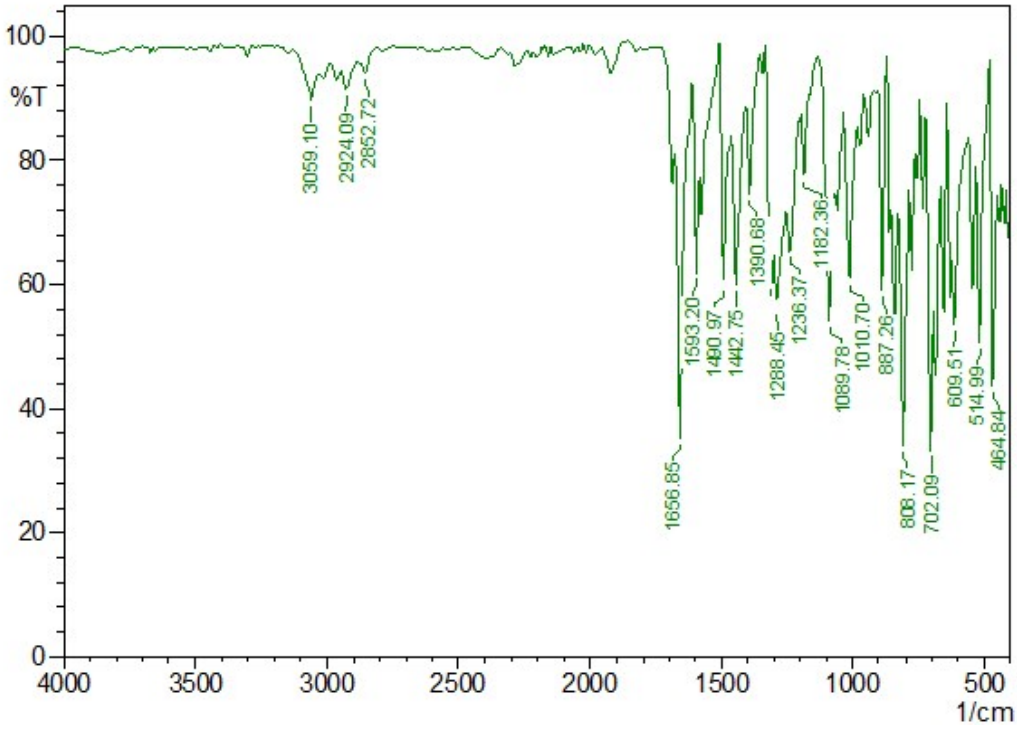
HRMS and IR of compound **6o.**



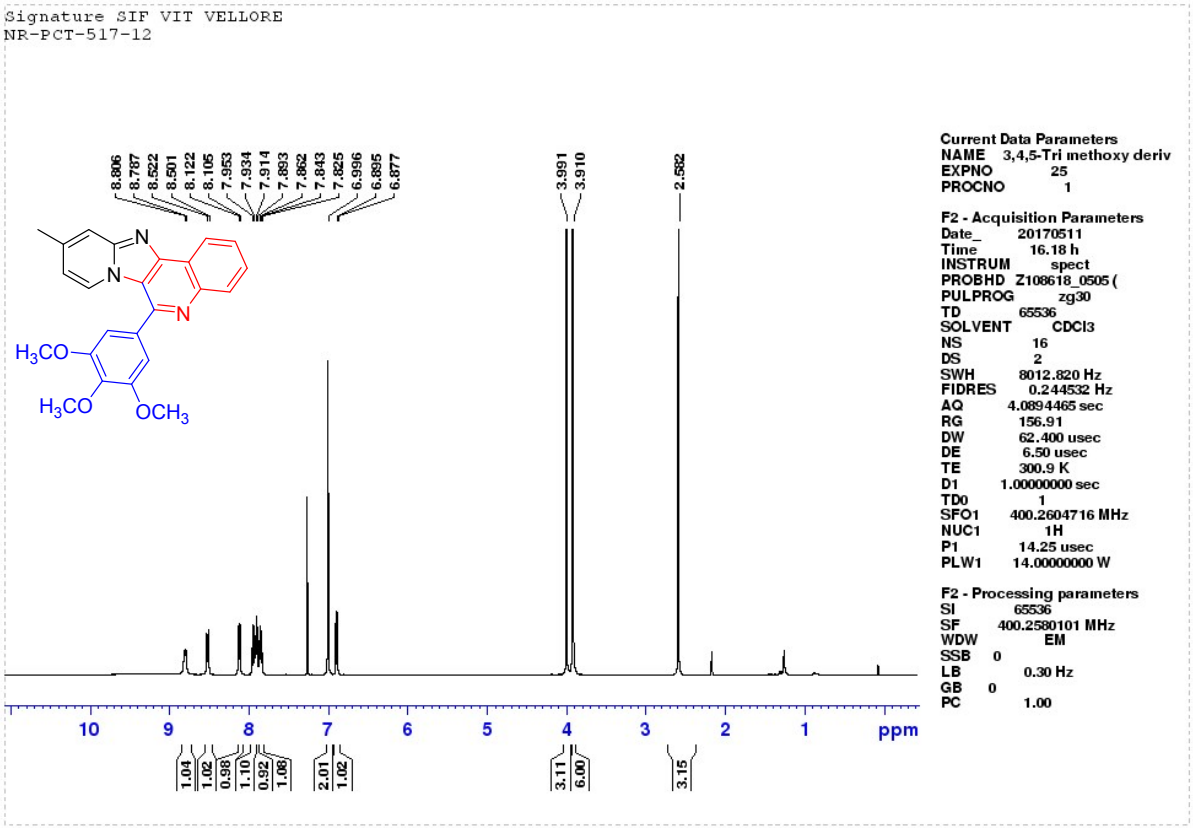


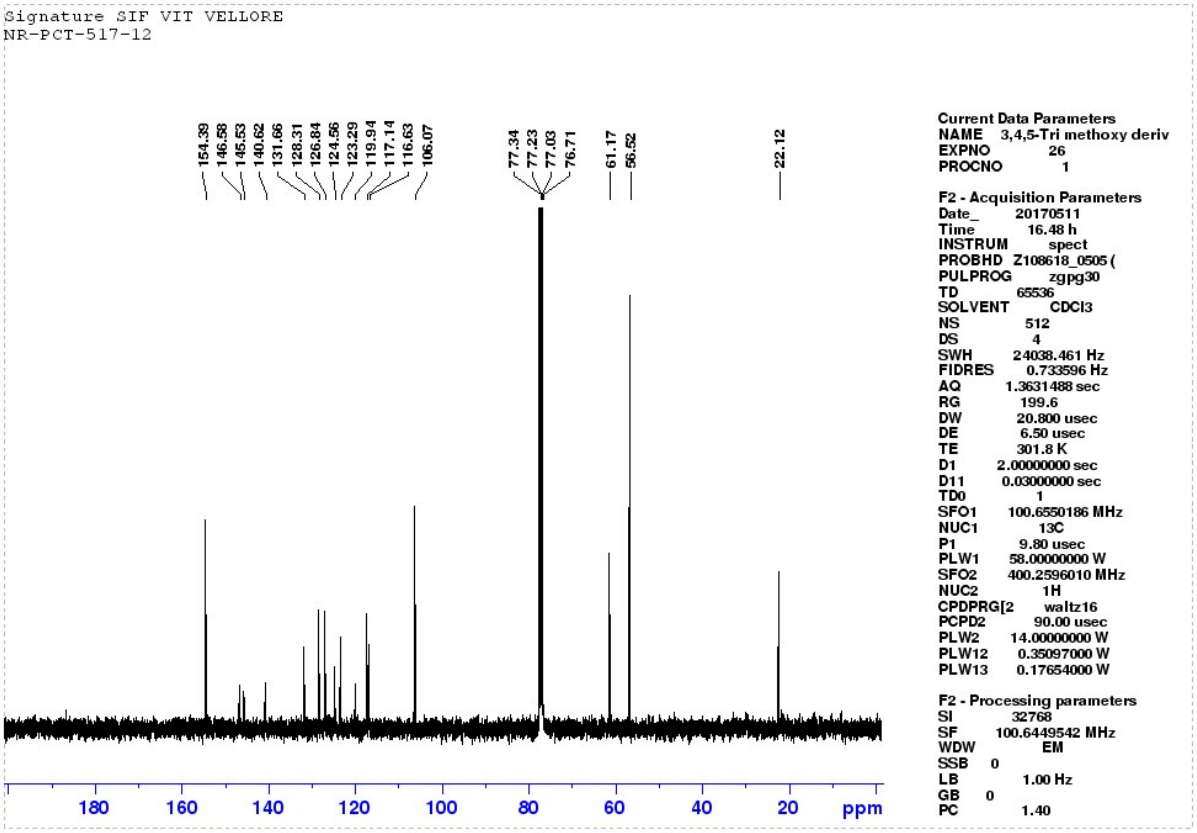
^{1}H-NMR and ^{13}C-NMR of compound **6p** in $CDCl_3$.



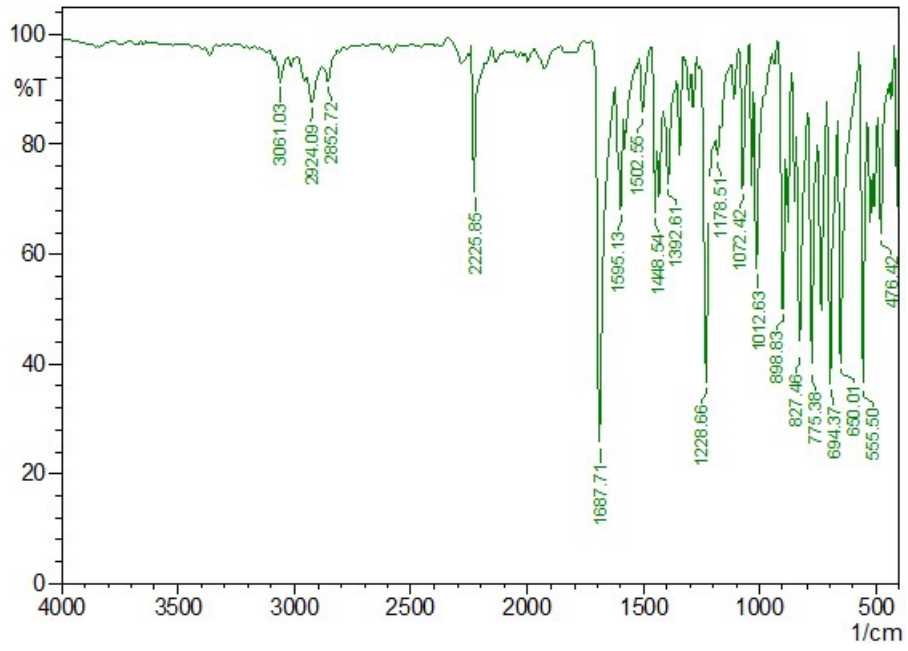


HRMS and IR of compound **6p.**

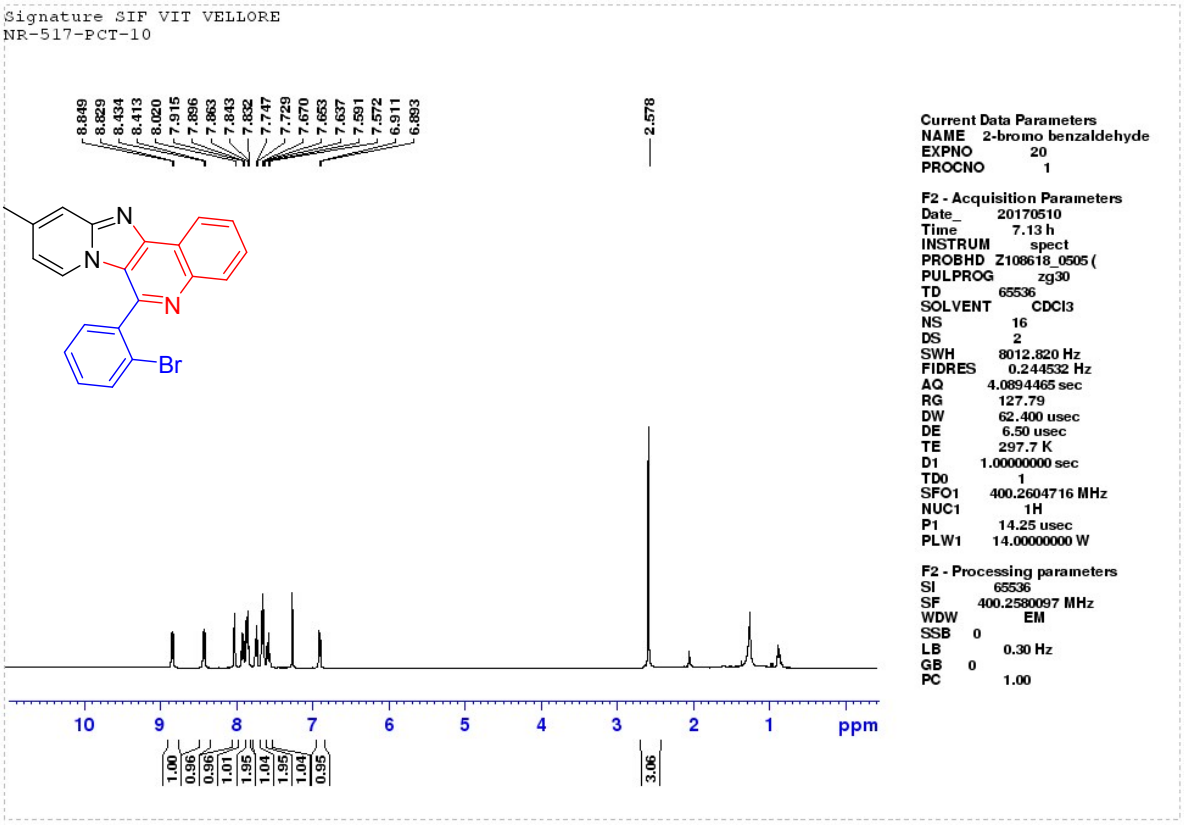


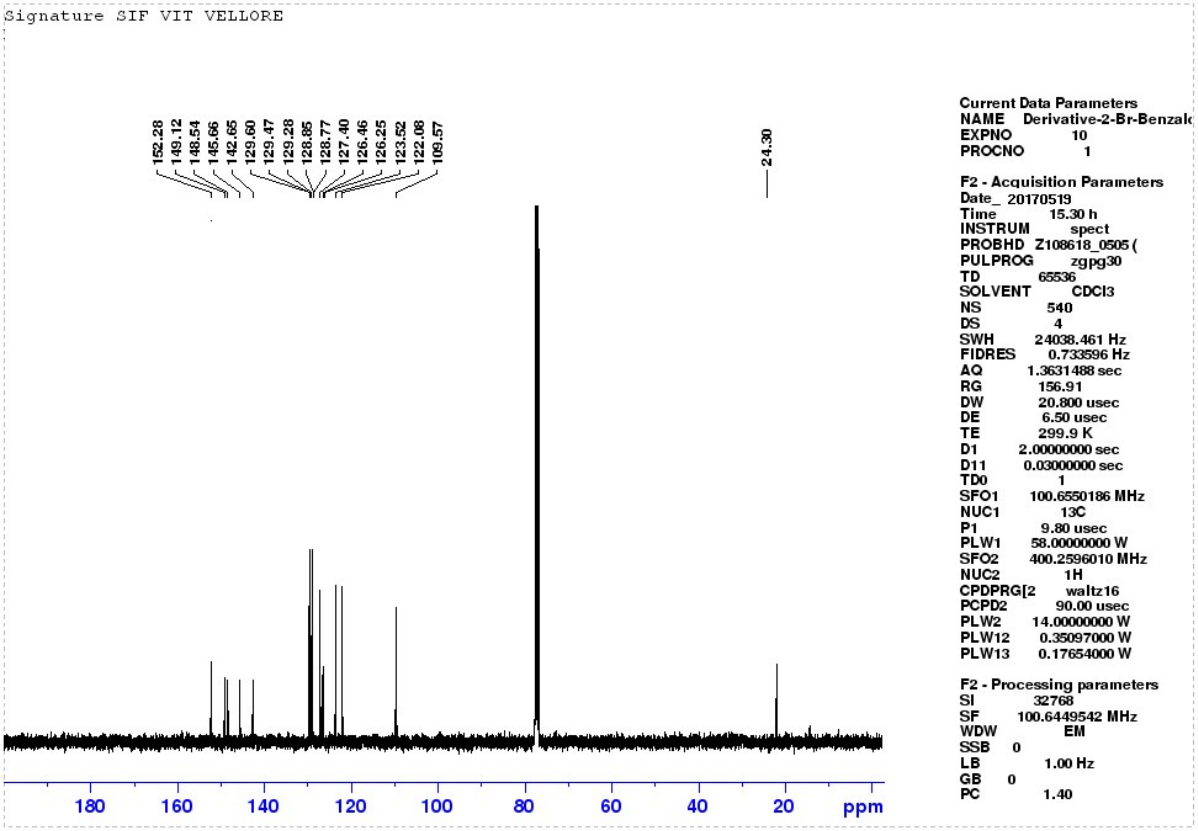


^{1}H-NMR and ^{13}C-NMR of compound **6q** in $CDCl_3$.

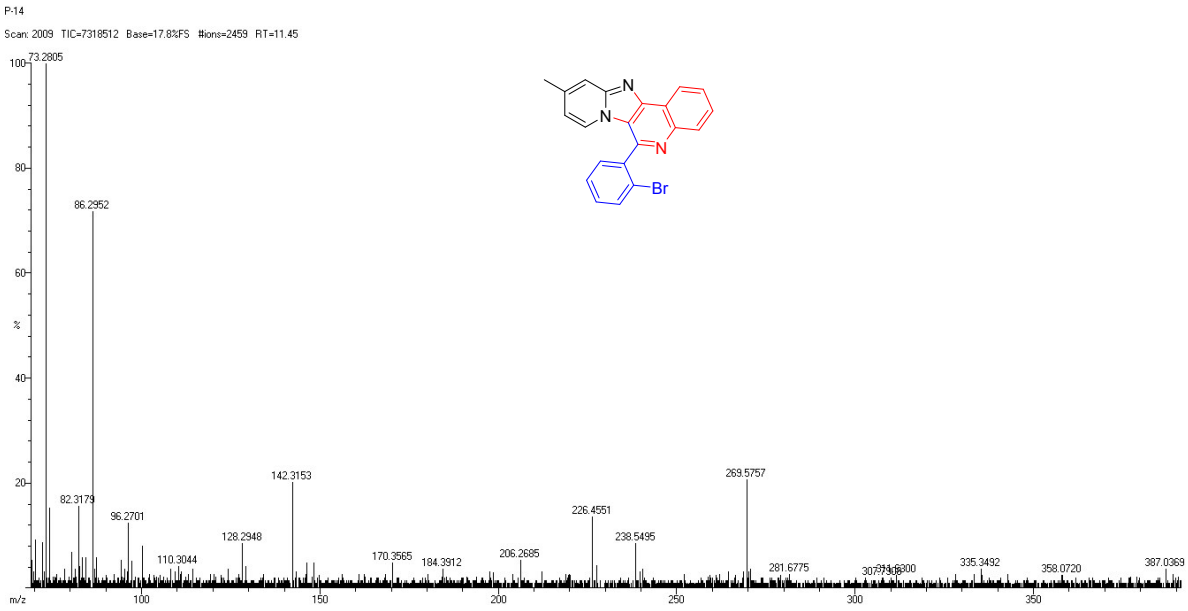


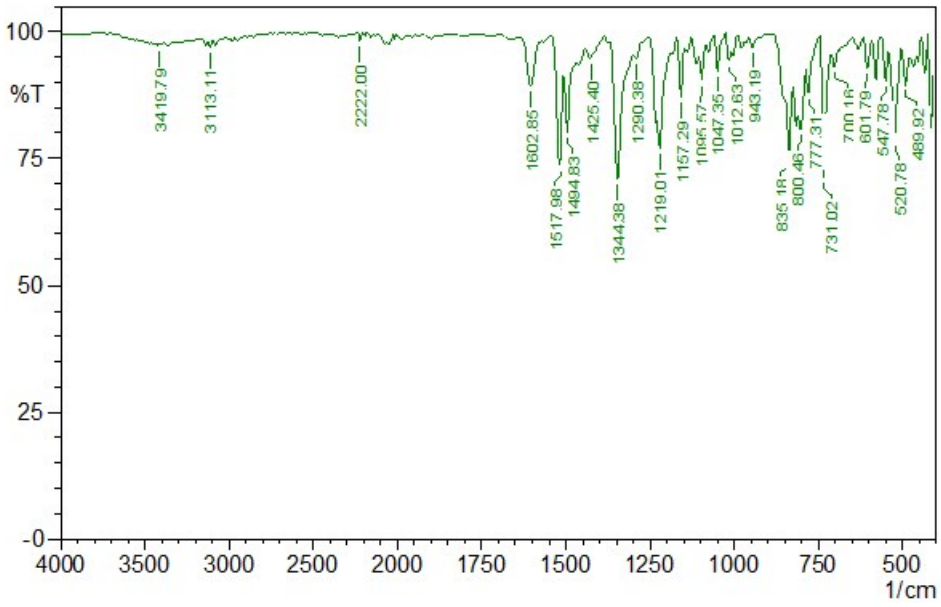
HRMS and IR of compound **6q.**



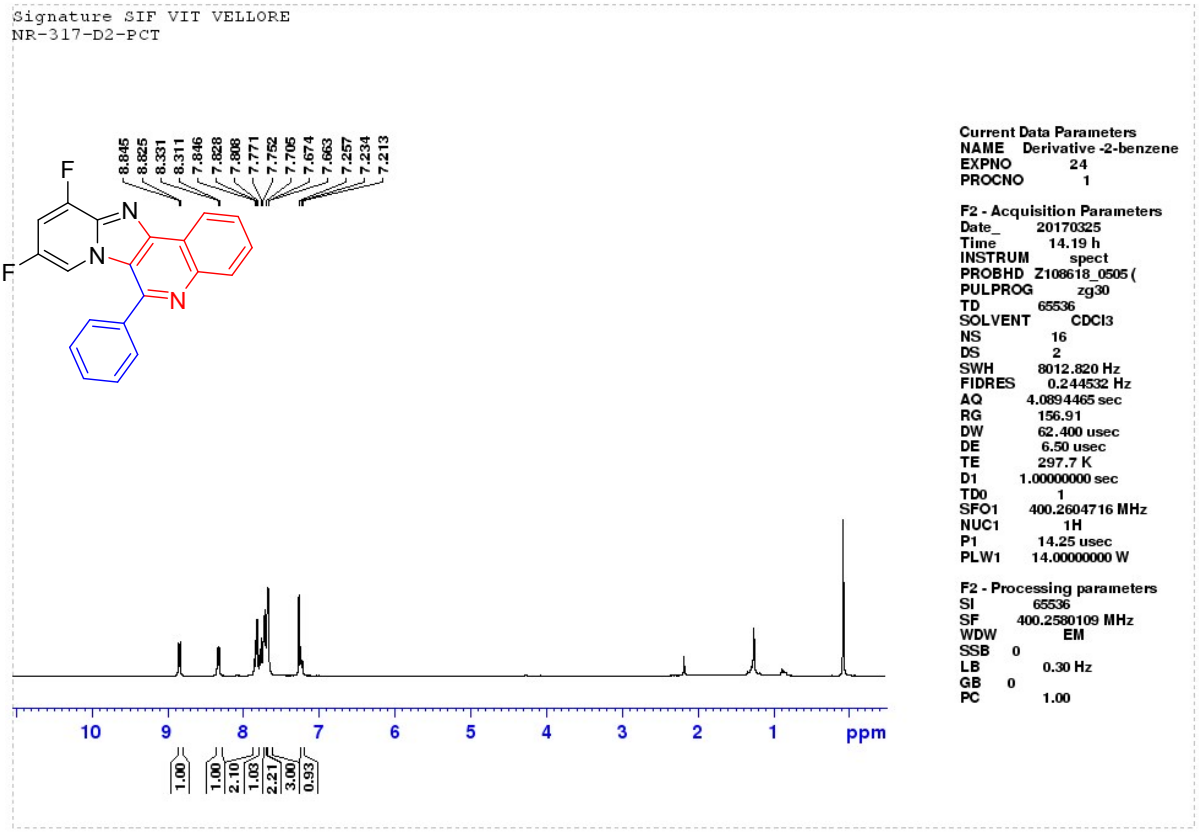


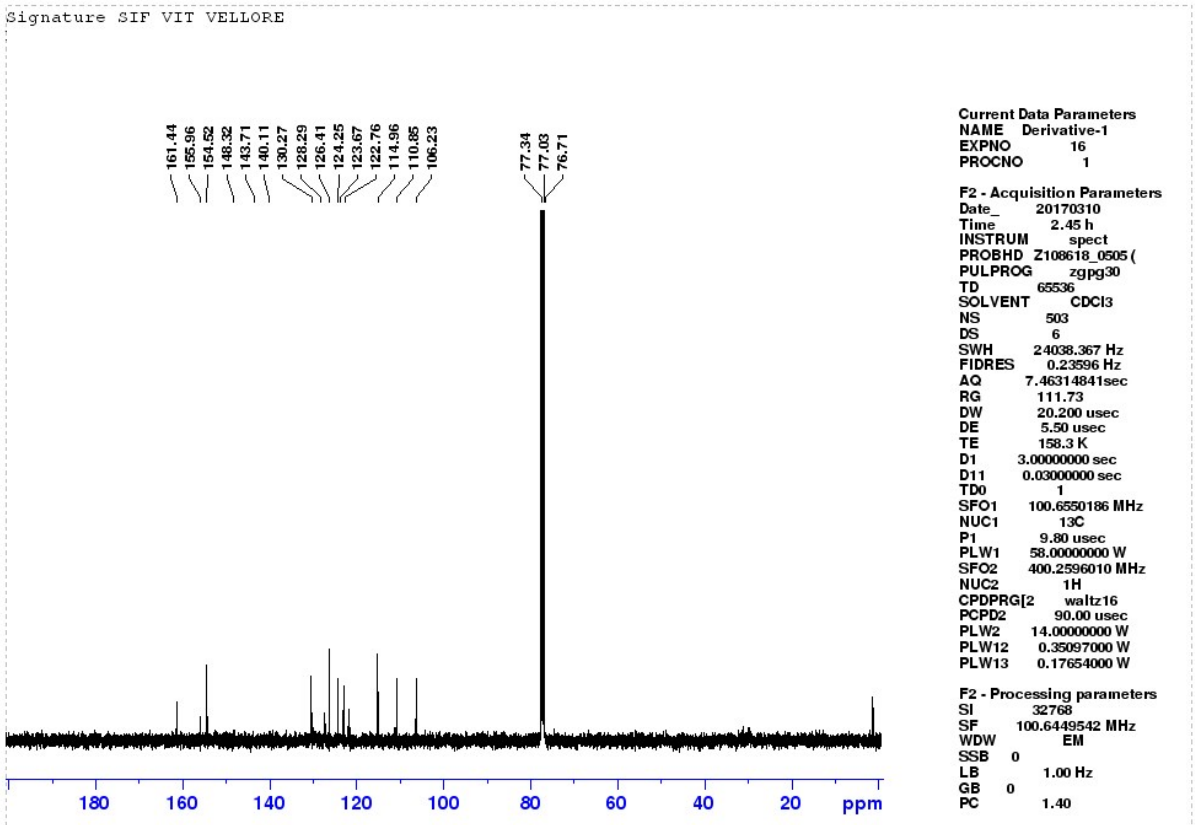
^{1}H-NMR and ^{13}C-NMR of compound **6r** in $CDCl_3$



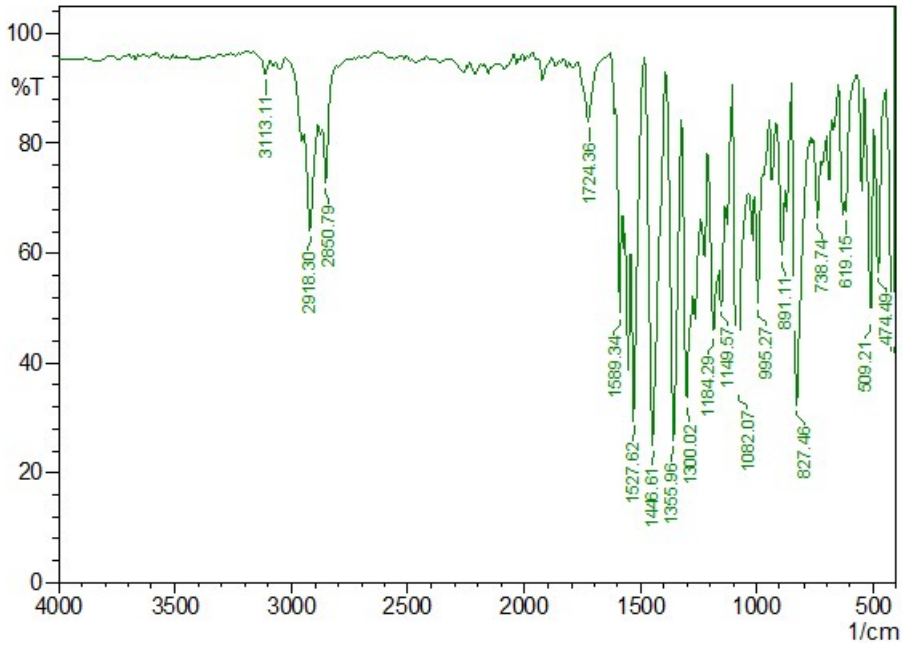


HRMS and IR of compound **6r.**

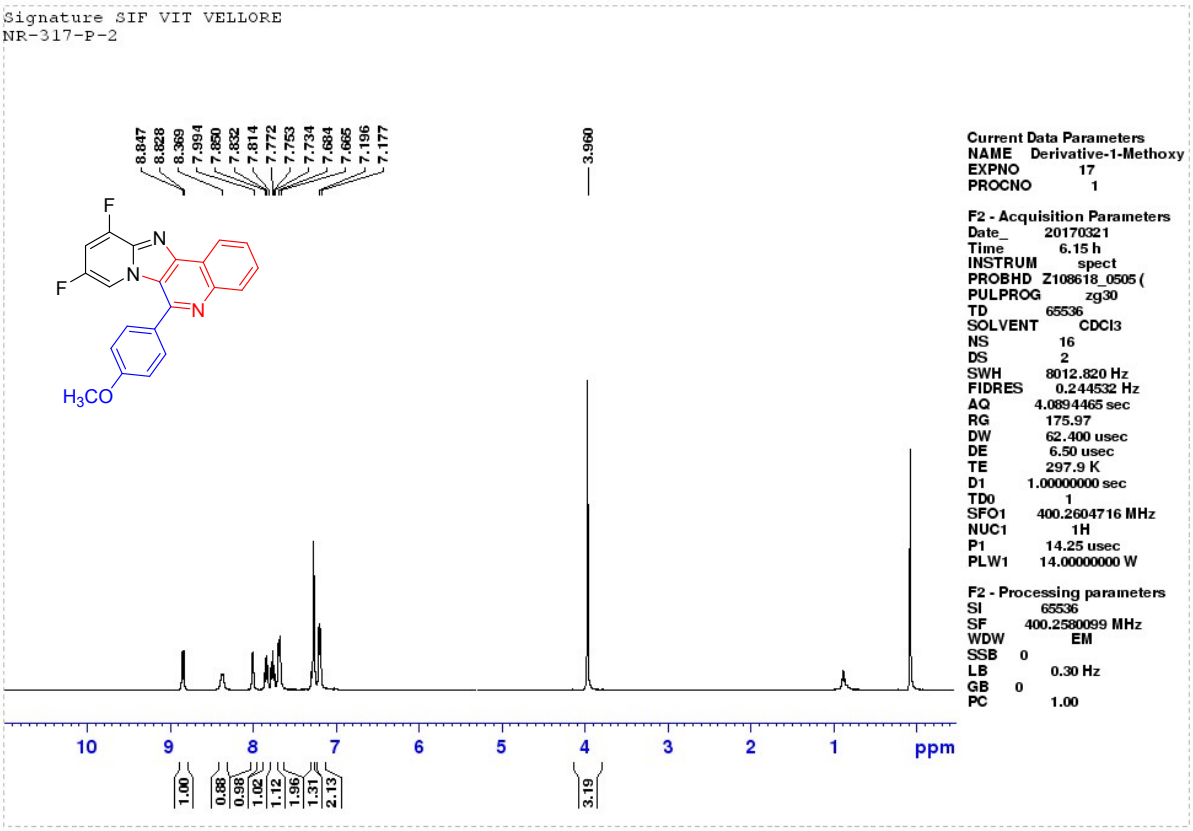


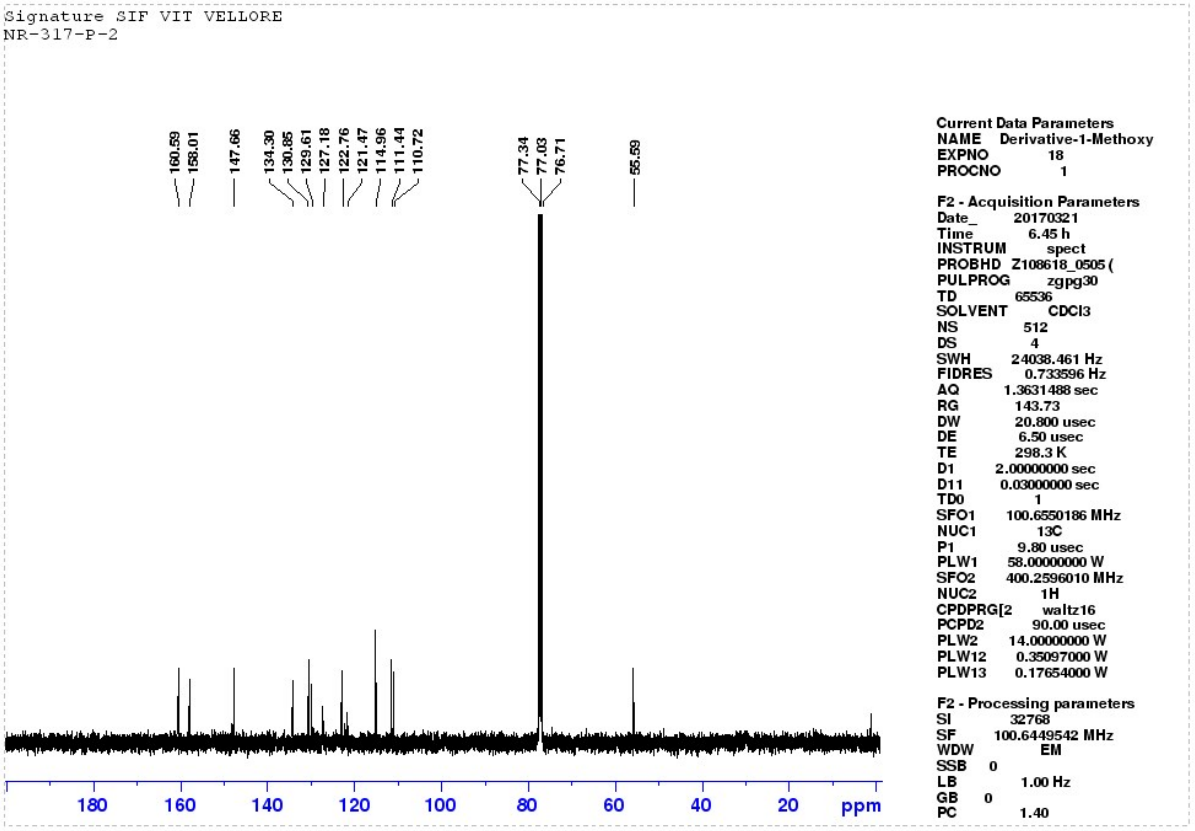


^{1}H-NMR and ^{13}C-NMR of compound **6s** in $CDCl_3$.

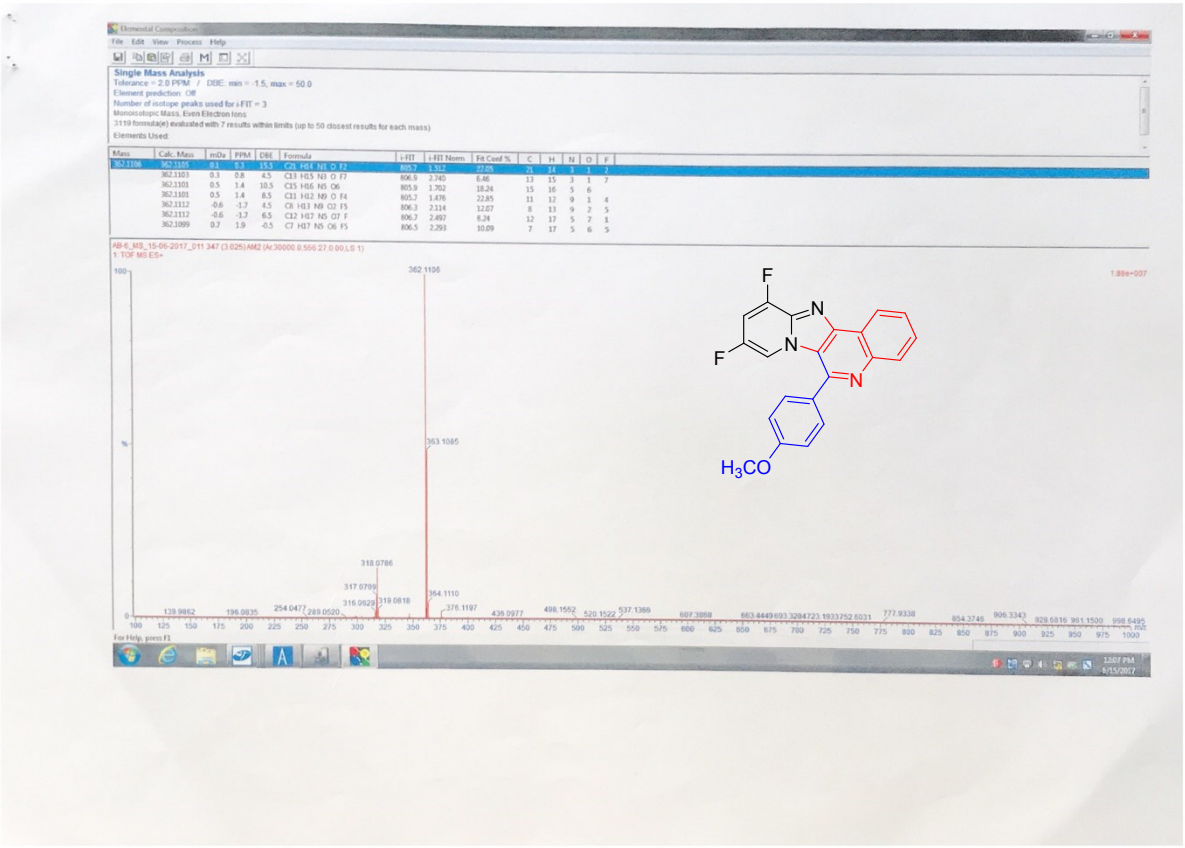


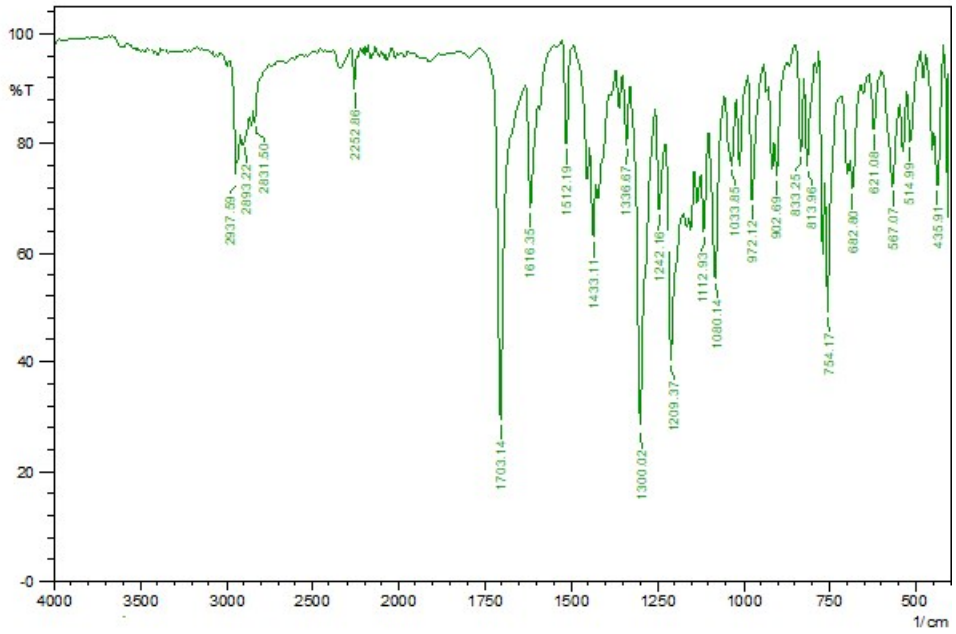
HRMS and IR of compound **6s.**



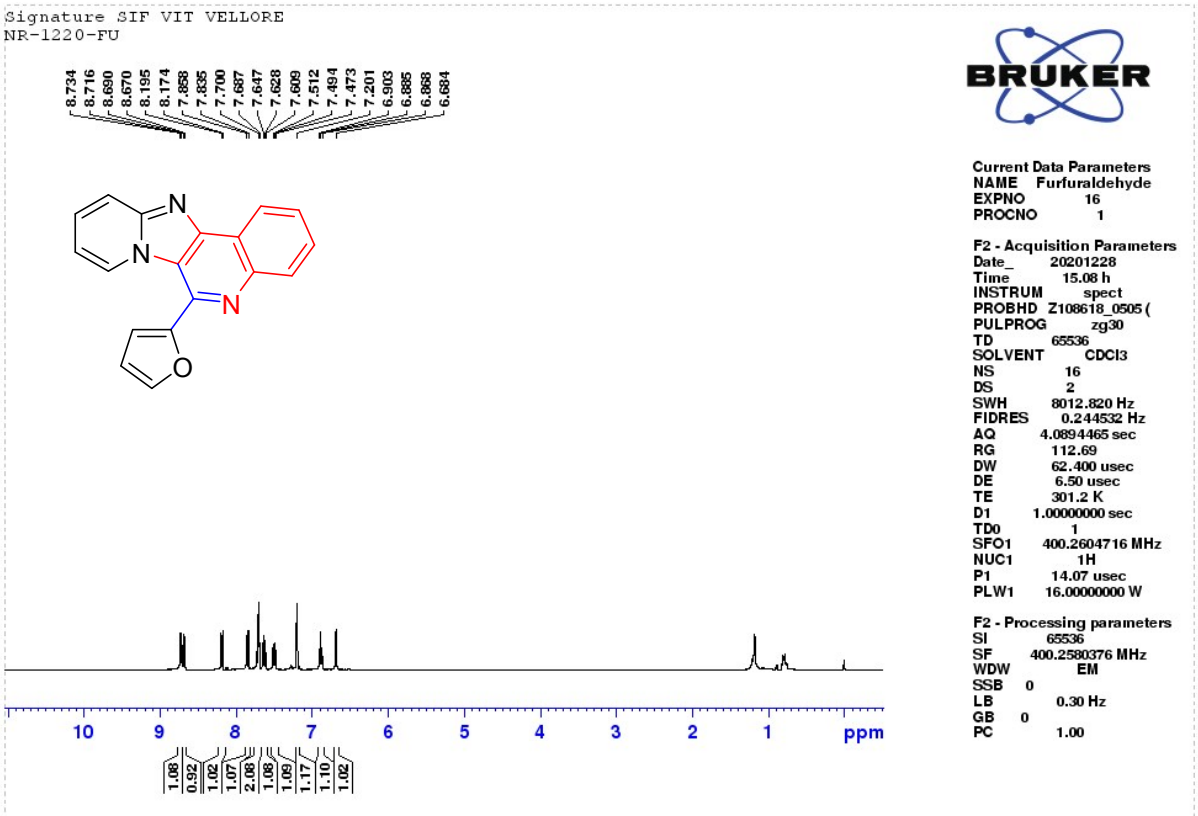


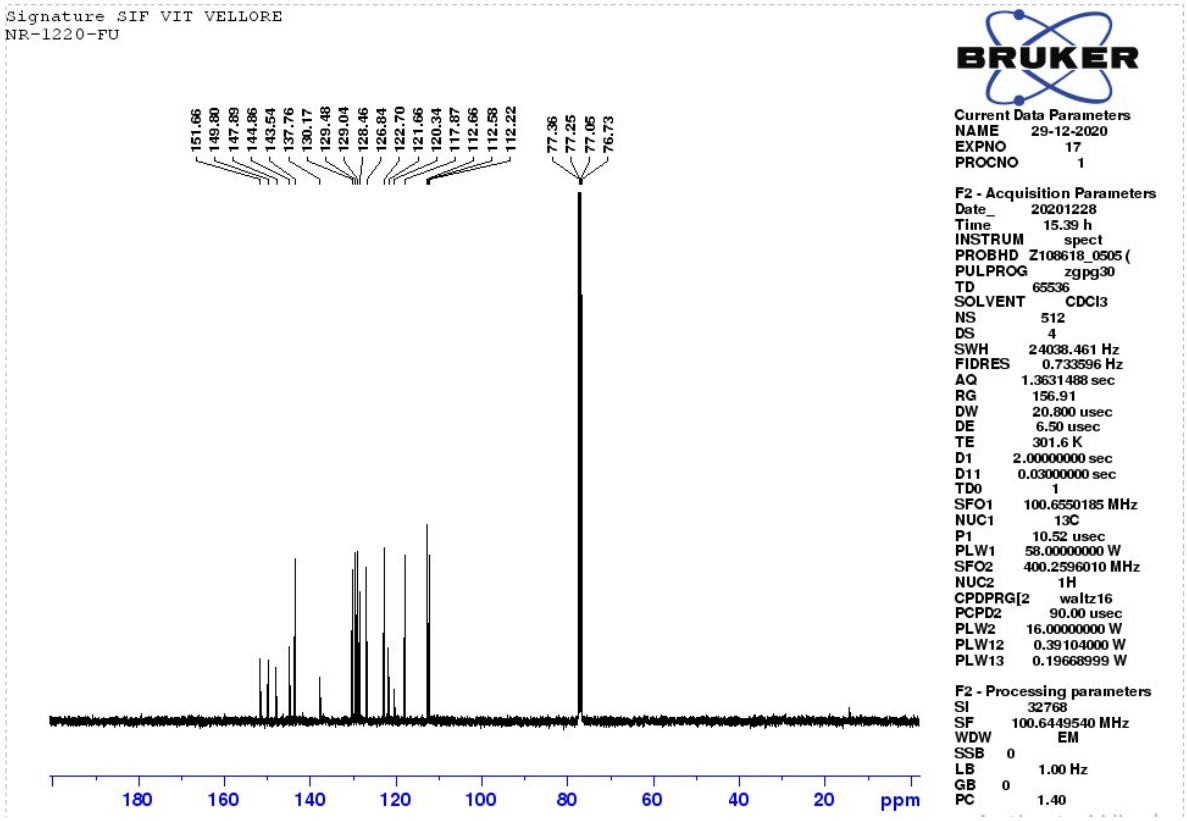
^{1}H-NMR and ^{13}C-NMR of compound **6t** in $CDCl_3$.



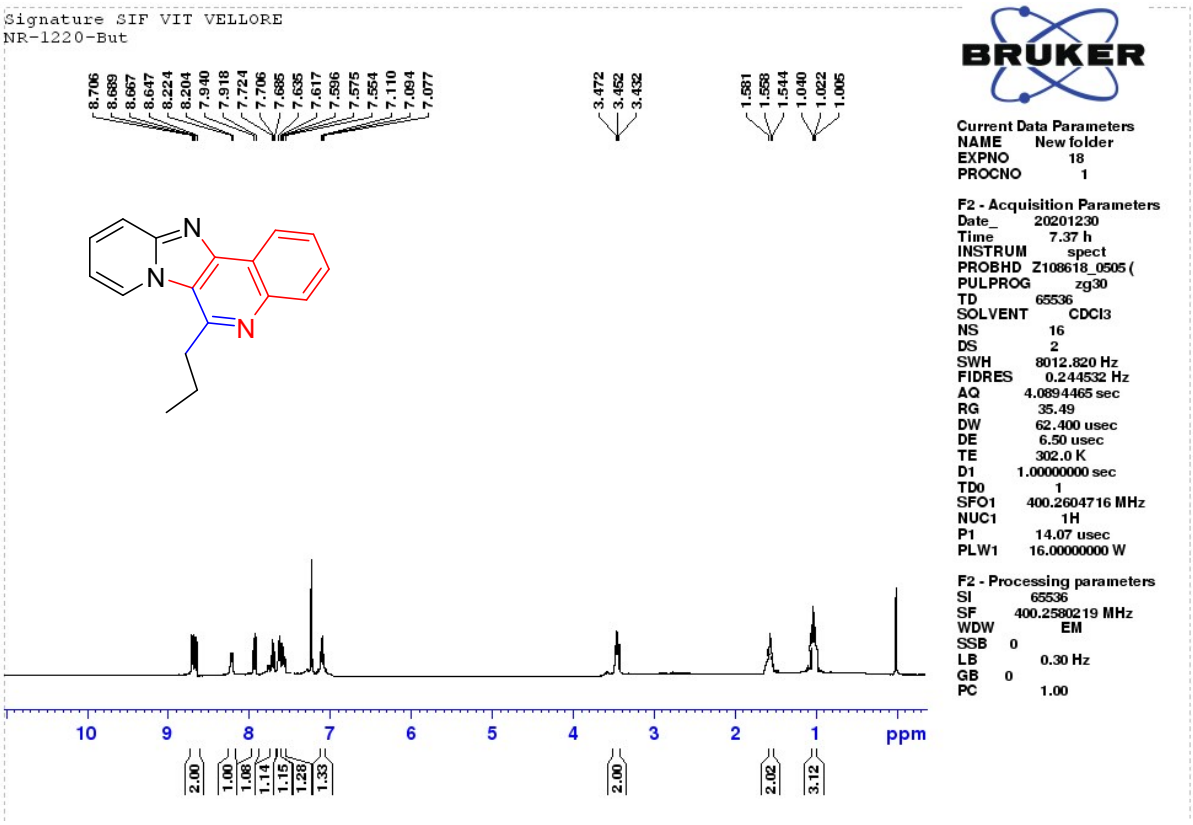


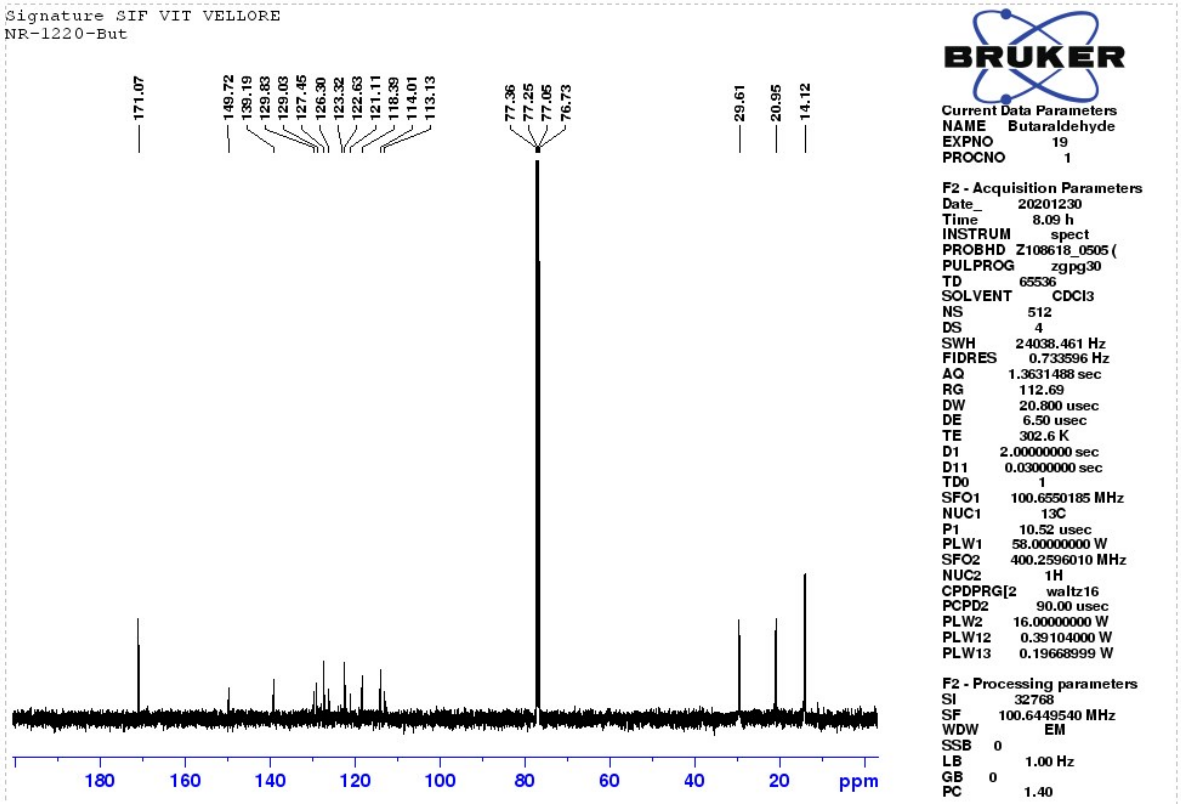
HRMS and IR of compound **6t**.





^{1}H-NMR and ^{13}C-NMR of compound **6u** in $CDCl_3$.





^{1}H-NMR and ^{13}C-NMR of compound **6v** in $CDCl_3$.