Electronic Supplementary Material (ESI) for RSC Advances.

Water mediated reactions: TiO_2 and ZnO Nanoparticles catalyzed Multi component domino reaction in the synthesis of tetrahydroacridinediones, acridindiones, xanthenones and xanthenes

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Supporting Documents

3,4,6,7-Tetrahydro-9-(1,2-dihydro-2-oxoquinolin-3-yl)-10-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (4a)

Yellow solid, Yield (83%), mp 260 - 265 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.72 (s, 1H), 8.24 (s, 1H), 7.62 - 7.68 (m, 2H), 7.28 (s, 1H), 7.22-7.24 (d, *J* = 8.1 Hz, 2H), 7.11 - 7.15 (m, 2H), 7.04-7.06 (d, *J* = 7.5 Hz, 1H), 5.41 (s, 1H), 2.41 (s, 3H), 2.20 - 2.33 (m, 4H), 2.07 - 2.13 (m, 4H), 1.78 - 1.84 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.67, 163.02, 156.25, 140.84, 139.23, 137.52, 137.04, 132.39, 130.93, 129.74, 129.33, 128.84, 122.18, 120.58, 114.27, 111.09, 36.82, 33.93, 28.50, 21.24, 21.20 ppm, HRMS calcd for $C_{29}H_{26}N_2O_3$ m/z 450.1943 [M^+], found 450.1941[M^+] .

3,4,6,7-Tetrahydro-9-(1, 2-dihydro-2-oxoquinolin-3-yl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione. (4b)

Yellow solid, Yield (80%), mp 260-262 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.33 (s, 1H, NH), 8.42 (s, 1H), 7.71 – 7.77 (m, 3H), 7.48 – 7.52 (m, 5H), 7.38 – 7.42 (t, *J* = 7.8 Hz, 1H), 5.46 (s, 1H), 2.25 - 2.31 (m, 4H), 2.07 - 2.14 (m, 4H), 1.75-1.86 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.64, 163.28, 153.94, 140.97, 139.72, 137.61, 132.33, 130.38, 129.69, 129.17, 129.13, 128.82, 122.16, 120.58, 114.34, 111.21, 36.81, 33.98, 28.54, 21.21 ppm, HRMS calcd for $C_{28}H_{24}N_2O_3$ m/z 436.1786 [M^+], found 436.1782[M^+] .

3,4,6,7-tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (4c)

Pale yellow solid, Yield (78%), mp 240 - 242 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.50 (s, 1H, NH), 8.20 (s, 1H), 7.66 - 7.68 (dd, *J* = 7.9, *J* = 1.8 Hz, 1H), 7.46 (s, 1H), 7.29 (s, 1H), 7.19 - 7.21 (d, *J* = 7.9 Hz, 1H), 7.12-7.14 (dd, *J* = 7.9, *J* = 1.9 Hz, 1H), 6.95 – 7.00 (m, 2H), 5.40 (s, 1H), 2.40 (s, 3H), 2.35 (s, 3H), 2.24-2.31 (m, 4H), 2.12-2.17 (m, 4H), 1.81-1.88 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.62, 163.26, 154.12, 140.73, 139.19, 137.06, 135.65, 132.23, 131.52, 130.93, 129.72, 129.33, 128.39, 120.53, 114.24, 111.20, 36.81, 33.95, 28.51, 21.23, 21.20, 20.89 ppm, HRMS calcd for $C_{30}H_{28}N_2O_3$ m/z, 464.2099 [M^+], found 464.2090

3,4,6,7-Tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (4d)

Yellow solid, Yield (86%), mp 255-257 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.18 (s, 1H, NH), 8.31 (s, 1H), 7.63-7.65 (dd, *J* = 7.2 Hz, *J* = 2.8 Hz, 1H), 7.53 (s, 1H), 7.17-7.19 (d, *J* = 7.8 Hz, 1H), 7.13 - 7.15 (dd, *J* = 7.7 Hz , *J* = 3.0 Hz, 1H), 7.07-7.09 (d, *J* = 8.3 Hz, 1H) 6.96 - 6.98 (m, 2H), 5.42 (s, 1H), 3.85 (s, 3H), 2.39 (s, 3H), 2.23-2.30 (m, 4H), 2.08 - 2.15 (m, 4H), 1.77 - 1.88 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.64, 162.79, 159.73, 154.48, 140.65, 136.48, 132.36, 131.31, 130.55, 130.38, 128.47, 120.55, 114.91, 114.55, 114.04, 111.16, 55.59, 36.81, 33.8, 28.45, 21.21, 20.86 ppm, HRMS calcd for $C_{30}H_{28}N_2O_3$ m/z 480.2049[M^+] , found 480.2043[M^+] .

3,4,6,7-Tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (4e)

Yellow solid, Yield (75%), mp 268-270 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.17 (s, 1H, NH), 8.23 (s, 1H),7.76 (s, 1H), 7.45 - 7.51 (m, 5H), 7.01-7.10 (dd, *J* = 17.8 Hz, *J* = 9.0 Hz, 2H), 5.41 (s, 1H), 2.36 (s, 3H), 2.25-2.30 (m, 4H), 2.05 - 2.13 (m, 4H), 1.78-1.87 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.67, 162.85, 153.95, 140.72, 139.78, 135.50, 132.22, 131.65, 130.39, 130.35, 129.69, 129.13, 128.46, 120.52, 114.09, 111.17, 36.81, 33.87, 28.50, 21.21, 20.87 ppm, HRMS calcd for $C_{29}H_{26}N_2O_3$ m/z, 450.1943 [M^+], found 450.1931 [M^+].

3,4,6,7-Tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-m-tolylacridine-1,8(2H,5H,9H,10H)-dione (4f)

Greenish yellow solid, Yield (84%), mp 255 - 260 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.55 (s, 1H, NH), 8.30 (s, 1H), 7.52 (s, 2H), 7.34 - 7.38 (t, *J* = 7.6 Hz, 1H), 7.10-7.14 (m, 3H), 7.04 (s, 3H), 5.43(s, 1H), 2.39 (s, 3H),2.20 – 2.36 (m, 4H), 2.24- 2.28 (m, 4H), 2.11(s, 3H), 1.78-1.87 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.60, 153.96, 140.72, 139.68, 139.54, 139.22, 135.61, 131.55, 130.76, 130.13, 129.83, 128.89, 128.45, 127.30, 126.62, 120.54, 114.12, 111.12, 36.84, 33.99, 33.89, 28.52, 21.22, 20.87.ppm

3,4,6,7-Tetrahydro-9-(1,2-dihydro-7-methyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (4g)

Yellow solid, Yield (76%), mp 265-267 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.14 (s, 1H, NH), 8.19 (s, 1H), 7.64 - 7.66 (d, *J* = 8.0 Hz, 1H), 7.52 - 7.54 (d, *J* = 7.1 Hz , 1H), 7.13 - 7.15 (d, *J* = 7.1 Hz, 1H), 6.95 - 6.97 (d, *J* = 6.5 Hz, 2H), 6.82-6.87 (m, 1H), 5.37 (s, 1H), 3.80 (s, 3H), 2.29 (s, 3H), 2.20-2.23 (m, 4H), 2.13 – 2.16 (m, 4H), 1.71 - 1.87 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.72, 163.53, 159.76, 154.41, 141.00, 139.54, 137.73, 132.29, 130.56, 128.62, 123.76, 118.50, 114.77, 114.68, 114.24, 111.33, 55.65, 36.85, 33.82, 28.47, 21.45, 21.28 ppm, HRMS calcd for $C_{30}H_{28}N_2O_4$ m/z, 480.2049 [M^+], found 480.2039

3,4,6,7-Tetrahydro-9-(1,2-dihydro-7-methyl-2-oxoquinolin-3-yl)-10-(2-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (4h)

Yellow solid, Yield (65%), mp 283 - 285 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.39 (s, 1H, NH), 8.18 (s, 1H), 7.74 - 7.76 (dd, *J* = 9.6 Hz , *J* = 6 Hz , 1H), 7.51 - 7.53 (d, *J* = 8 Hz , 1H), 7.415-7.418 (m, 1H), 7.02 - 7.04 (d, *J* = 7.6 Hz , 1H), 6.91 - 6.97 (q, *J* = 24.0 Hz , 2H), 6.78 (s, 1H), 5.38(s, 1H), 3.92 (s, 3H), 2.25 - 2.35 (m, 4H), 2.19 (m, 6H), 1.79 (m, 5H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.75, 163.33, 156.16, 154.70, 140.94, 139.61, 137.69, 131.68, 131.31, 130.68, 128.59, 128.15, 123.76, 121.82, 118.50, 114.13, 111.44, 111.18, 55.62, 36.87, 33.90, 29.71, 26.71, 26.56, 21.49 ppm, . HRMS calcd for $C_{30}H_{28}N_2O_4$ m/z, 480.2049 [M^+], found 480.2042 [M^+]

3,4,6,7-Tetrahydro-9-(1,2-dihydro-5,7-dimethyl-2-oxoquinolin-3-yl)-10-(2-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (4i)

Greenish yellow solid, Yield (68%), mp 250 - 252 ^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.39 (s, 1H, NH), 8.35 (s, 1H), 7.74 - 7.77 (dd, *J* = 9.2 Hz , *J* = 6.0 Hz , 1H), 7.39 - 7.42 (td, *J* = 8.2 Hz , *J* = 1.6 Hz, 1H), 7.04 - 7.05 (d, *J* = 6.4 Hz , 1H), 6.92 - 6.96 (t, *J* = 14.8 Hz, 1H), 6.75 (s, 1H), 6.63 (s, 1H), 5.41 (s, 1H), 3.92 (s, 3H), 2.63 (s, 3H), 2.27 - 2.35 (m, 4H), 2.15 - 2.24 (m, 4H), 2.11 (s, 3H), 1.82 - 1.83 (m, 4H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.77, 163.25, 156.15, 154.62, 139.32, 138.17, 137.92,136.30, 131.76, 130.656, 128.15, 128.20, 121.85, 117.40, 112.43, 111.38, 111.31, 111.28, 55.61, 36.89, 34.23, 26.56, 21.35, 21.20, 18.95 ppm, HRMS calcd for $C_{31}H_{30}N_2O_4$ m/z, 494.2056 [M^+], found 494.2198 [M^+].

3,4,6,7-Tetrahydro-9-(1,2-dihydro-5,7-dimethyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)-3,3,6,6-tetramethylacridine -1,8(2H,5H,9H,10H)-dione (4j)

Yellow solid, Yield (85%), mp 245-248, ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.06 (s, 1H, NH), 8.24 (s, 1H), 7.56-7.58 (dd, *J* = 6.0 Hz , *J* = 2.8 Hz , 1H), 7.00-7.20 (dd, *J* = 6.4 Hz , *J* = 2.4 Hz , 1H), 6.89-6.92 (dd, *J* = 5.6 Hz , *J* = 2.8 Hz, 1H), 6.72 - 6.78 (m, 2H), 6.58 (s, 1H), 5.26 (s, 1H), 3.78 (s, 3H), 2.56 (s, 3H), 2.09 - 2.13 (m, 5H), 1.98 - 2.06 (m, 4H), 1.84 - 1.94 (m, 2H), 0.87 (s, 6H), 0.77 (s, 6H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.59, 159.58, 152.8, 139.27, 136.42, 132.27, 131.53, 130.61, 130.23, 125.07, 117.33, 114.89, 114.33, 112.78, 110.31, 55.58, 50.43, 41.93, 34.17, 32.32, 29.65, 26.98, 21.58, 18.94 ppm, HRMS calcd for $C_{35}H_{38}N_2O_4$ m/z, 550.2831[M^+], found 550.2826 [M^+].

3,4,6,7-Tetrahydro-9-(1,2-dihydro-6,8-dimethyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)-3,3,6,6-tetramethylacridine-1,8(2H,5H,9H,10H)-dione (4k)

Yellow solid, Yield (80%), mp 250 - 253 ^{o}C ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.38 (s, 1H, NH), 8.09 (s, 1H), 7.70 - 7.73 (m, 1H), 7.33 (s, 1H), 6.96 - 7.10 (m, 4H), 5.29 (s, 1H), 3.90 (s, 3H), 2.30 (s, 3H), 2.34 (s, 3H), 2.07 - 2.19 (m, 4H), 1.98 - 2.02 (m, 2H), 1.85 - 1.89 (d, *J* = 17.2 Hz, 2H), 0.94 (s, 6H), 0.84 (s, 6H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.33, 161.91, 159.95, 152.95, 141.19, 133.93, 132.51, 131.94, 131.34, 130.81, 126.75, 120.75, 120.25, 115.32, 114.24, 110.04, 55.55, 50.37, 41.81, 33.64, 32.31, 29.48, 27.18, 20.77, 16.20 ppm, HRMS calcd for $C_{35}H_{38}N_2O_4$ m/z, 550.2831[M^+], found 550.2824 [M^+] .

3,4,6,7-Tetrahydro-9-(1,2-dihydro-8-methyl-2-oxoquinolin-3-yl)-3,3,6,6-tetramethyl-10-(4-methoxyphenyl)-3,3,6,6-tetramethylacridine-1,8(2H,5H,9H,10H)-dione (4l)

Yellow solid, Yield (68%), mp 270-272 ^{o}C, ^{1}H NMR (400 MHz, DMSO-d_6) δ 10.76 (s, 1H, NH), 7.83 (s, 1H), 7.76 -7.78 (dd, *J* = 8.6, 2.1 Hz, 1H), 7.55 - 7.56 (d, *J* = 7.9 Hz, 1H), 7.33 - 7.35 (dd, *J* = 8.8, 2.2 Hz, 1H), 7.27-7.29 (d, *J* = 7.3 Hz, 1H), 7.14 -7.16 (dd, *J* = 8.6, 2.8 Hz, 1H), 7.09 (s, 1H), 6.94 - 6.96 (d, *J* = 8.9 Hz, 1H), 5.05 (s, 1H), 3.86 (s, 3H), 2.38 (s, 3H), 2.13 - 2.18 (dd, *J* = 16.0, 2.8 Hz, 4H), 1.93-1.97 (d, *J* = 16.1 Hz, 2H), 1.72-1.76 (d, *J* = 17.4 Hz, 2H), 0.87 (s, 6H), 0.75 (s, 6H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.34, 160.97, 158.57, 152.00, 140.34, 134.90, 131.43, 129.75, 129.46, 126.14, 120.83, 119.94, 119.21, 114.30, 113.24, 108.96, 54.52, 49.33, 40.79, 32.61, 28.47, 26.11, 15.27 ppm, HRMS calcd for $C_{34}H_{36}N_2O_4$ m/z, 536.2675 [M^+] found 536.2673[M^+]

3,4,6,7-Tetrahydro-9-(1,2-dihydro-6,8-dimethyl-2-oxoquinolin-3-yl)-10-(2-methoxyphenyl)-3,3,6,6-tetramethylacridine-1,8(2H,5H,9H,10H)-dione (4m)

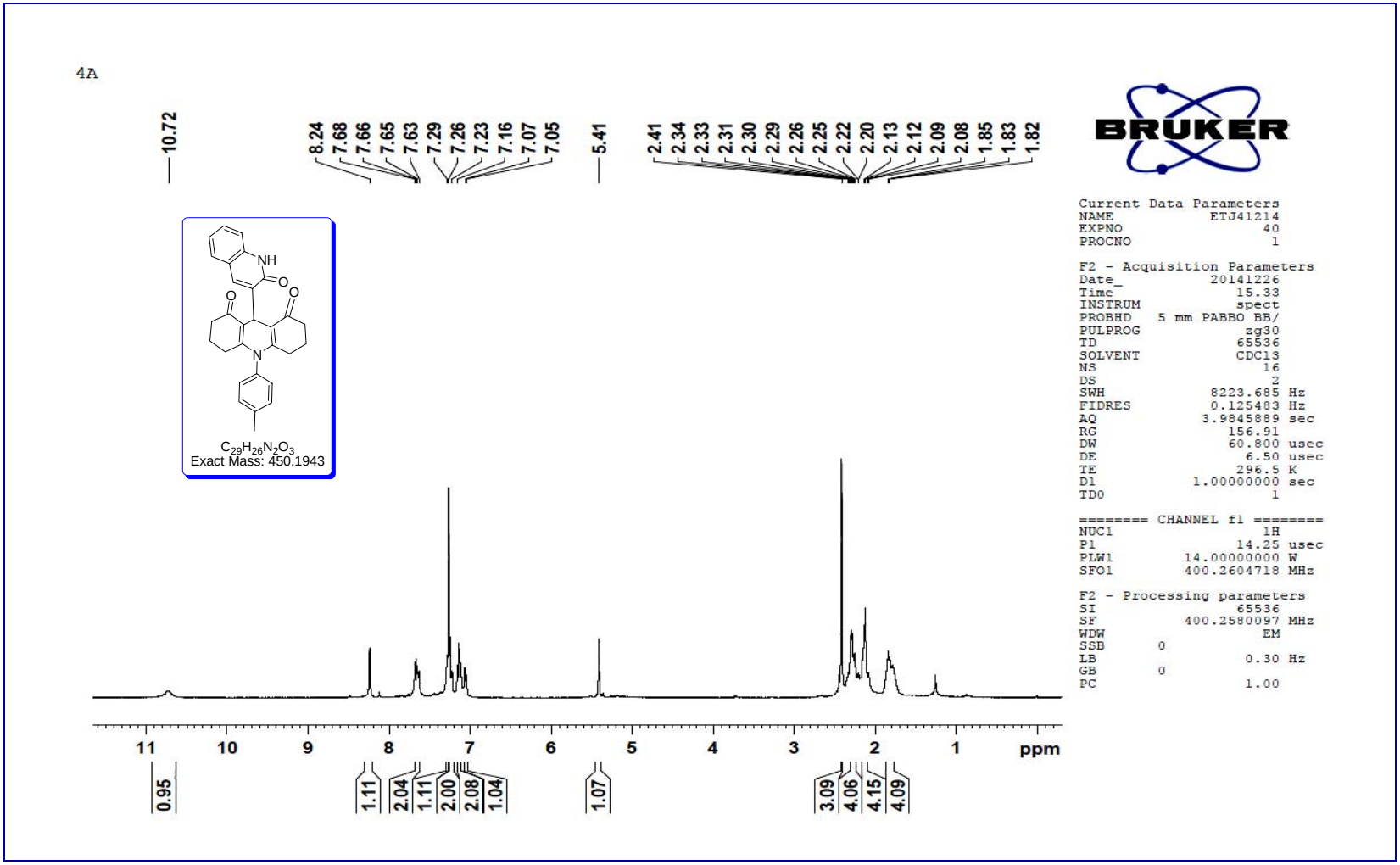
Yellow solid, Yield (81 %), mp-262-264 ^{o}C , ^{1}H NMR (400MHz, $CDCl_3$) δ 8.41 (s, 1H), 7.61-7.63 (d, *J* = 6.4 Hz, 1H), 7.46-7.49 (t, *J* = 7.6 Hz, 1H), 7.09-7.11 (d, *J* = 6.3 Hz, 1H), 7.07 (s, 1H), 7.04-7.06 (d, *J* = 8.4 Hz, 1H), 6.87 (s, 1H), 6.77 (s, 1H), 5.39 (s, 1H), 3.91 (s, 3H), 2.65 (s, 3H), 2.33 (s, 3H), 2.21 (s, 2H), 2.17 (s, 2H), 2.12 (s, 2H), 2.08 (s, 2H), 0.93 (s, 6H), 0.84 (s, 6H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.38, 162.30, 152.95, 141.47, 137.92, 136.00, 132.50, 131.33, 130.80, 130.39, 126.36, 124.41, 118.89, 118.62, 115.31, 114.26, 110.07, 55.75, 50.36, 41.82, 32.31, 29.75, 27.15, 20.72, 14.14, 11.93 ppm.

3,4,6,7-Tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)-3,3,6,6-tetramethylacridine-1,8(2H,5H,9H,10H)-dione (4n)

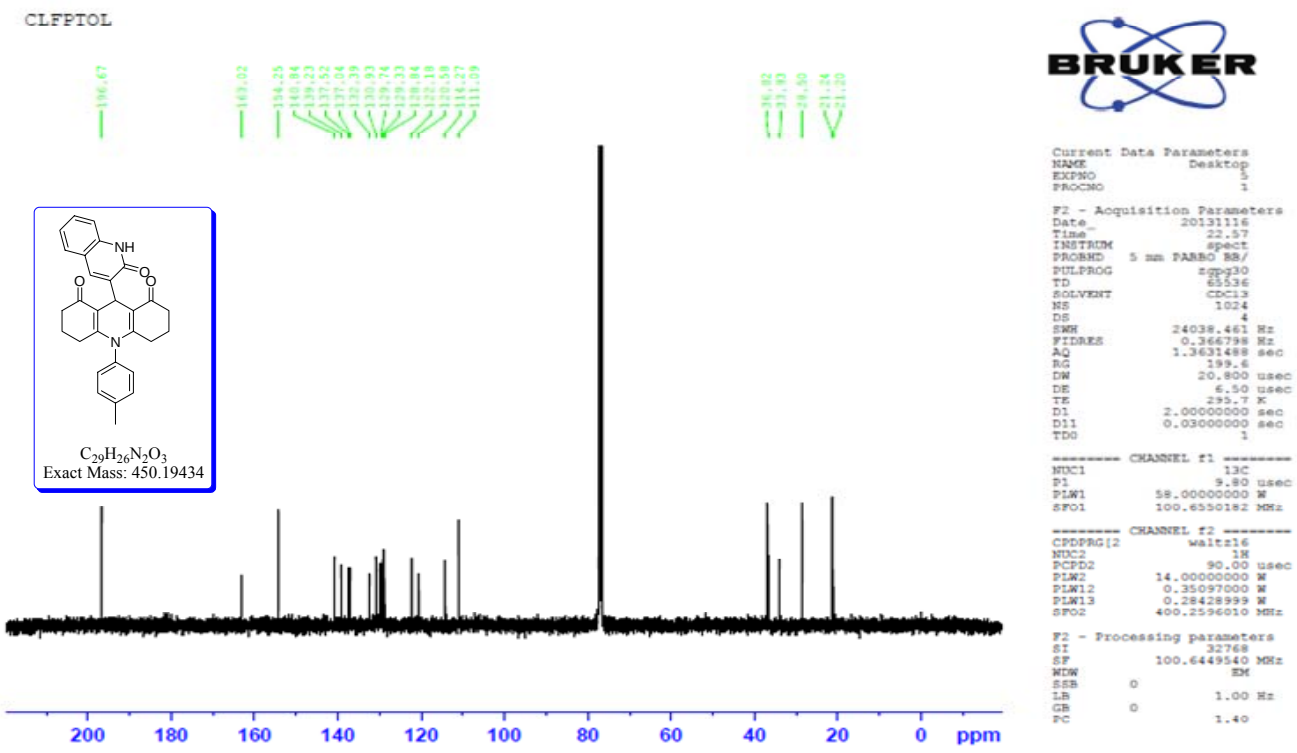
Yellow solid, Yield (69 %), mp-255-259 ^{o}C, ^{1}H NMR (400MHz, $CDCl_3$) δ 10.62 (s, 1H), 8.8 (s, 1H), 7.54-7.56 (d, *J* = 8.2 Hz, 1H), 7.35-7.39 (d, *J* = 14.5 Hz, 1H), 7.00-7.02 (d, *J* = 8.1 Hz, 2H), 6.79-6.95 (m, 3H), 5.25 (s, 1H), 3.79 (s, 3H), 2.30 (s, 3H), 2.05-2.12 (m, 4H), 1.80-1.97 (m, 4H), 0.87 (s, 6H), 0.77 (s, 6H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.47, 159.58, 157.77, 153.04, 140.75, 135.30, 131.37, 130.73, 130.63, 128.56, 126.32, 115.18, 114.58, 114.40, 110.08, 98.22, 55.54, 50.32, 43.48, 41.85, 32.31, 29.72, 28.38, 27.05 ppm.

3,4,6,7-Tetrahydro-9-(1,2-dihydro-5,7-dimethyl-2-oxoquinolin-3-yl)-10-(2-methoxyphenyl)-3,3,6,6-tetramethylacridine-1,8(2H,5H,9H,10H)-dione (4o)

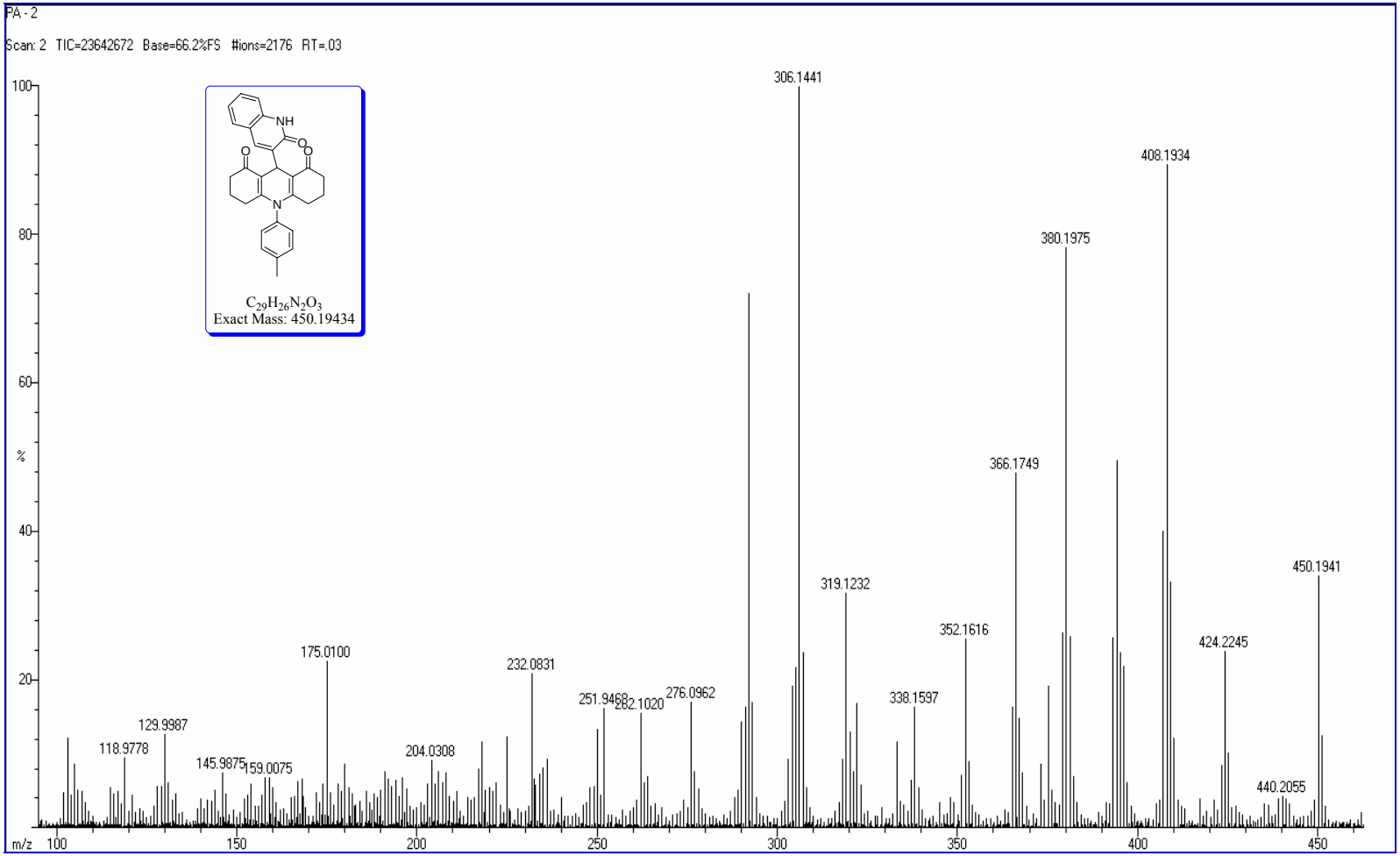
Yellow solid, Yield (78 %), mp-258-260 ^{o}C, ^{1}H NMR (400MHz, $CDCl_3$) δ 8.41 (s, 1H), 7.61-7.62 (d, *J* = 6.2 Hz, 1H), 7.45-7.47 (d, *J* = 7.6 Hz, 1H), 7.07-7.11 (t, *J* = 6.9 Hz, 2H), 7.03-7.05 (d, *J* = 8.2 Hz, 1H) 6.87 (s, 1H), 6.58 (s, 1H), 6.77 (s, 1H), 5.38 (s, 1H), 3.91 (s, 3H), 2.64 (s, 3H), 2.32 (s, 3H), 2.20 (s, 2H), 2.16 (s, 2H), 2.12 (s, 2H), 2.08 (s, 2H) 0.92 (s, 6H), 0.83 (s, 6H); ^{13}C NMR (100MHz, $CDCl_3$) δ 196.49, 156.13, 153.20, 137.91, 137.79, 131.70, 130.62, 128.22, 125.15, 121.91, 117.31, 112.38, 111.42, 110.12, 55.53, 50.48, 40.18, 34.08, 32.27, 29.71, 29.22, 27.43, 21.60, 18.94 ppm.



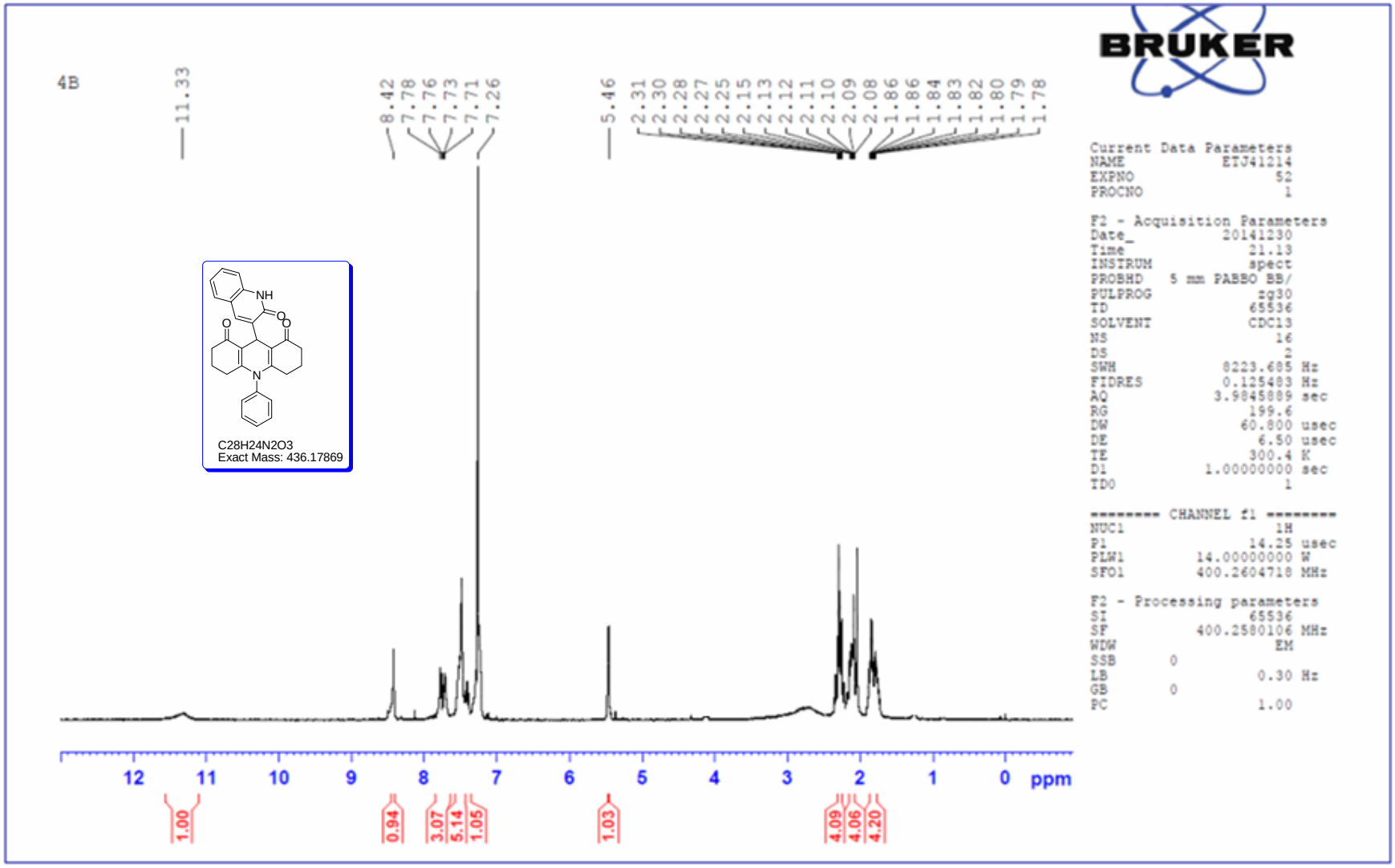
^{1}H NMR, 3,4,6,7-tetrahydro-9-(1,2-dihydro-2-oxoquinolin-3-yl)-10-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (4a)



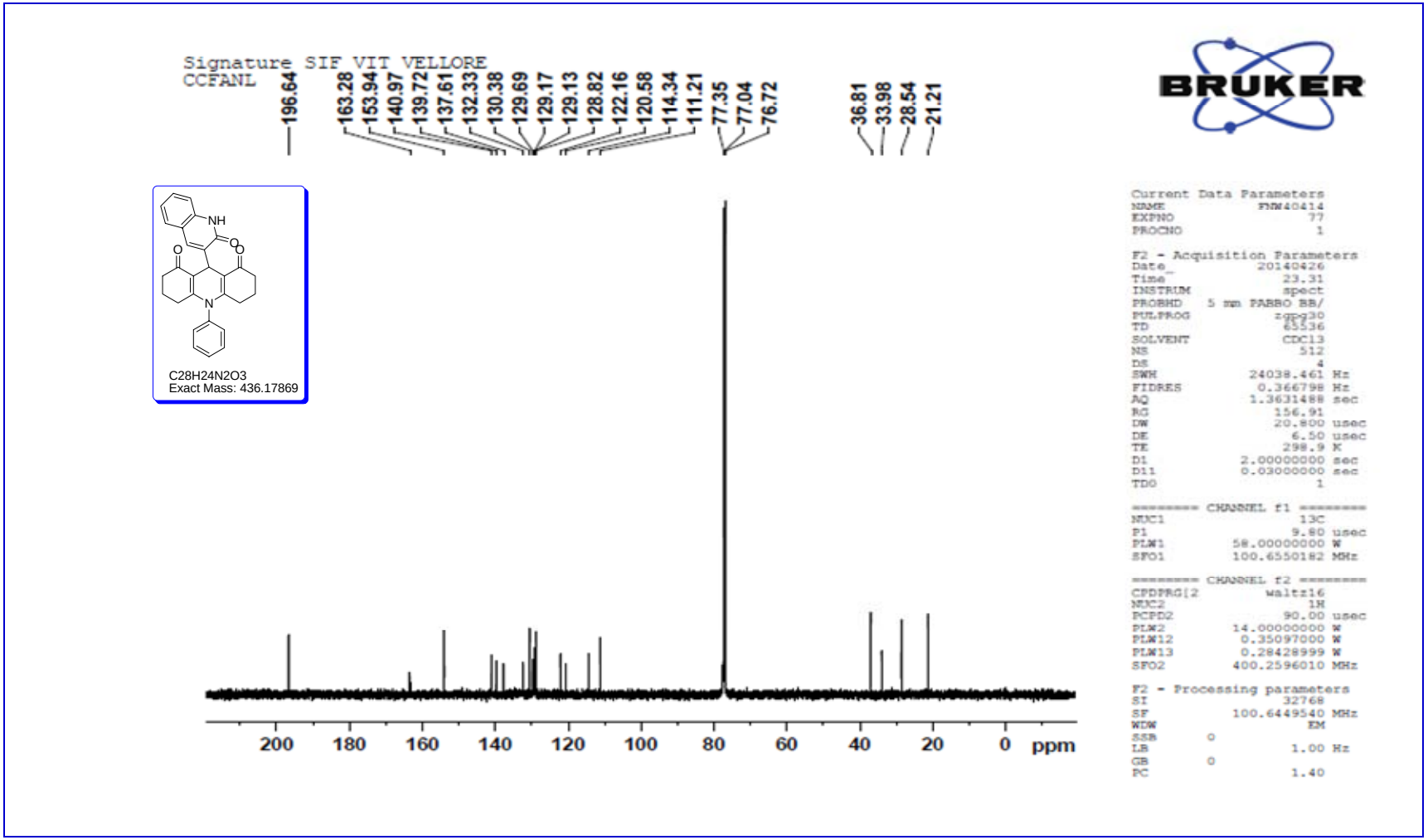
^{13}C NMR, 3,4,6,7-tetrahydro-9-(1,2-dihydro-2-oxoquinolin-3-yl)-10-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (4a)



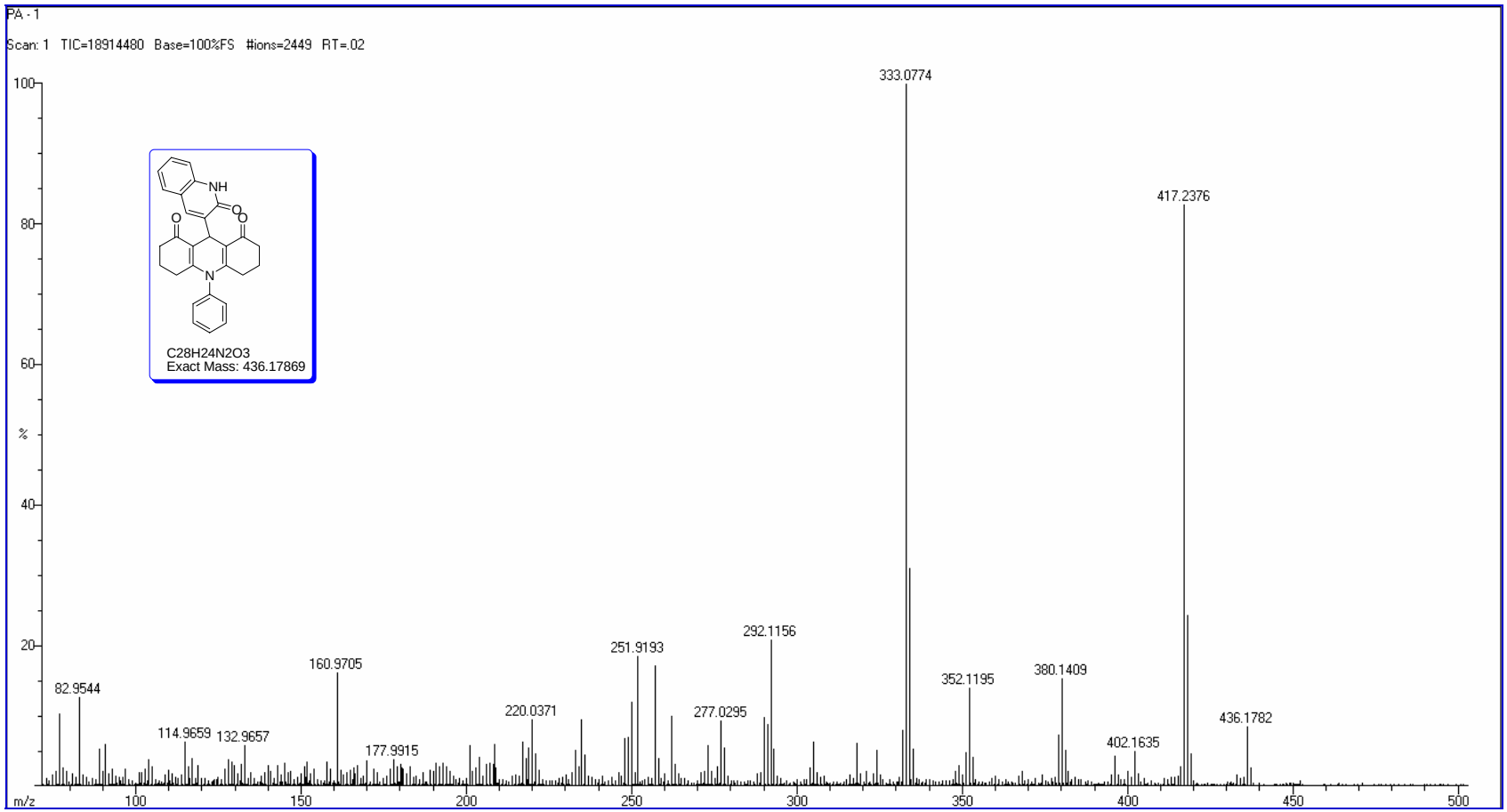
HRMS of 3,4,6,7-tetrahydro-9-(1,2-dihydro-2-oxoquinolin-3-yl)-10-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (4a)



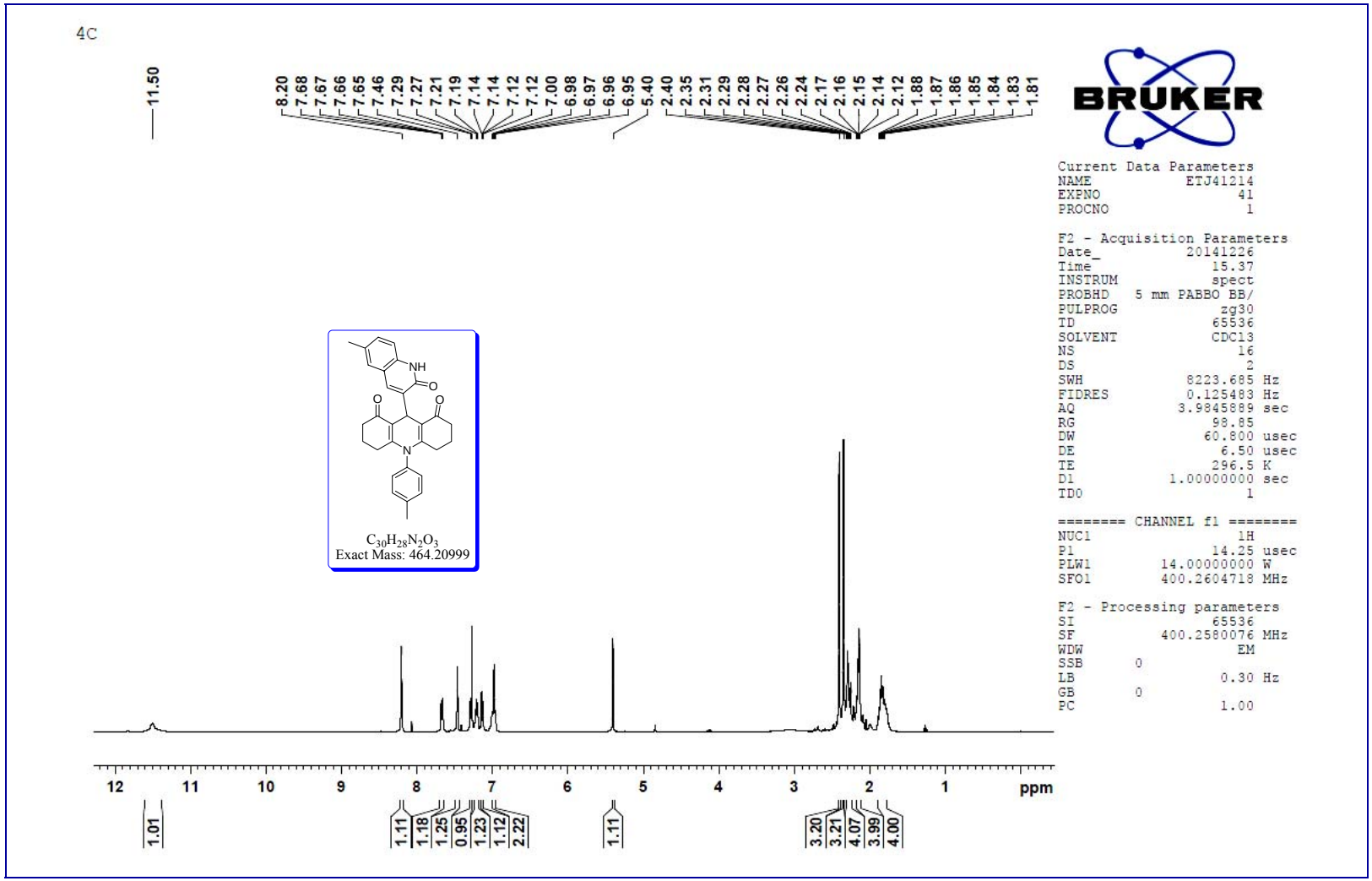
^{1}H NMR, 3,4,6,7-tetrahydro-9-(1, 2-dihydro-2-oxoquinolin-3-yl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (4b)



^{13}C NMR, 3,4,6,7-tetrahydro-9-(1, 2-dihydro-2-oxoquinolin-3-yl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione. (4b)



HRMS of 3,4,6,7-tetrahydro-9-(1, 2-dihydro-2-oxoquinolin-3-yl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione, (4b)



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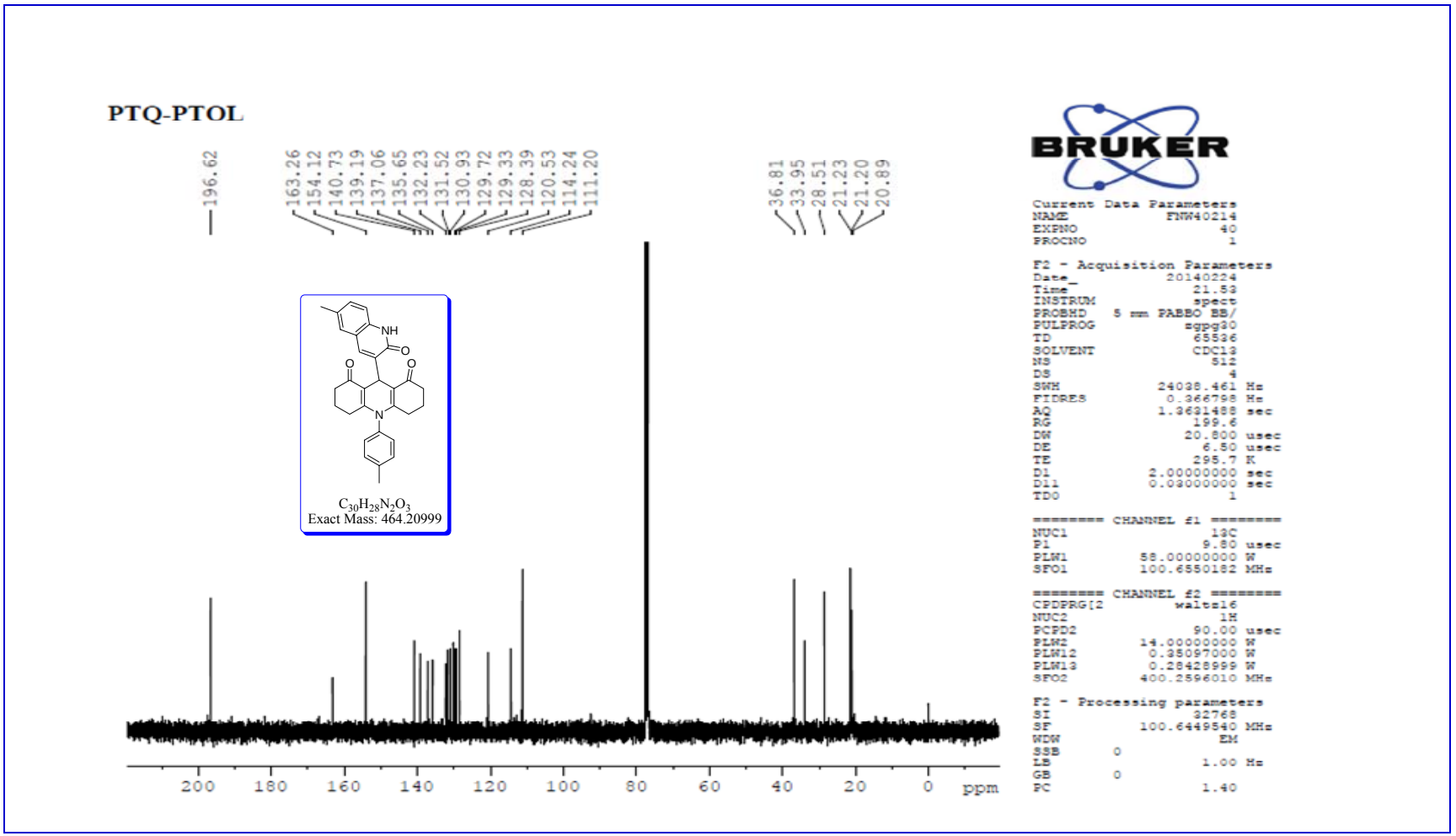
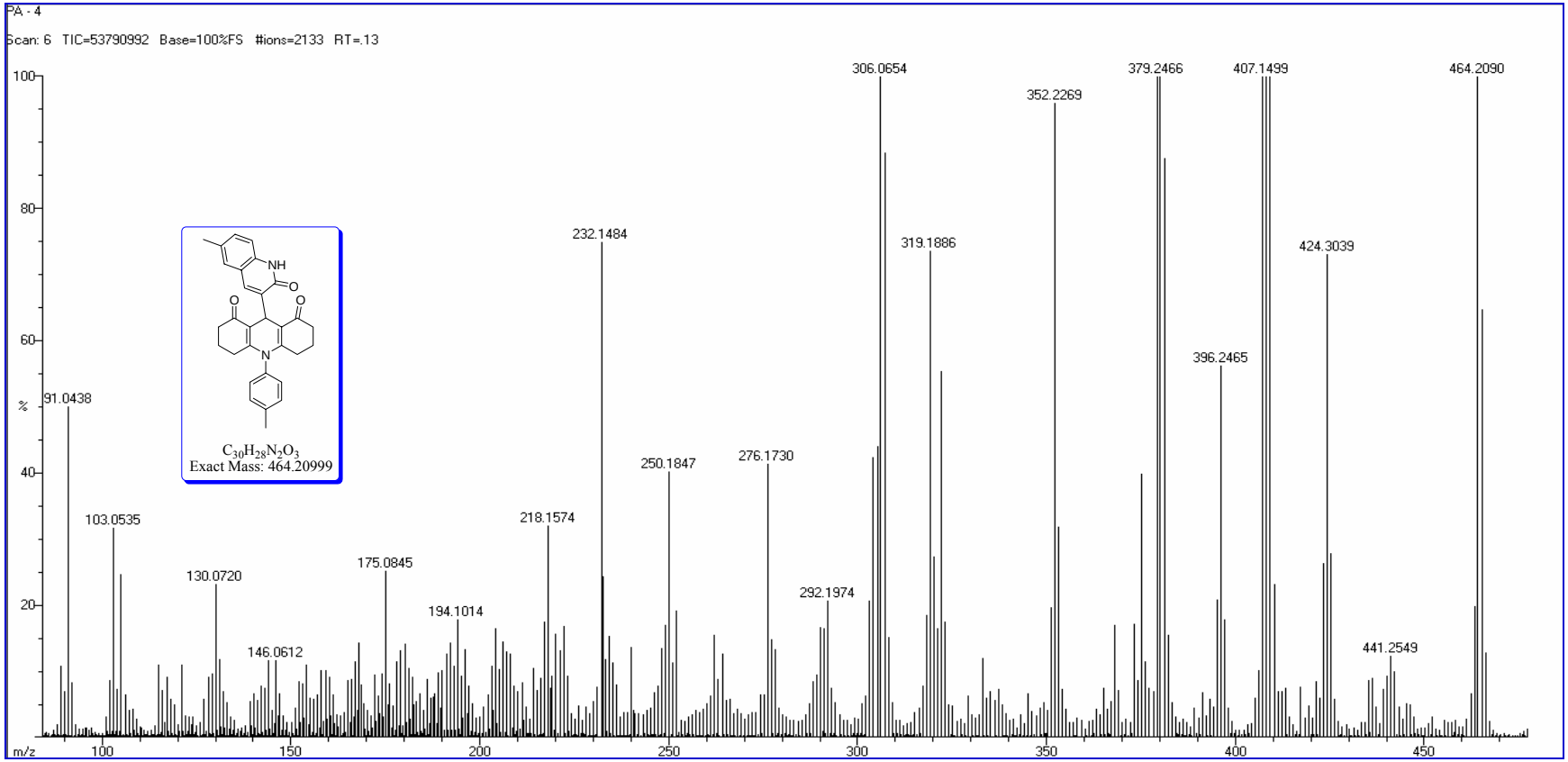


^{13}C NMR of 3,4,6,7-tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (4c)



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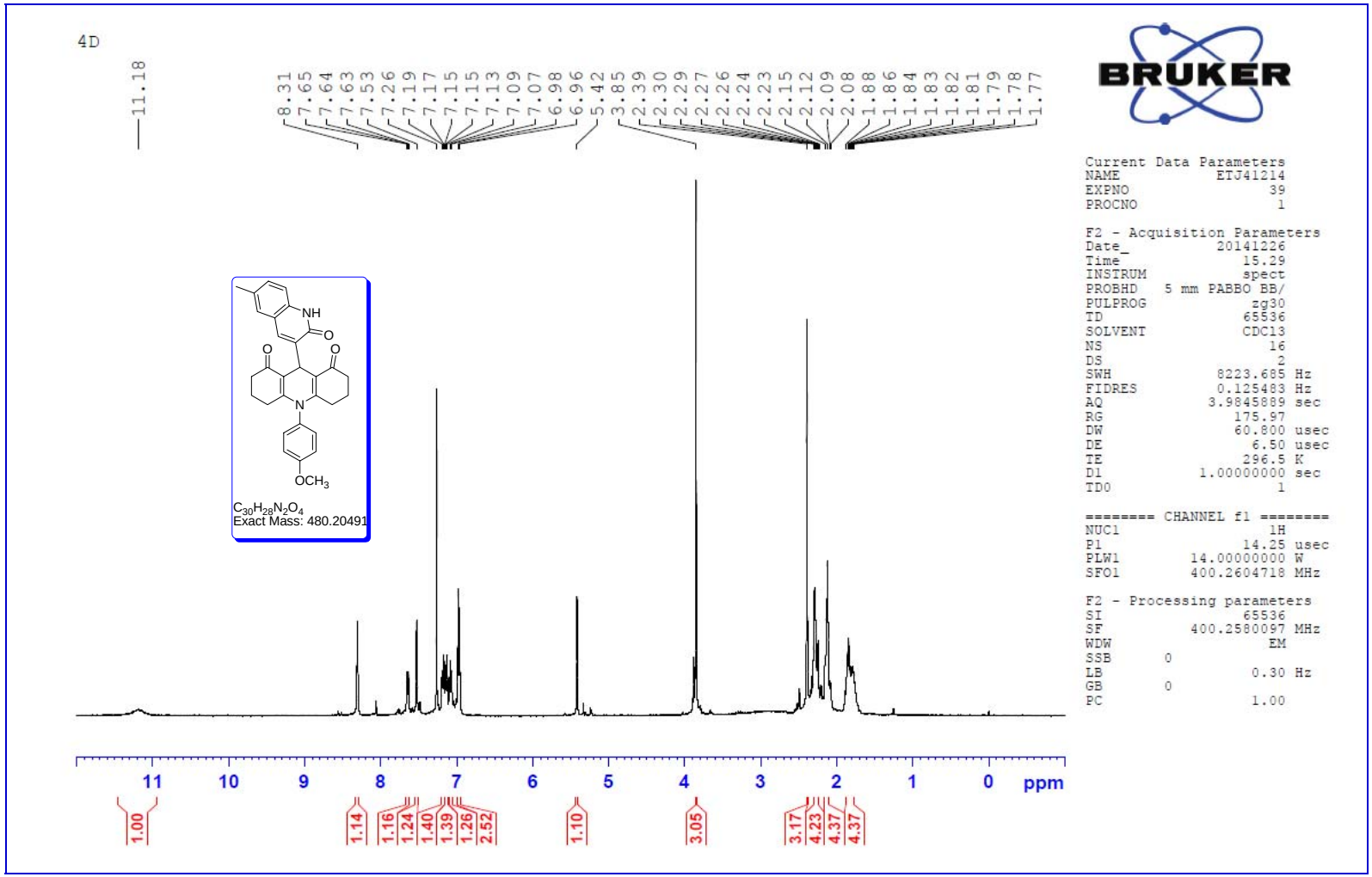

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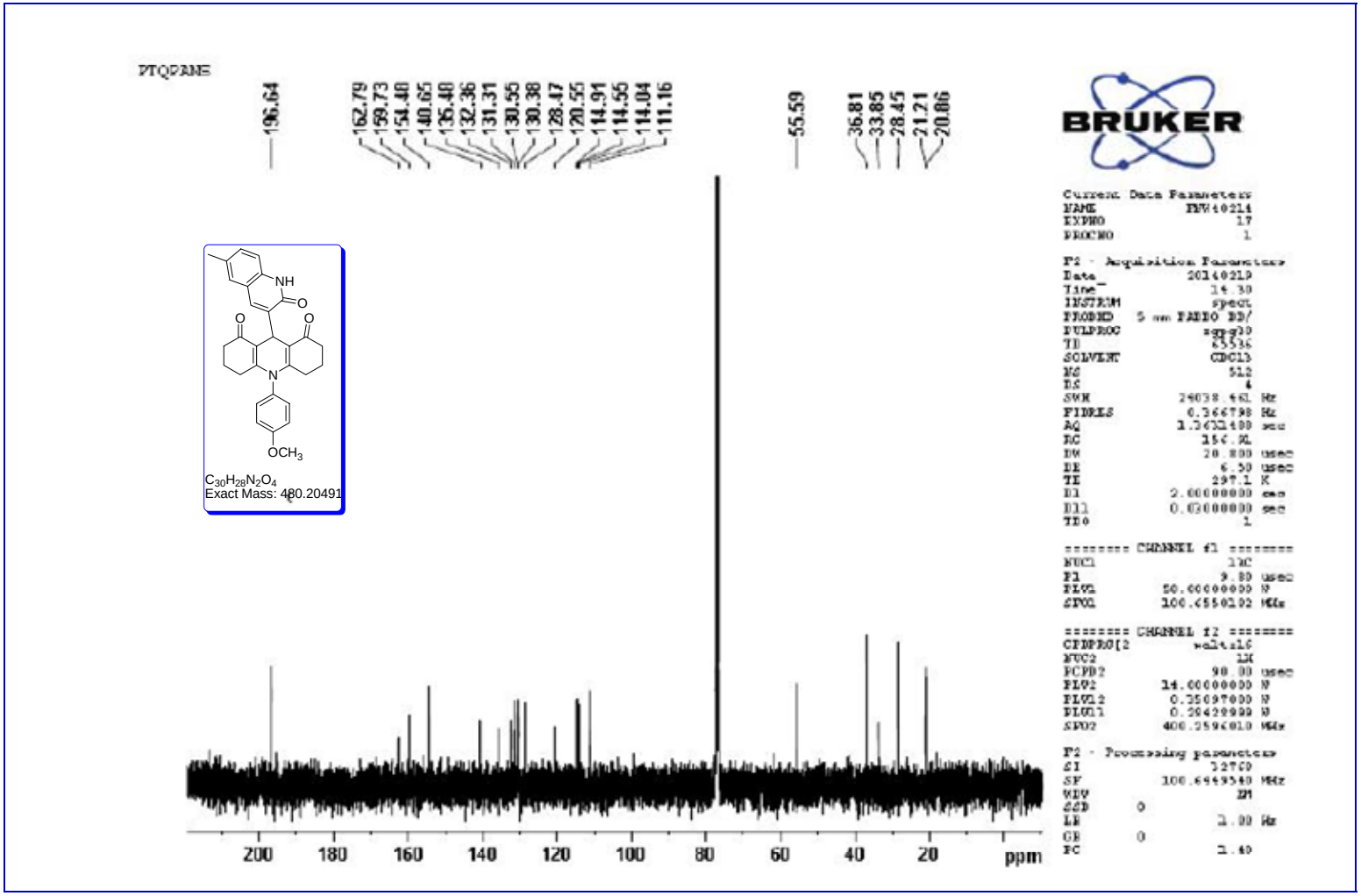
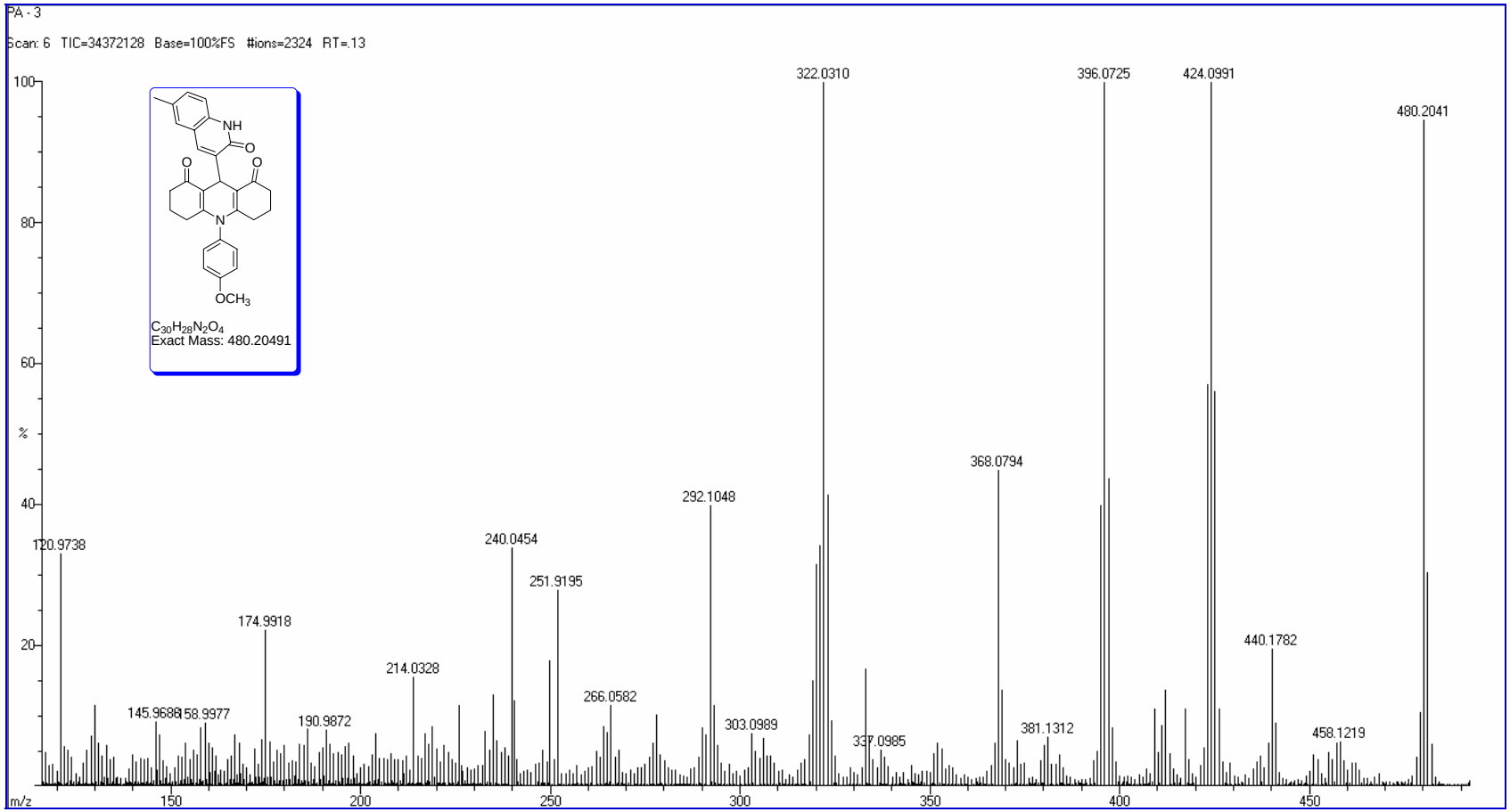
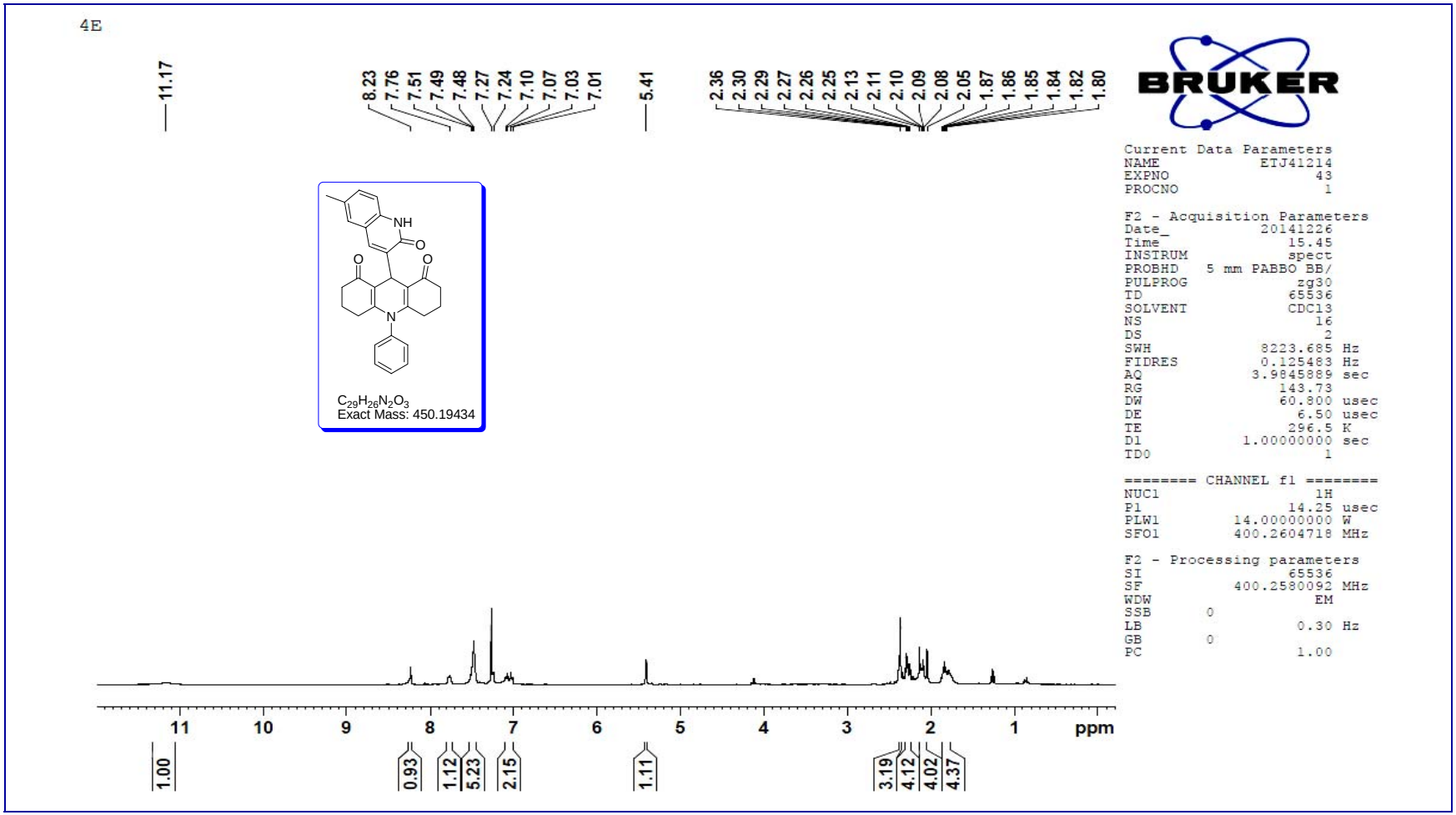


[13]C NMR spectrum of 3,4,6,7-tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-1dione (4d)



HRMS of 3,4,6,7-tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (4d)



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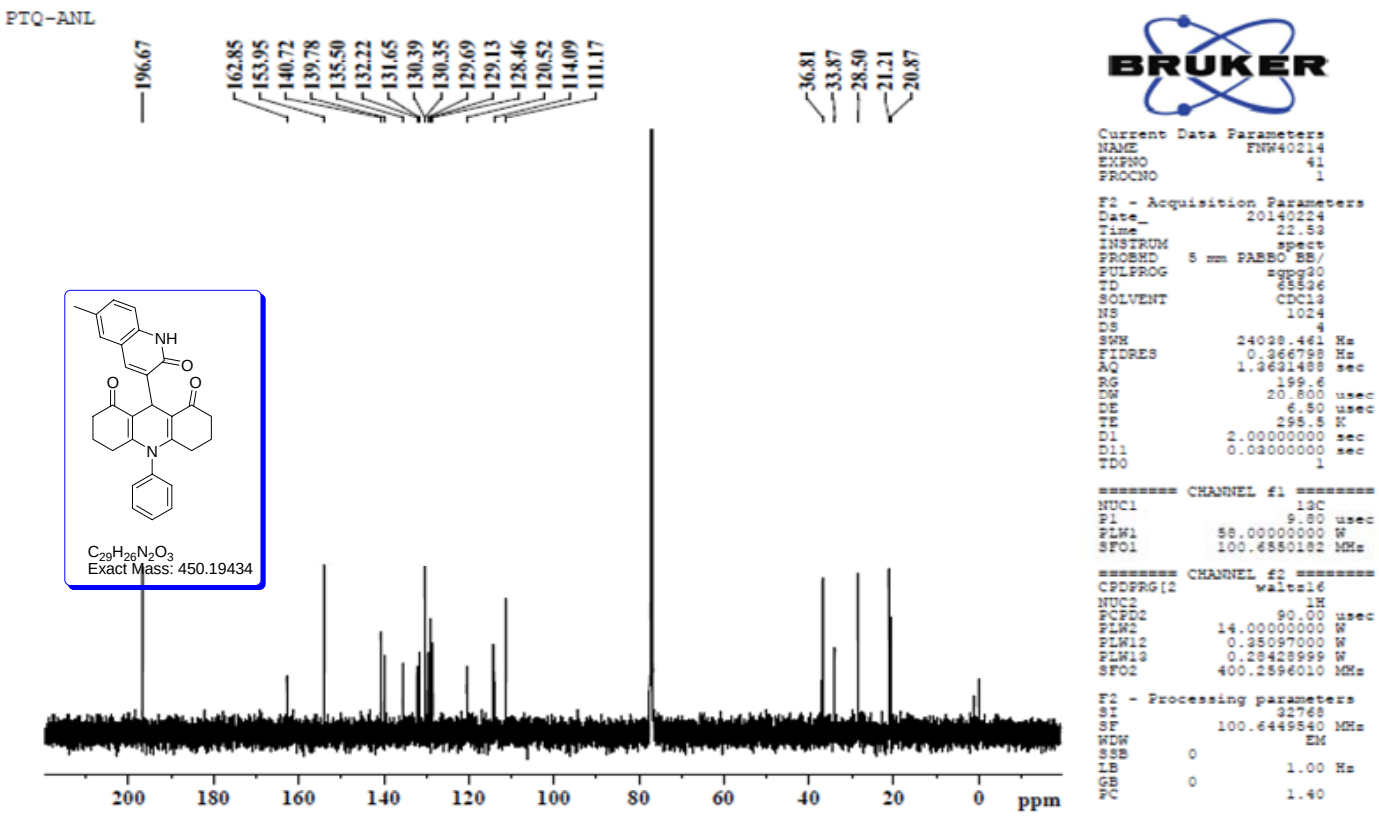

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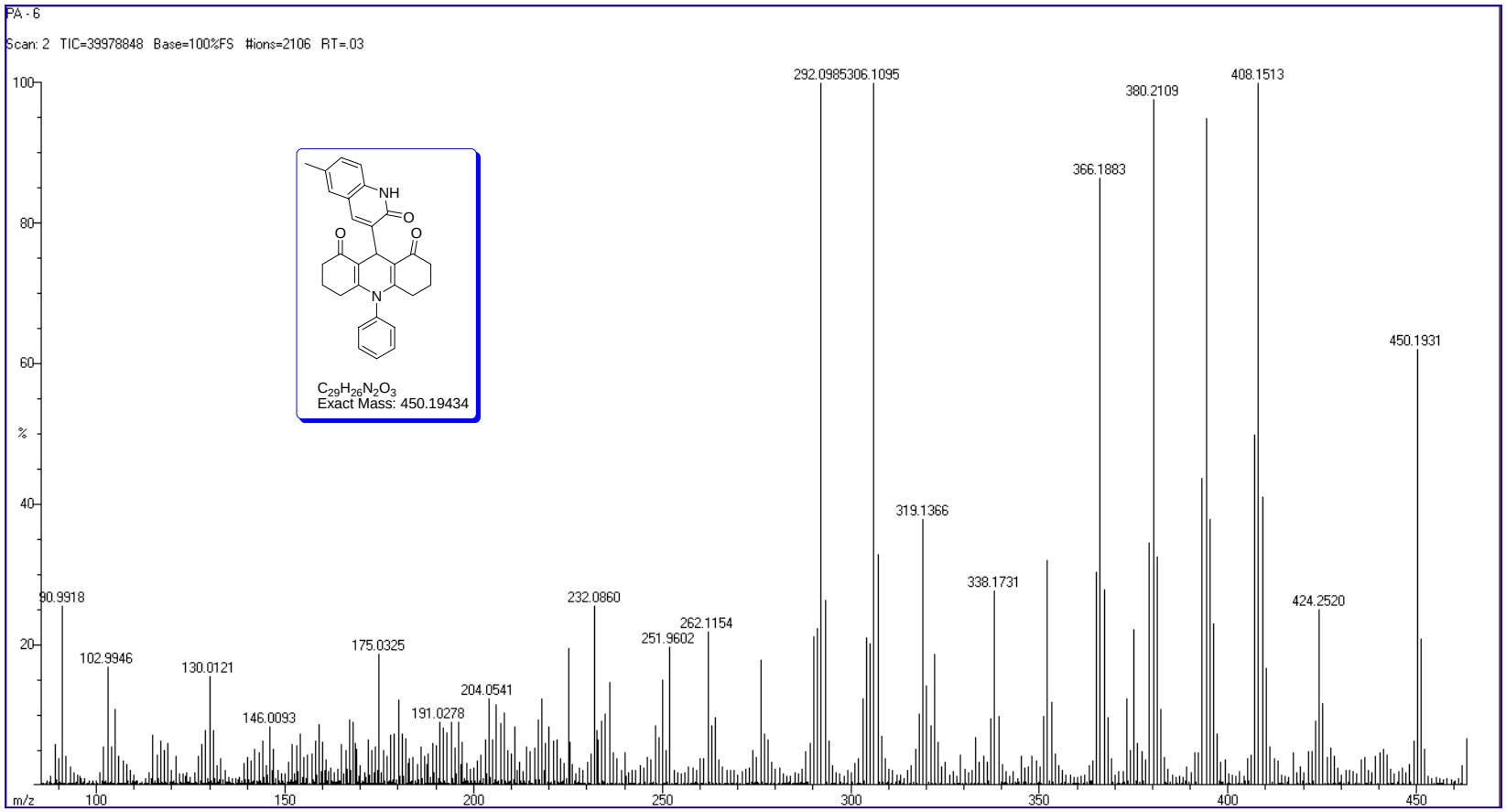

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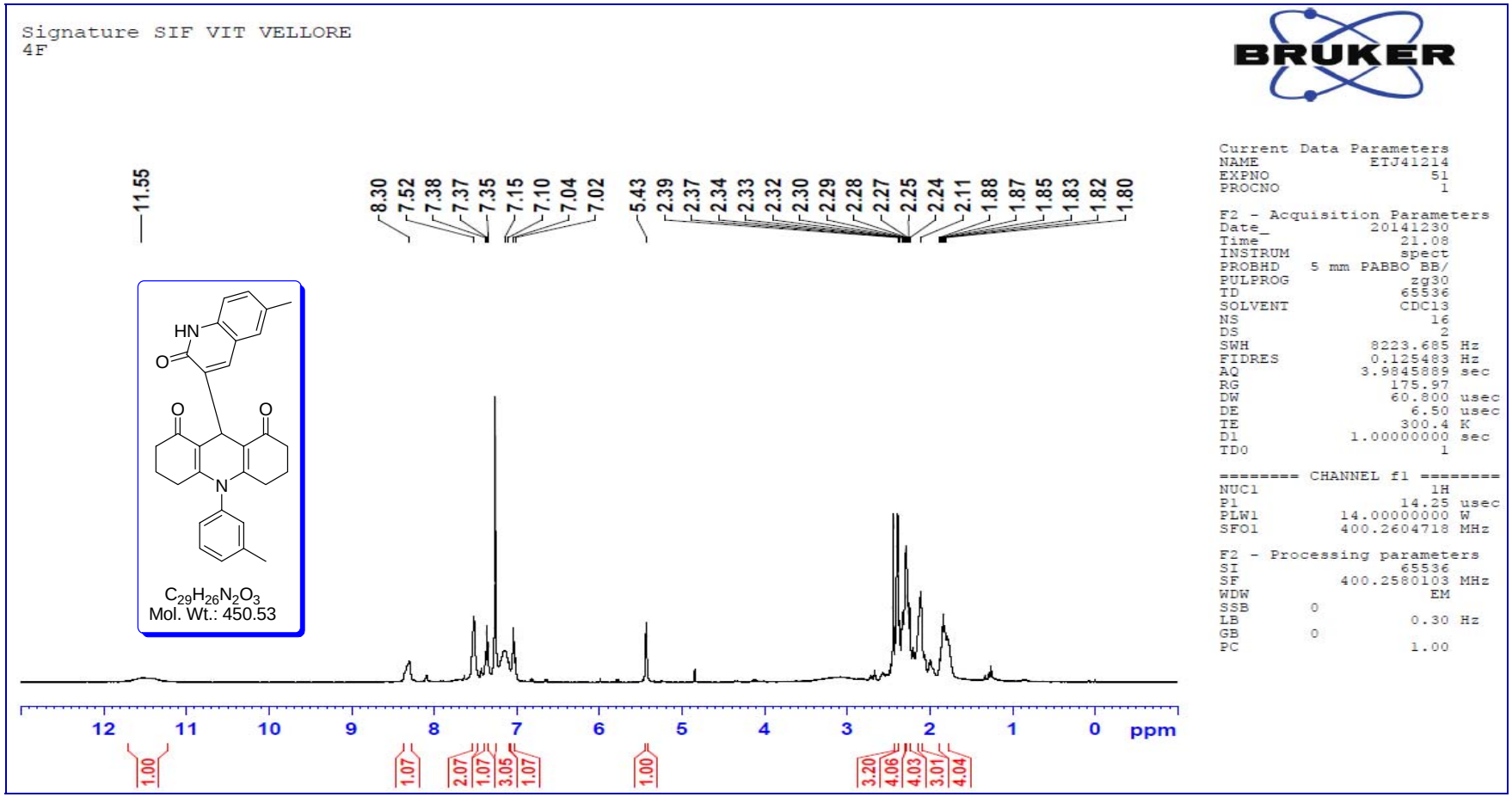

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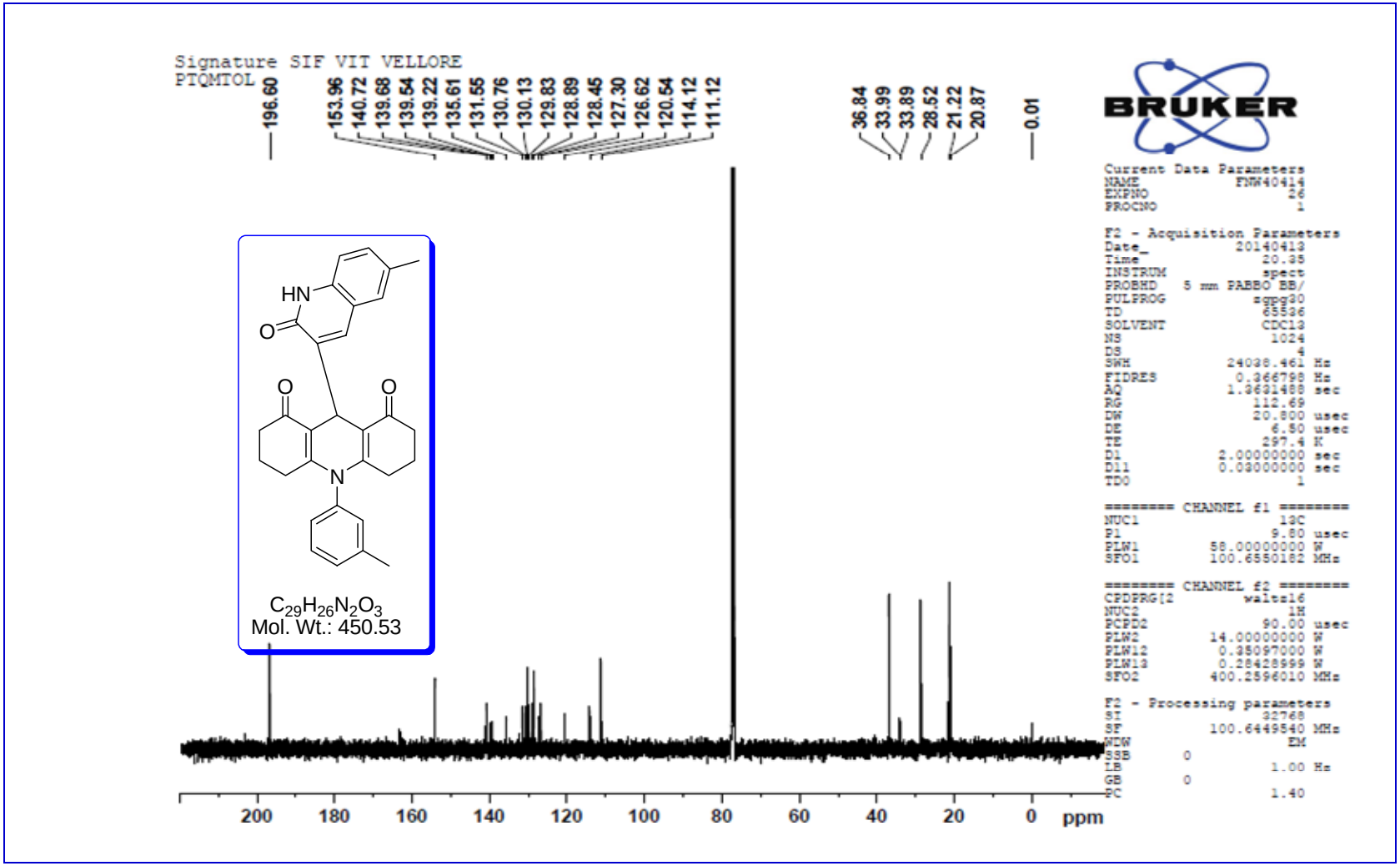
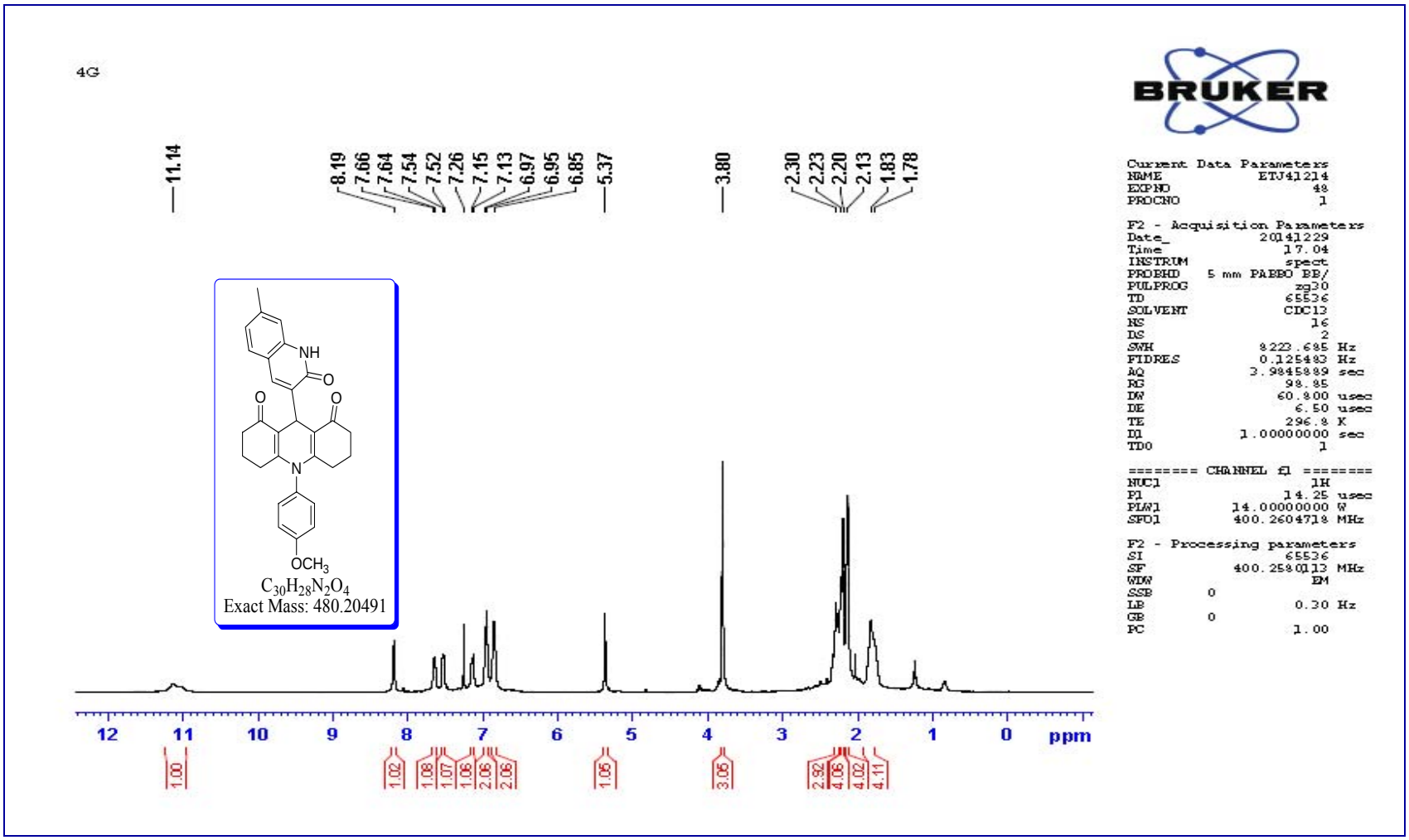


^{13}C NMR of 3,4,6,7-tetrahydro-9-(1,2-dihydro-6-methyl-2-oxoquinolin-3-yl)-10-m-tolylacridine-1,8(2H,5H,9H,10H)-dione (4f)



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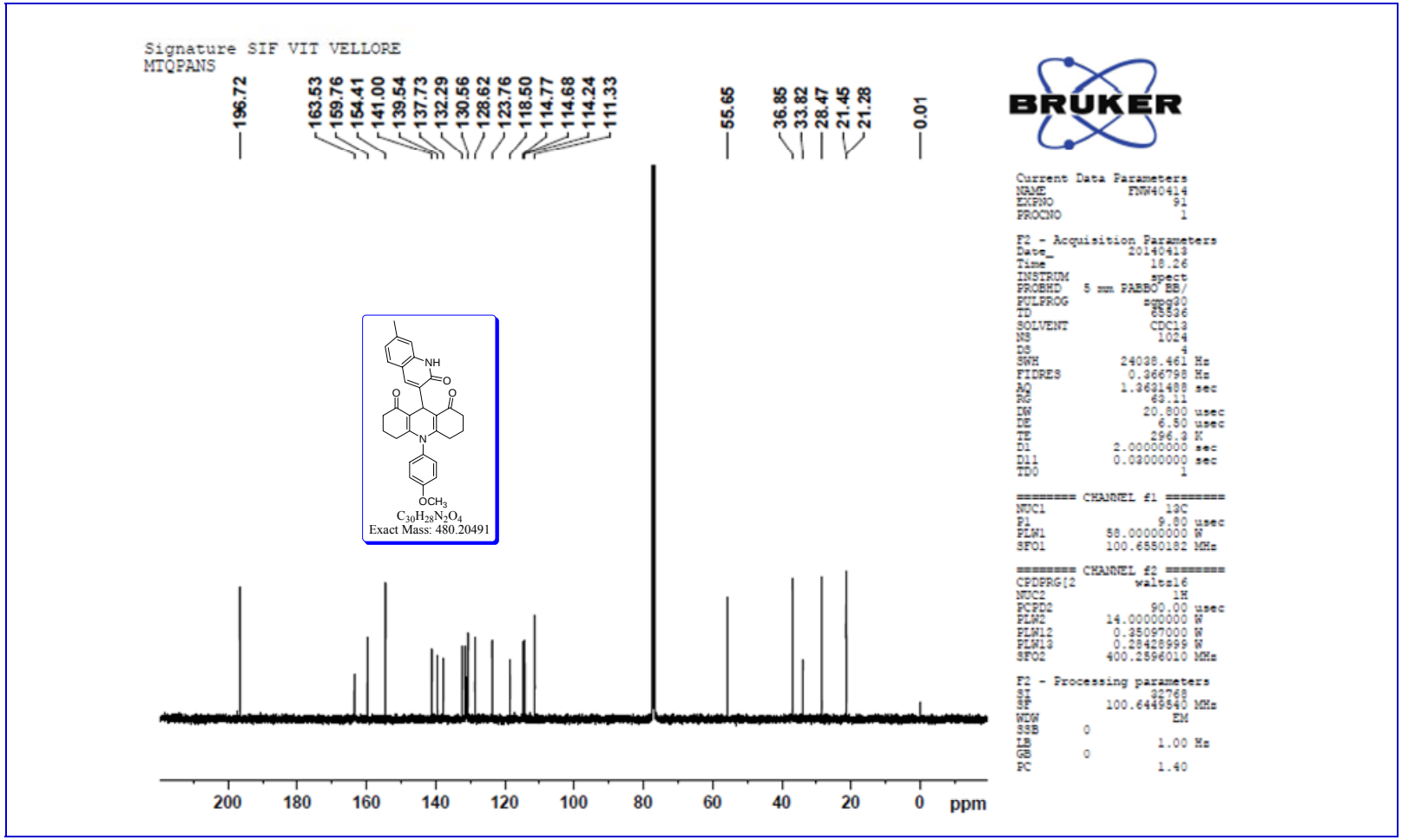

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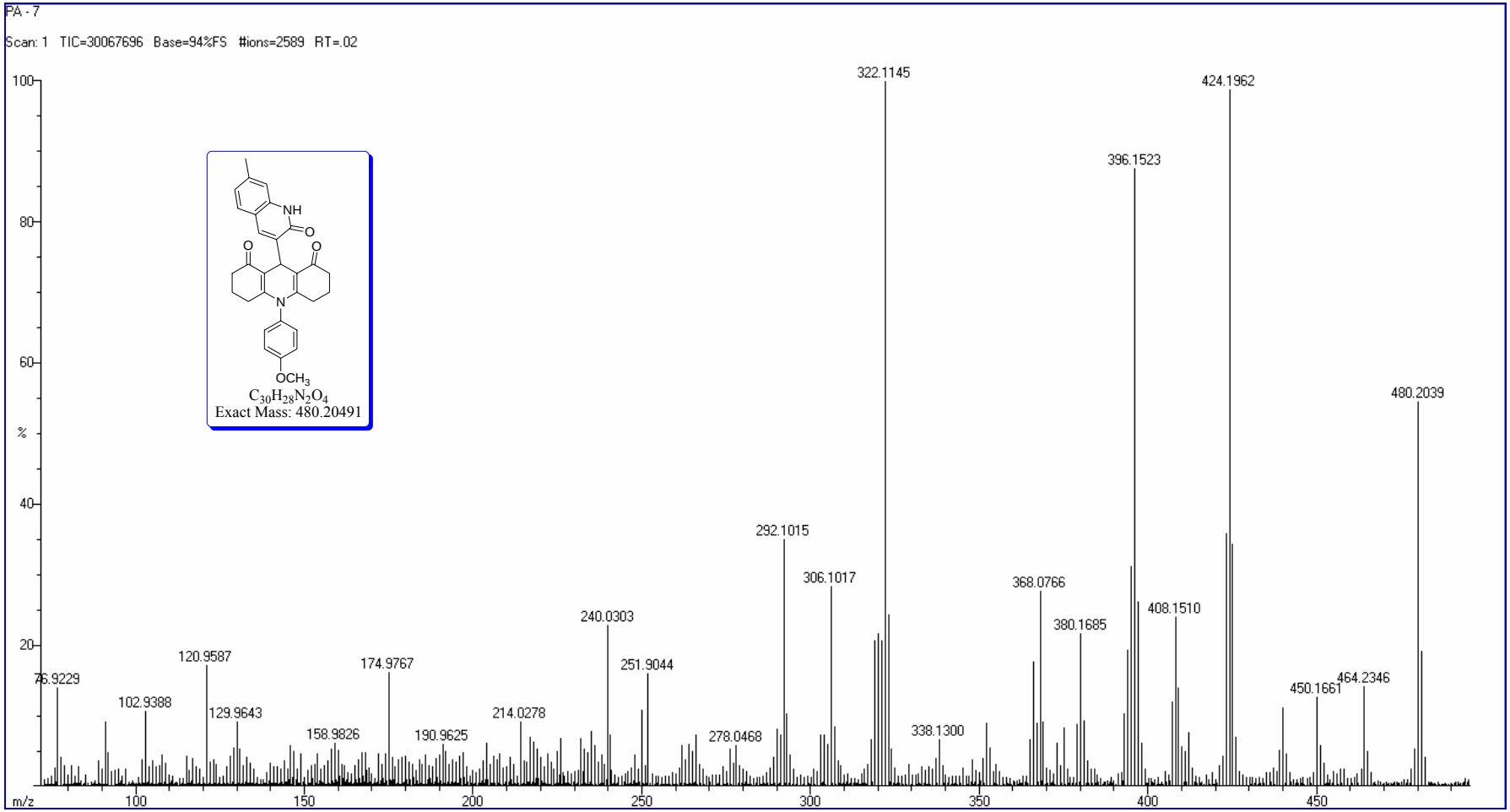

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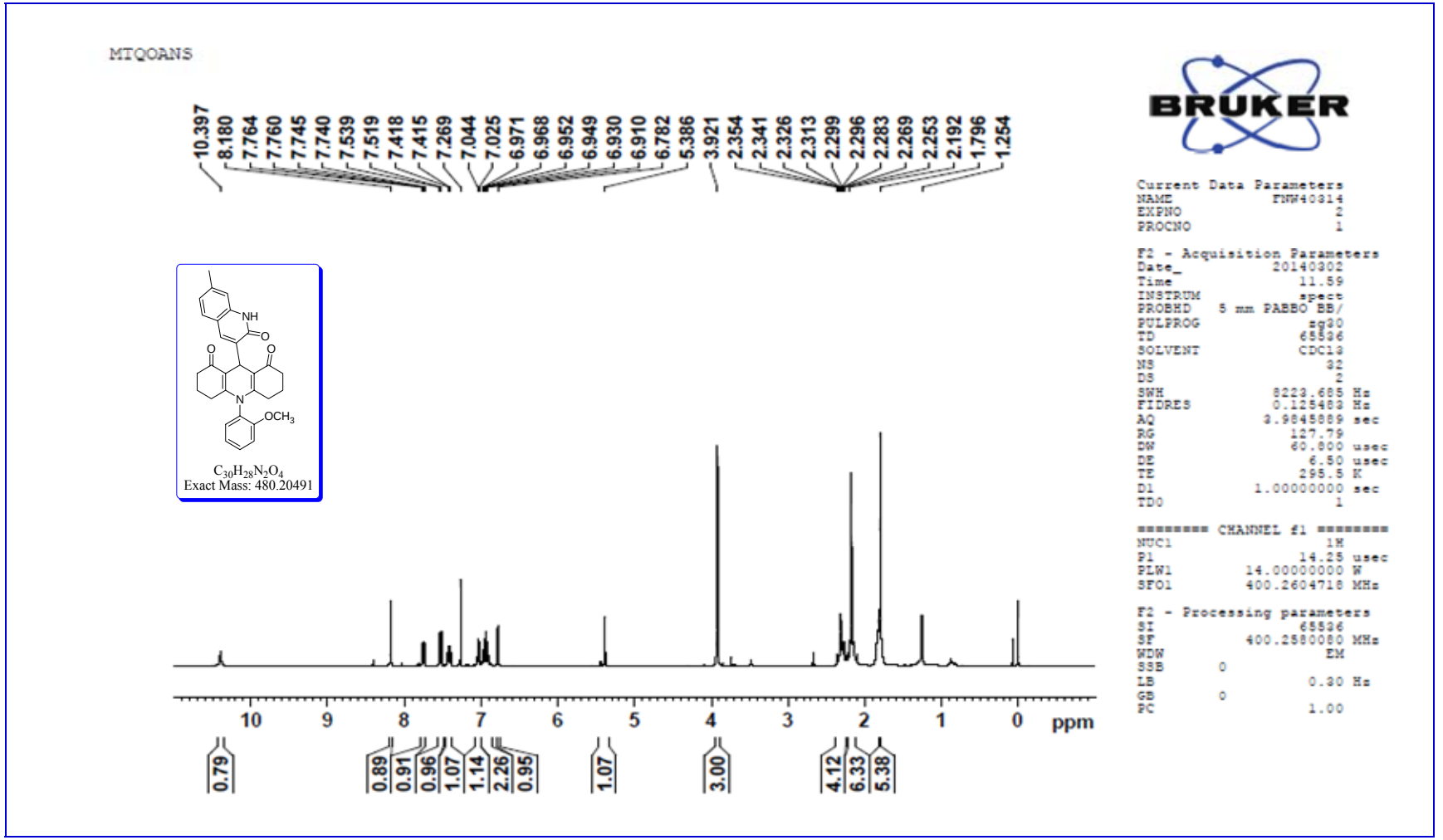

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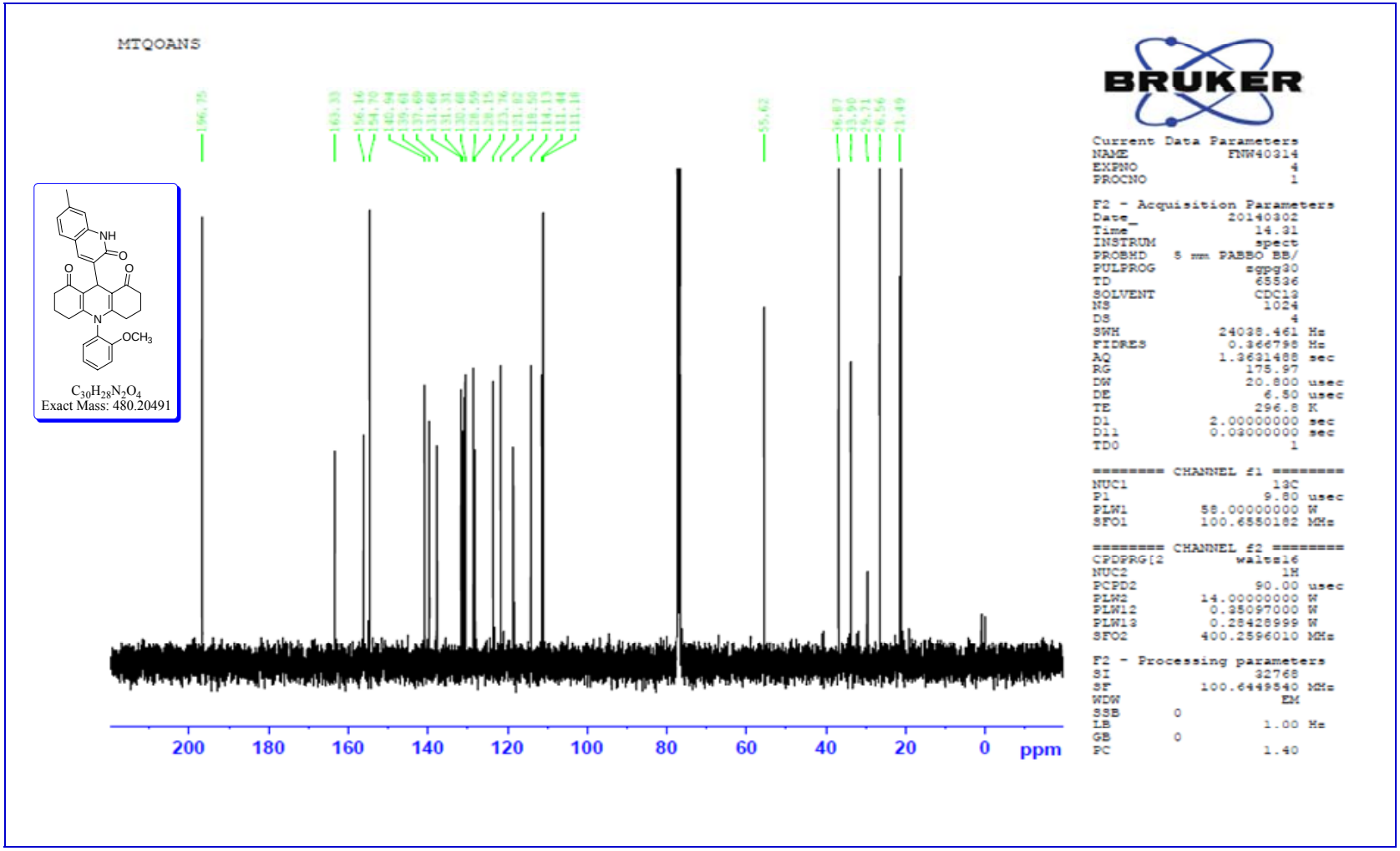

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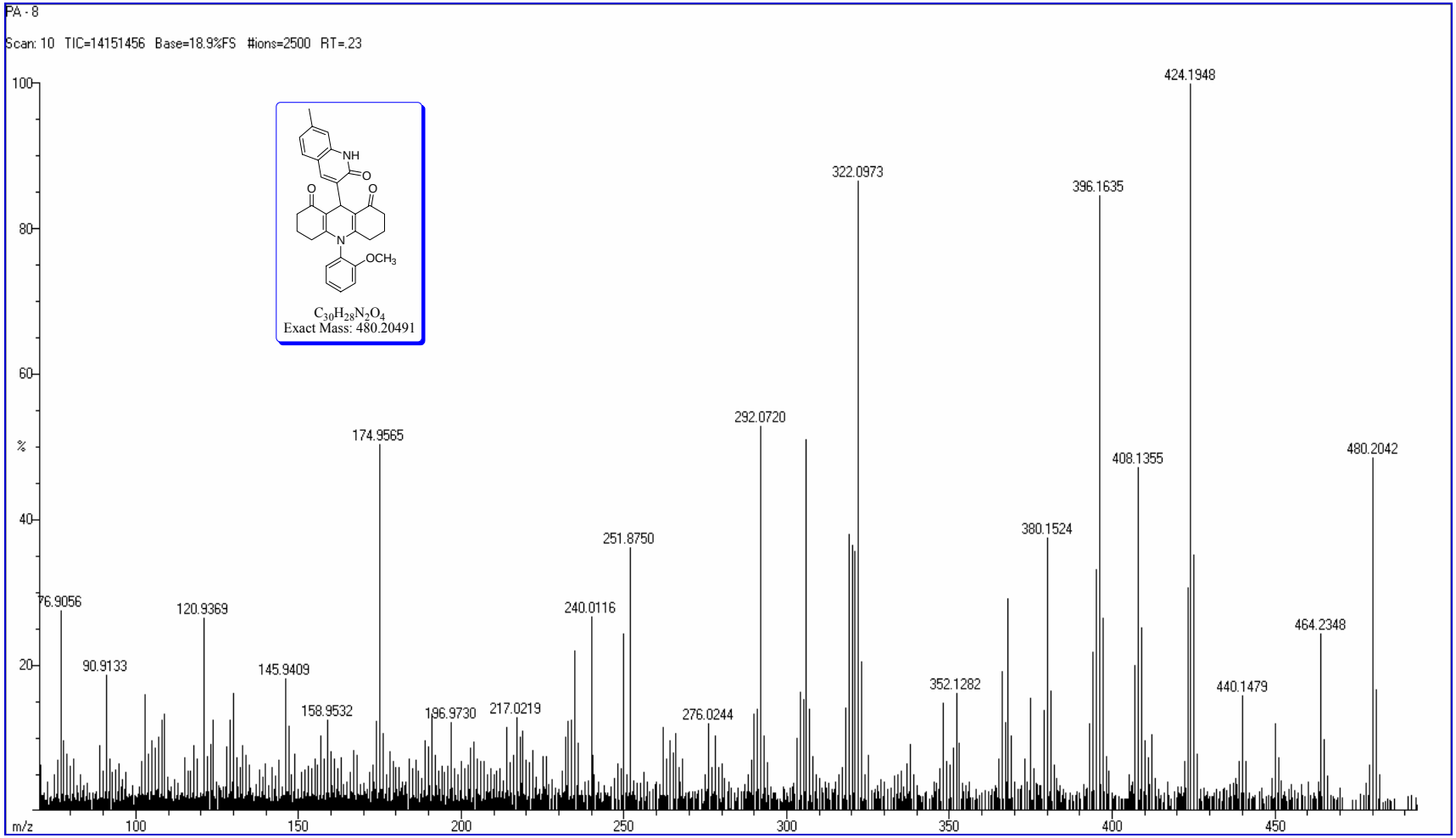

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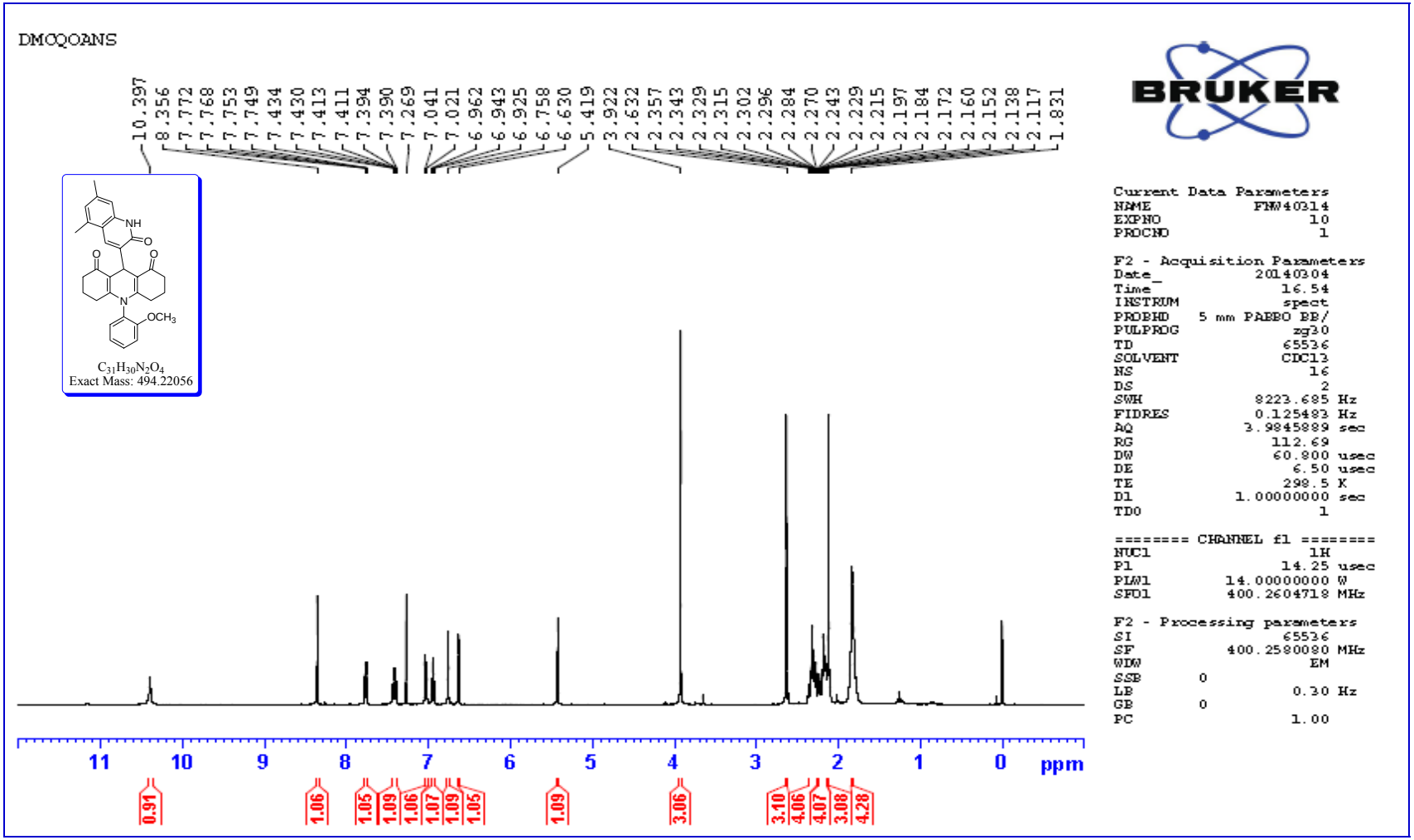

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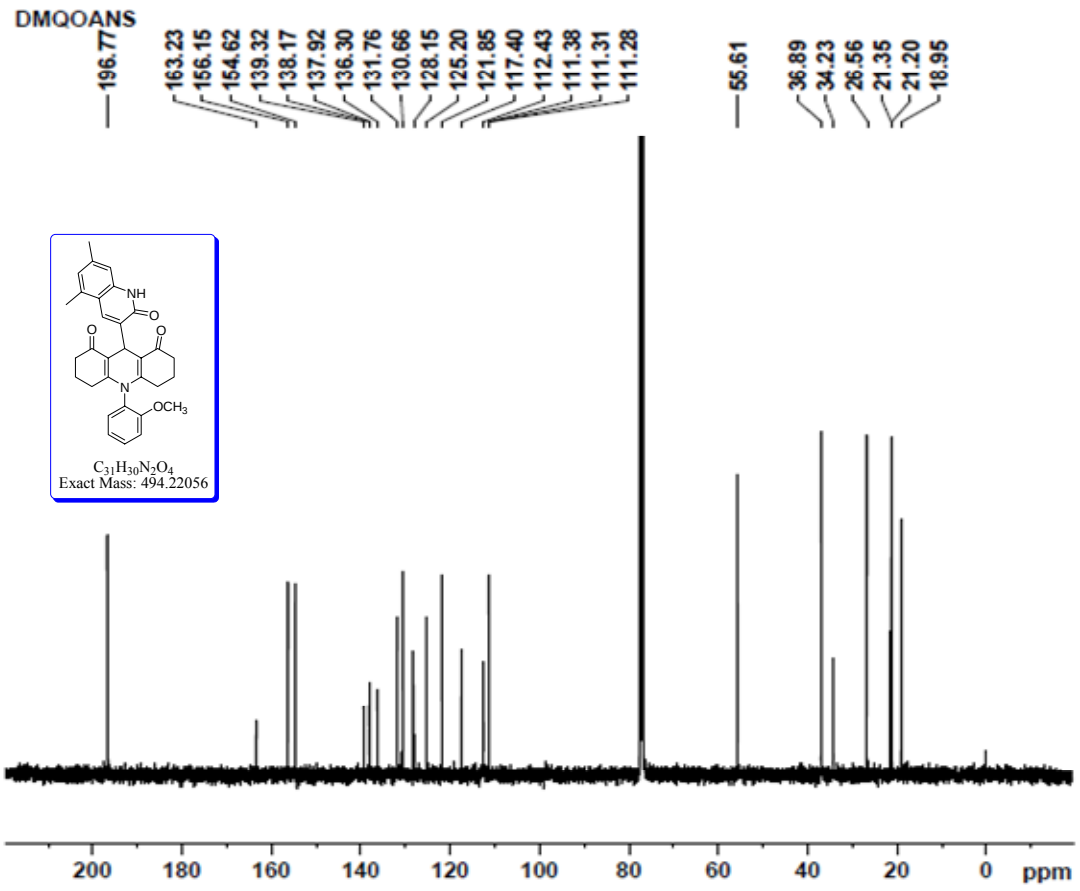


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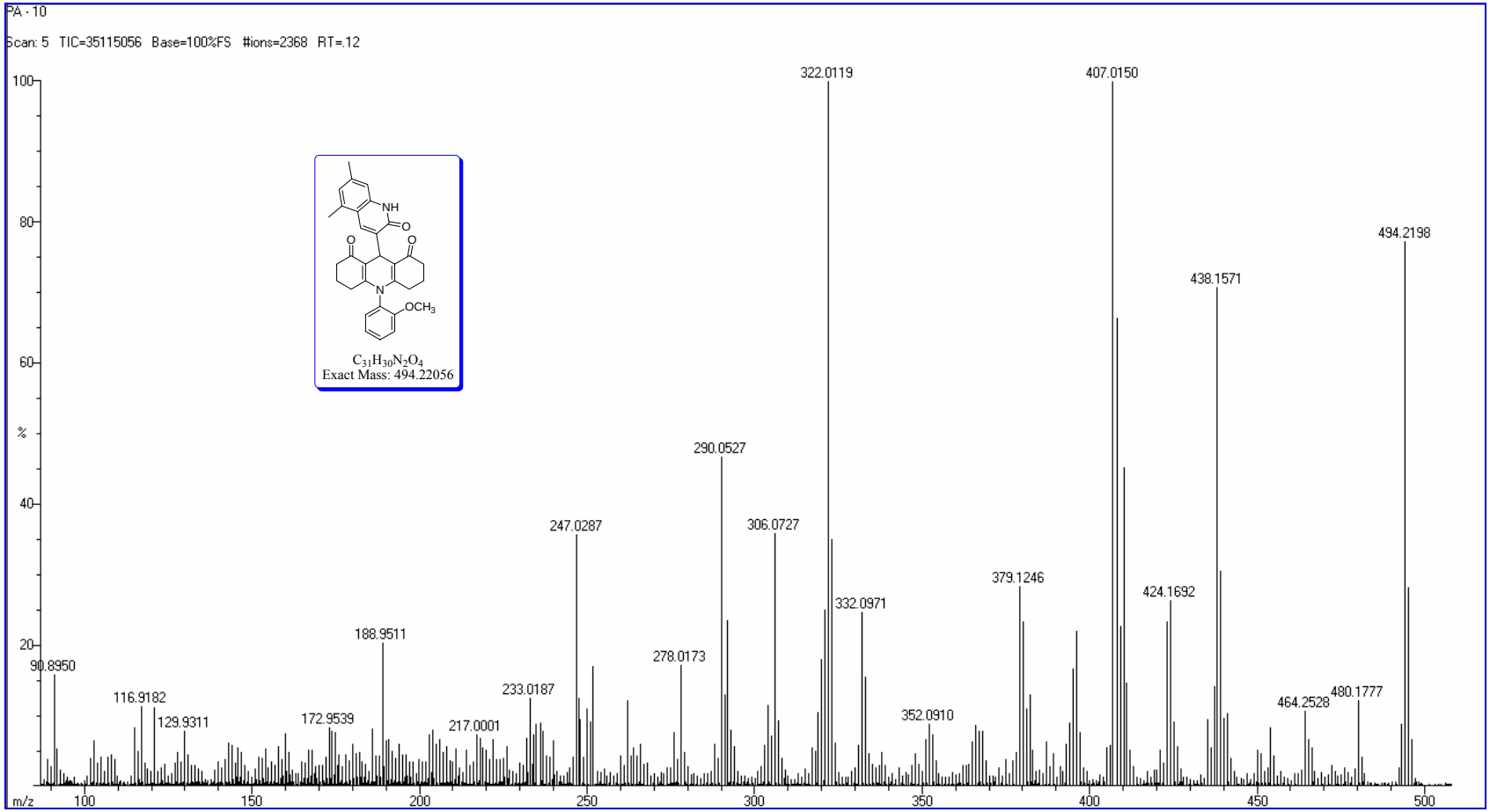
C^{13} NMR of 3,4,6,7-tetrahydro-9-(1,2-dihydro-5,7-dimethyl-2-oxoquinolin-3-yl)-10-(2-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (4i)



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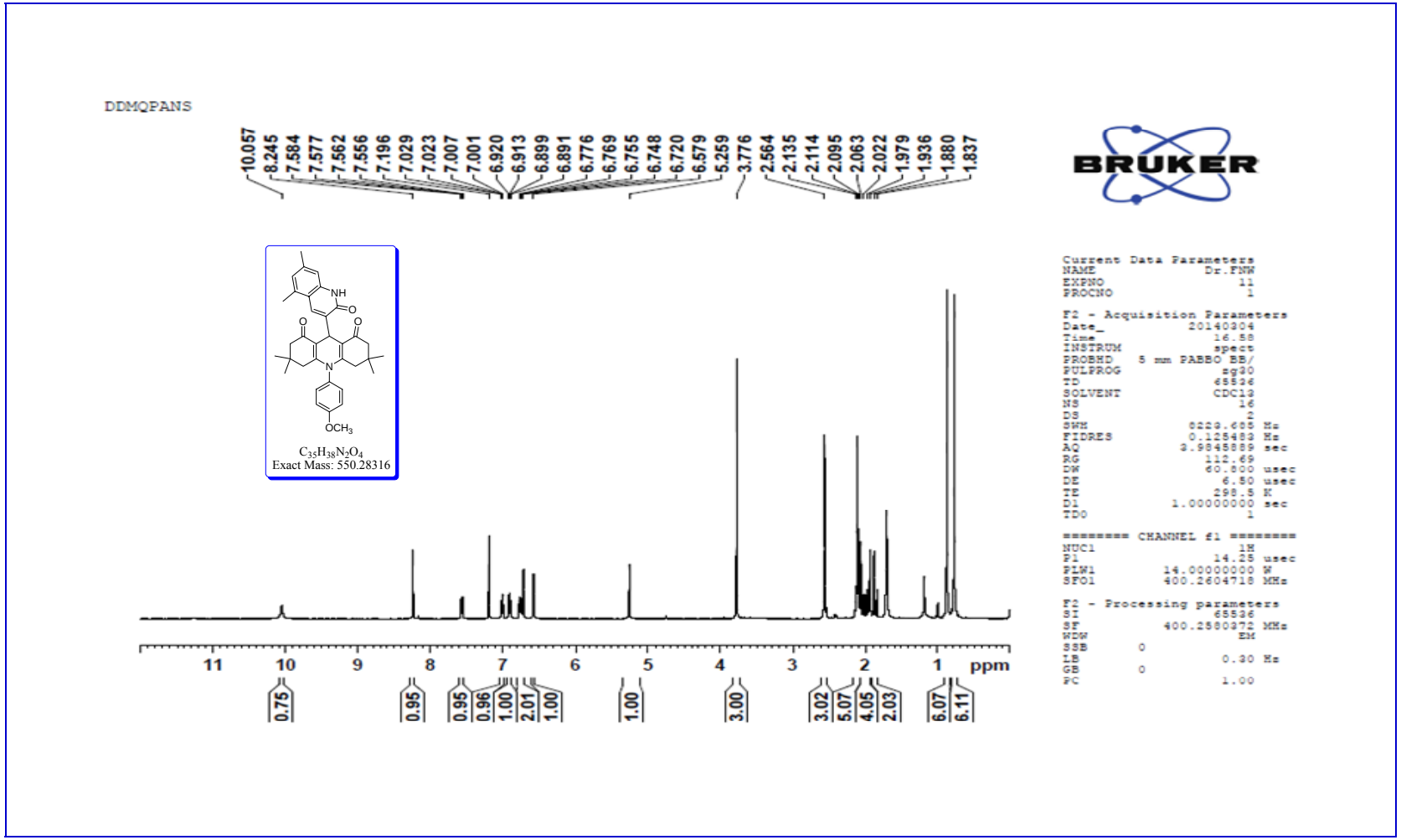

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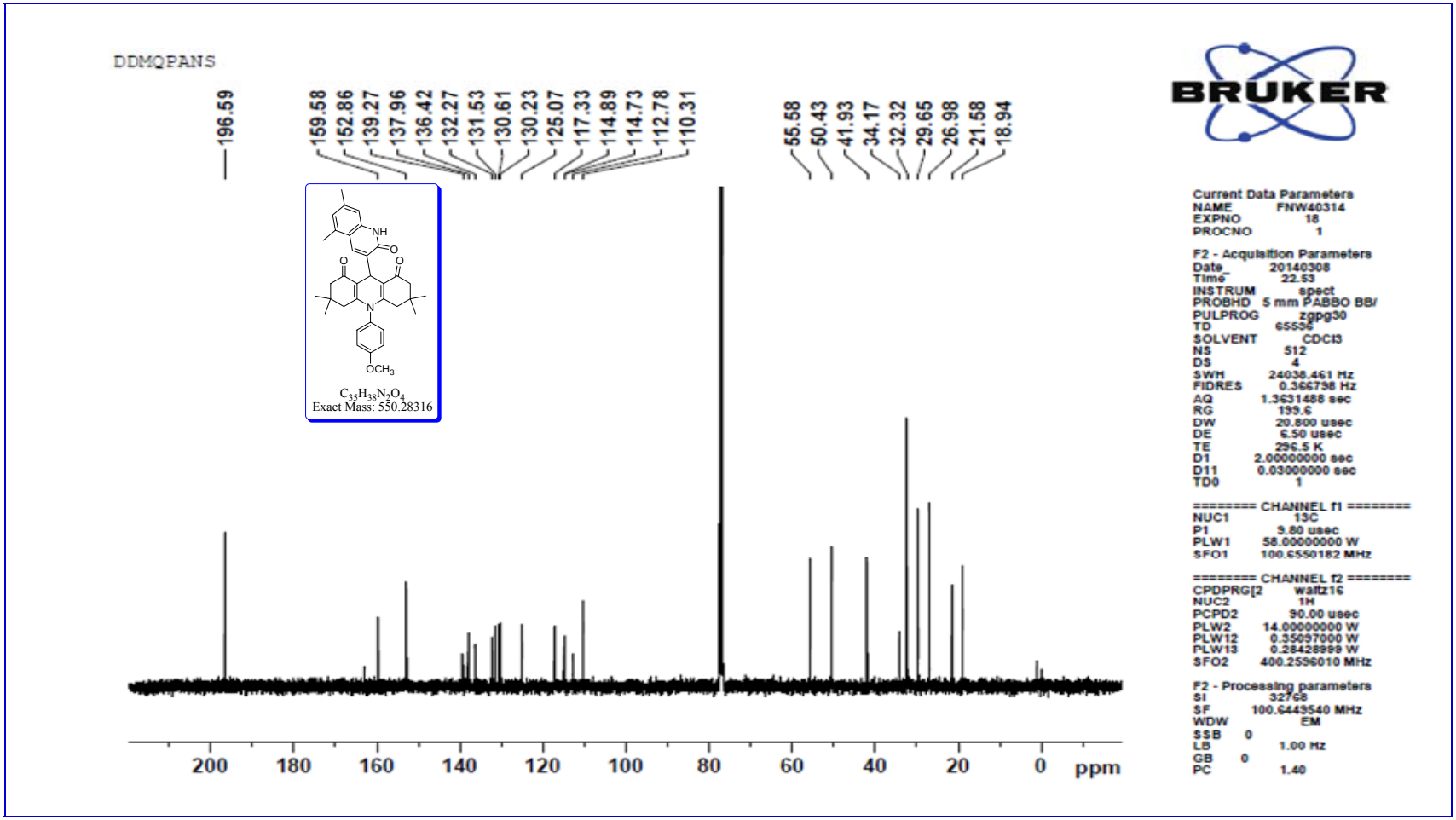

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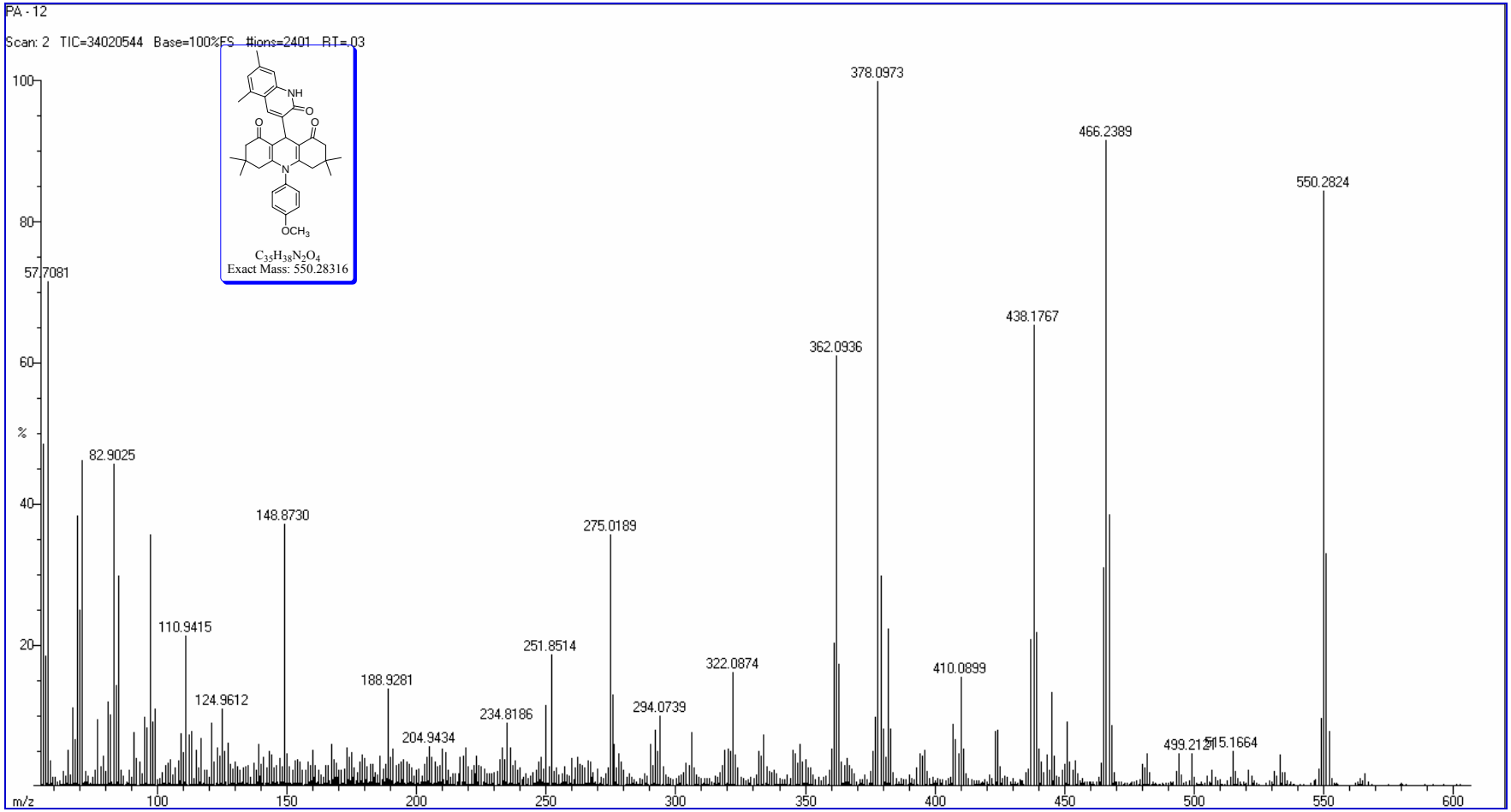

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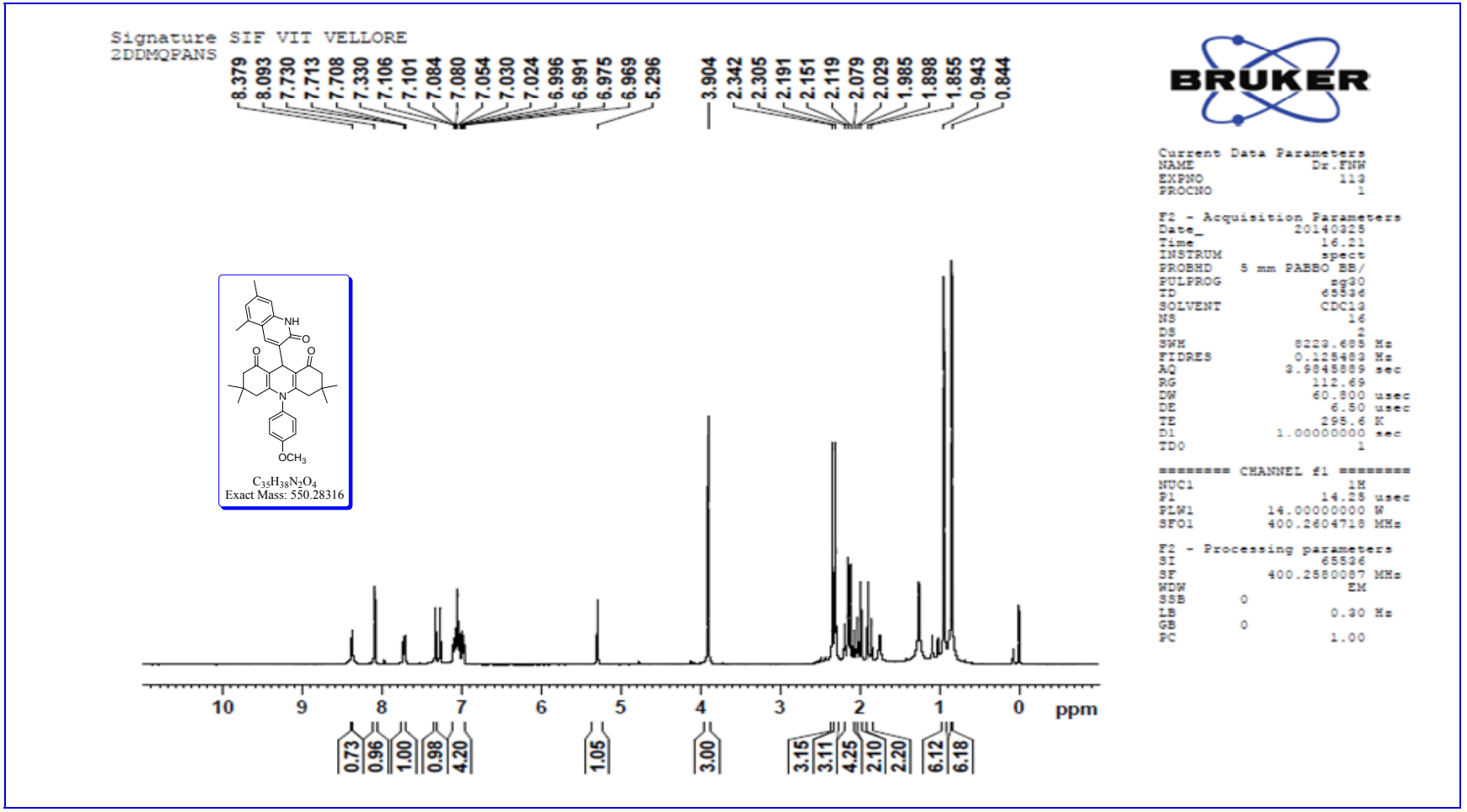

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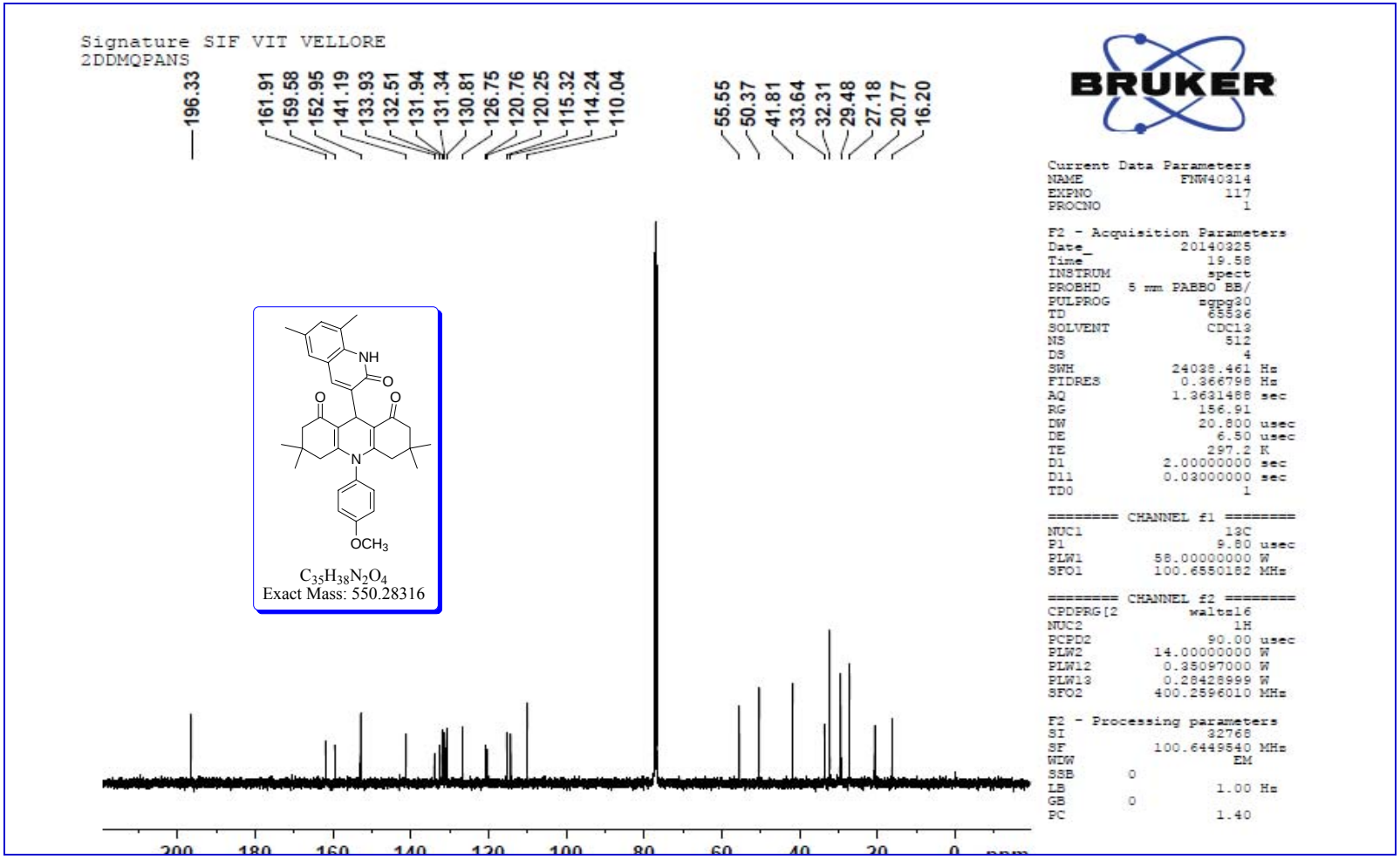

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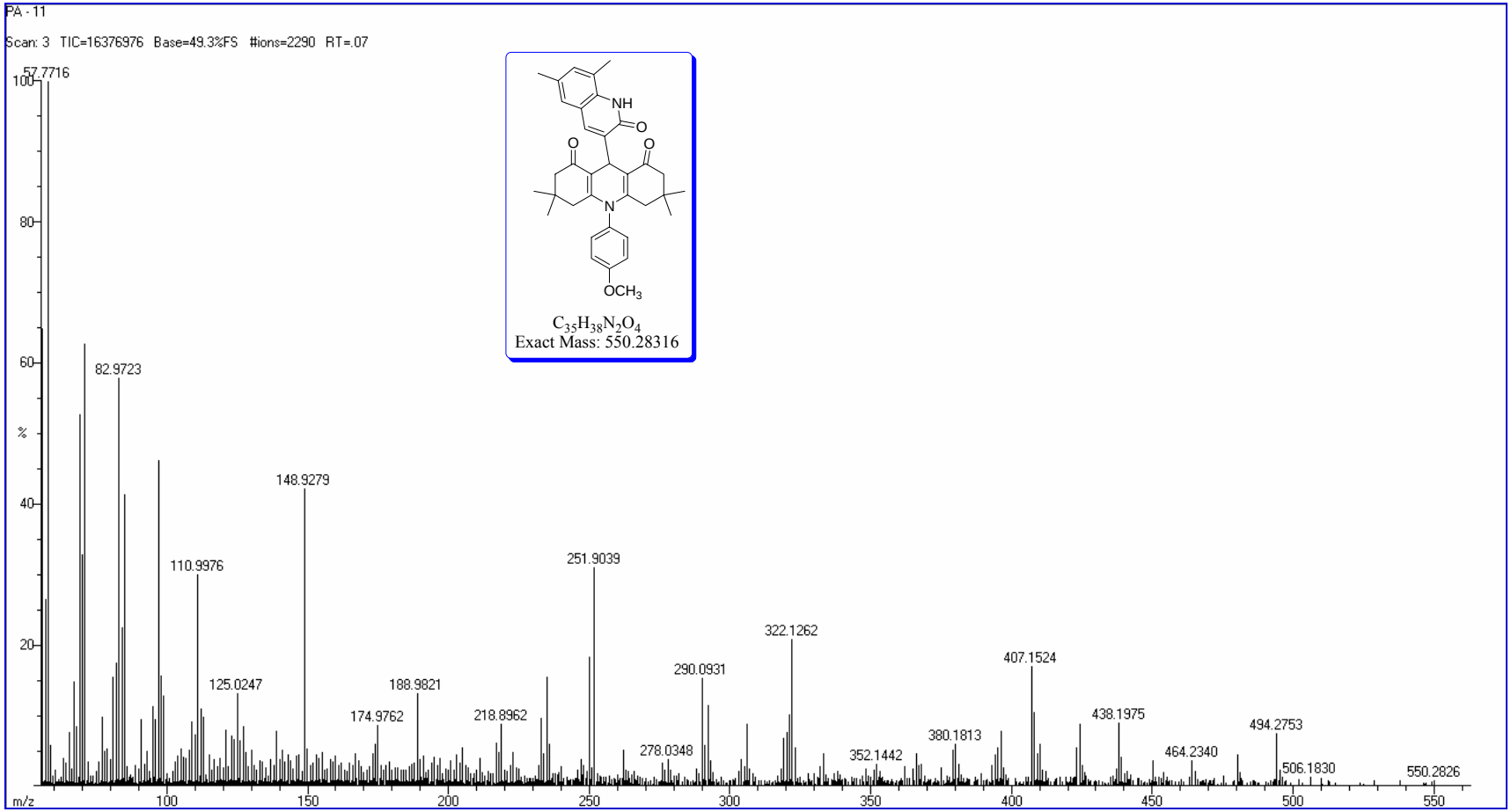

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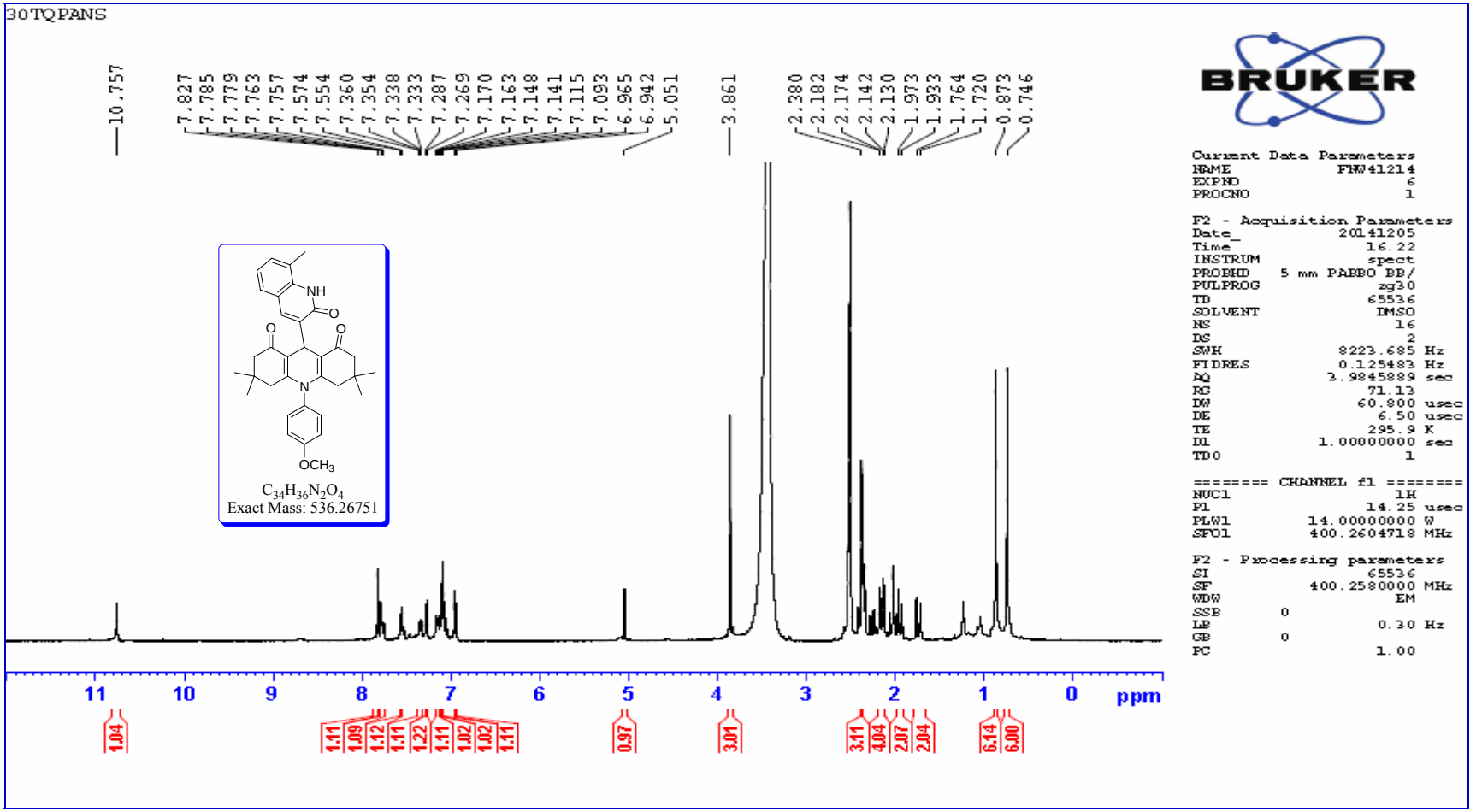

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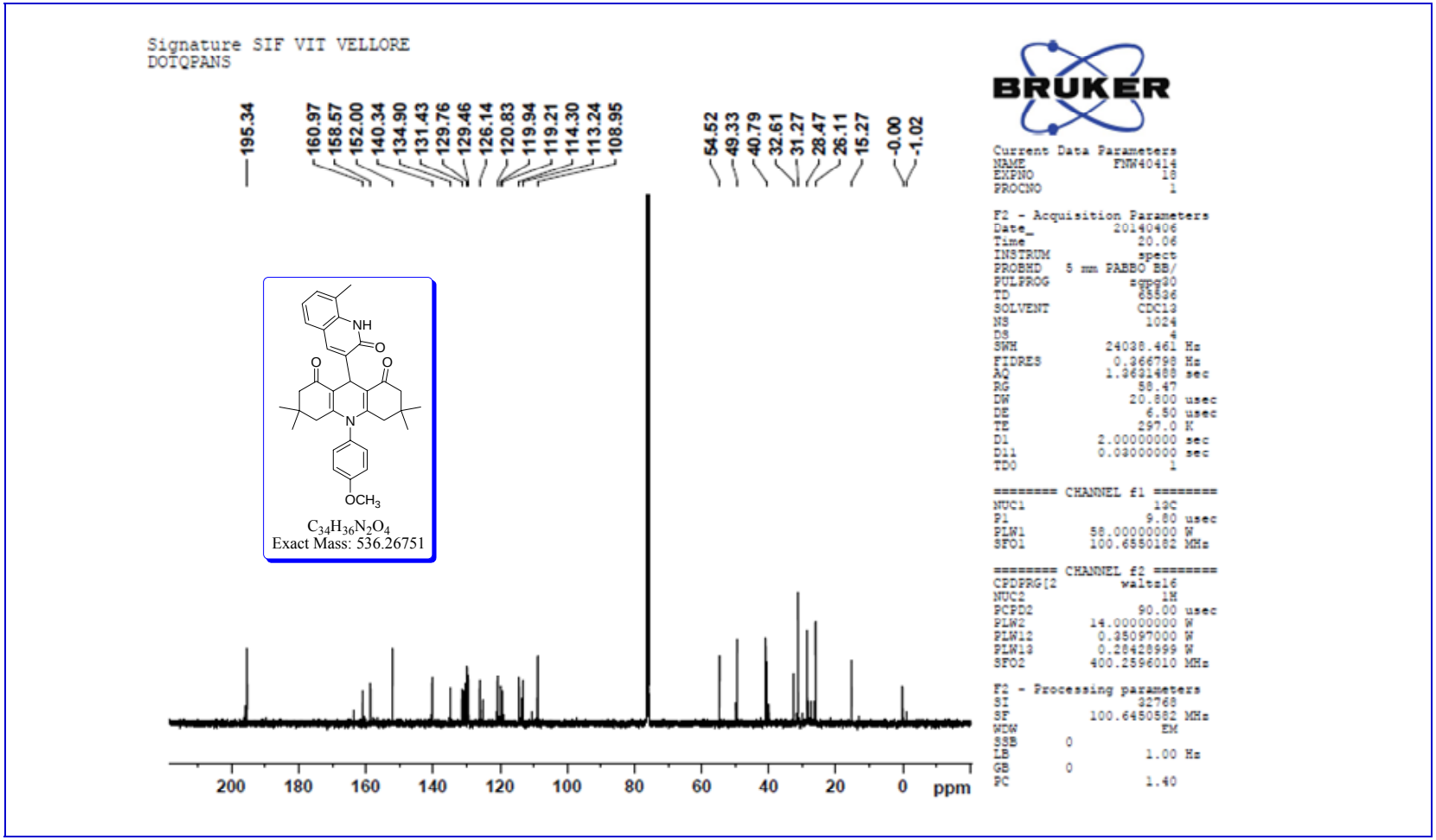

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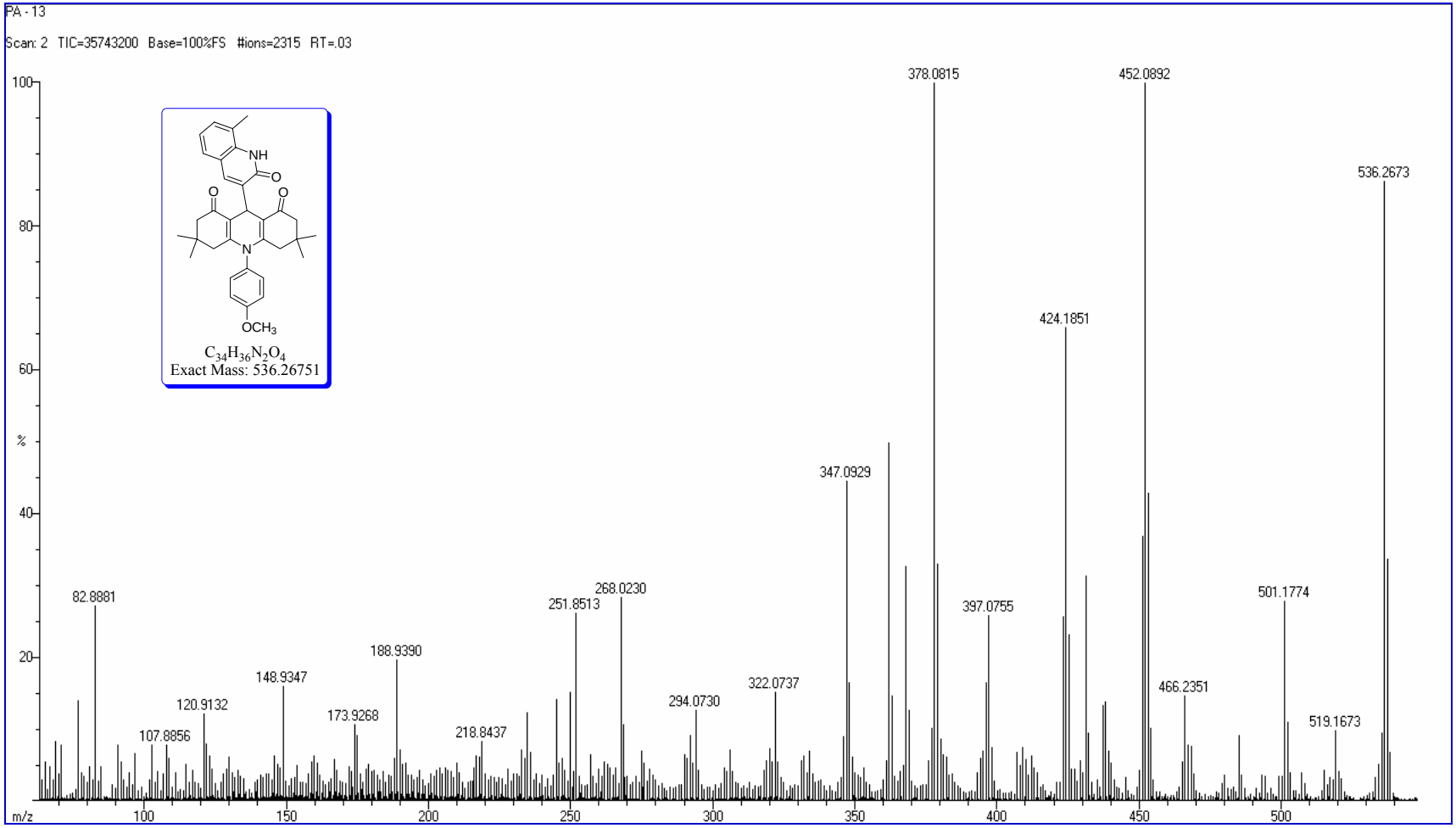

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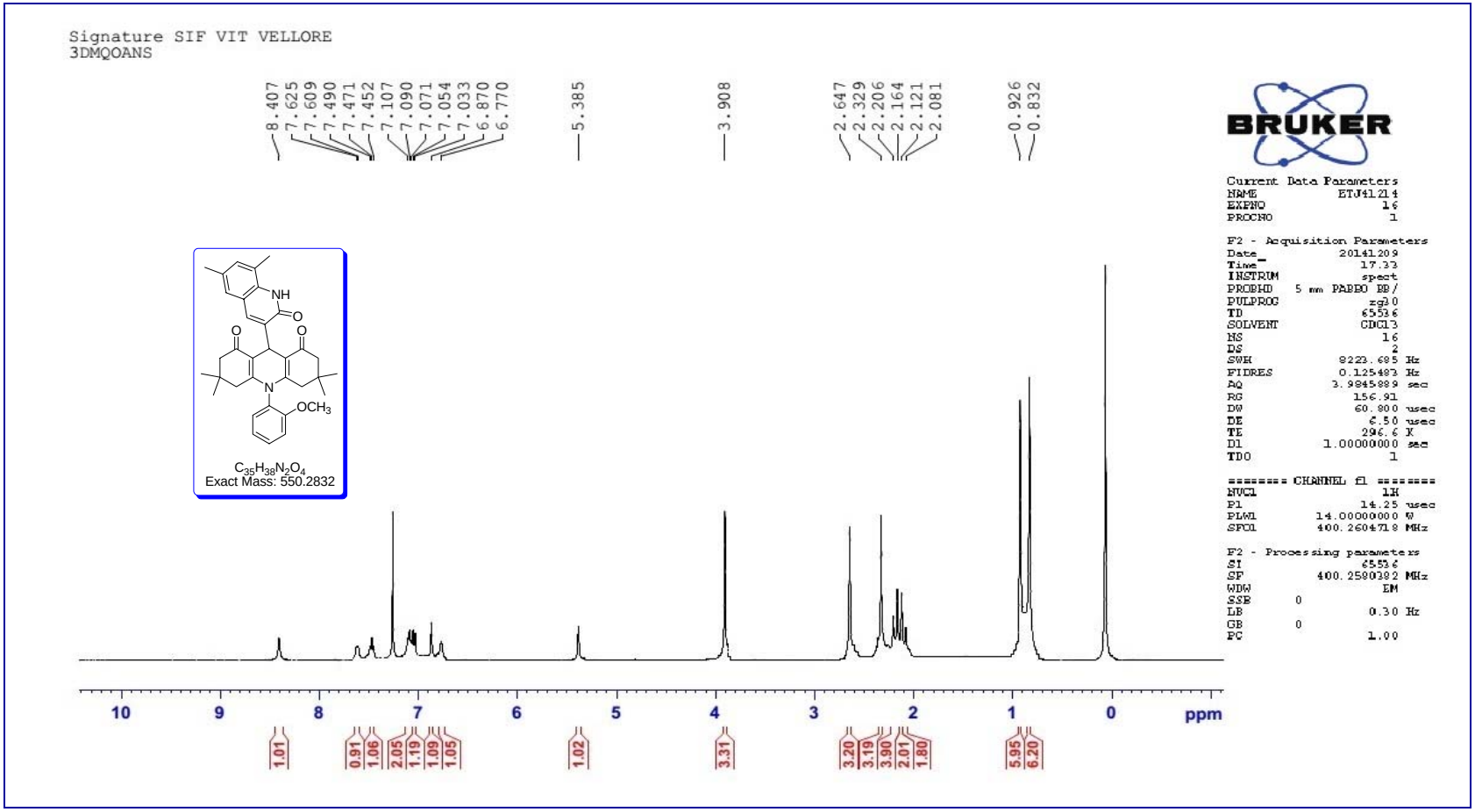

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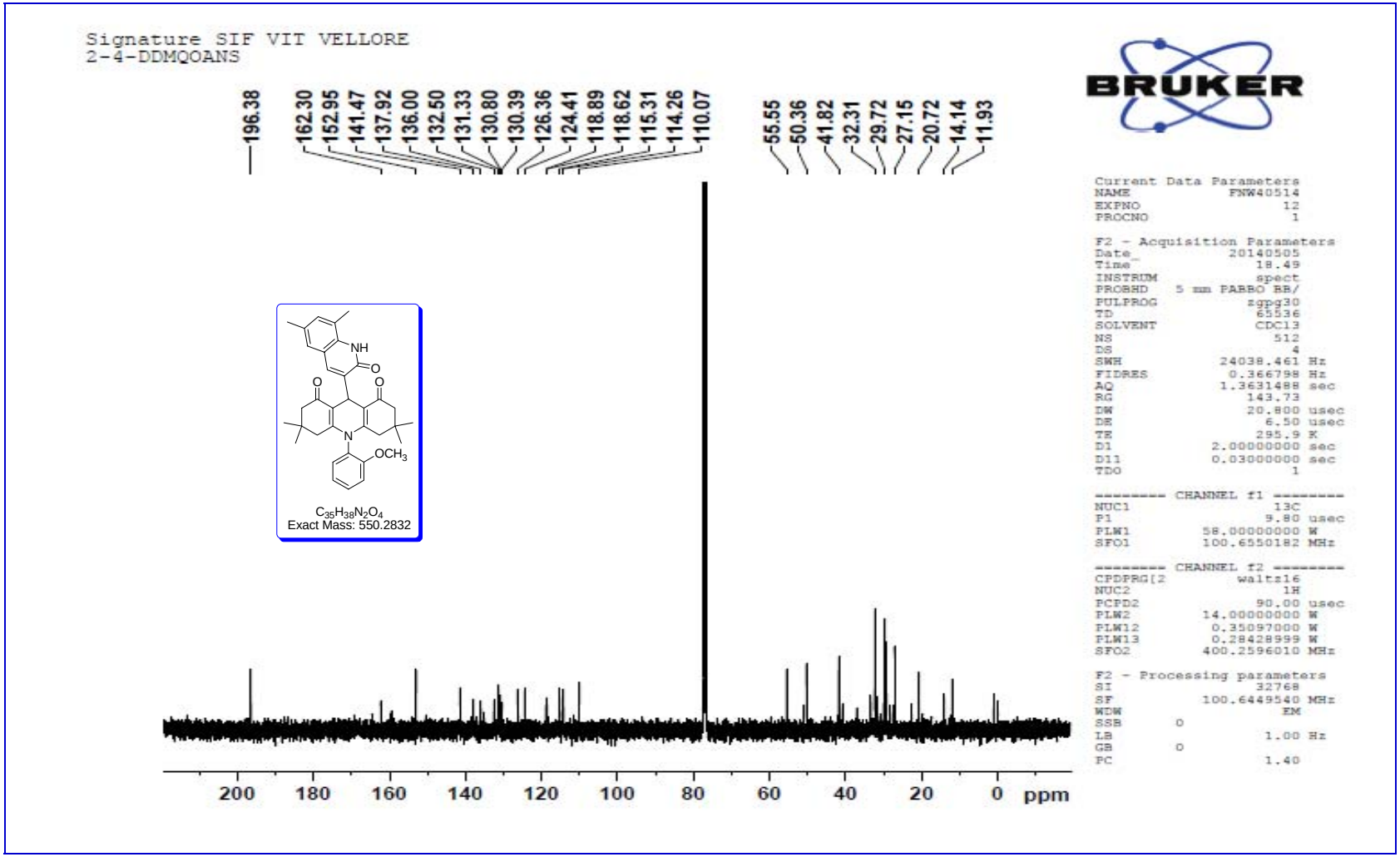

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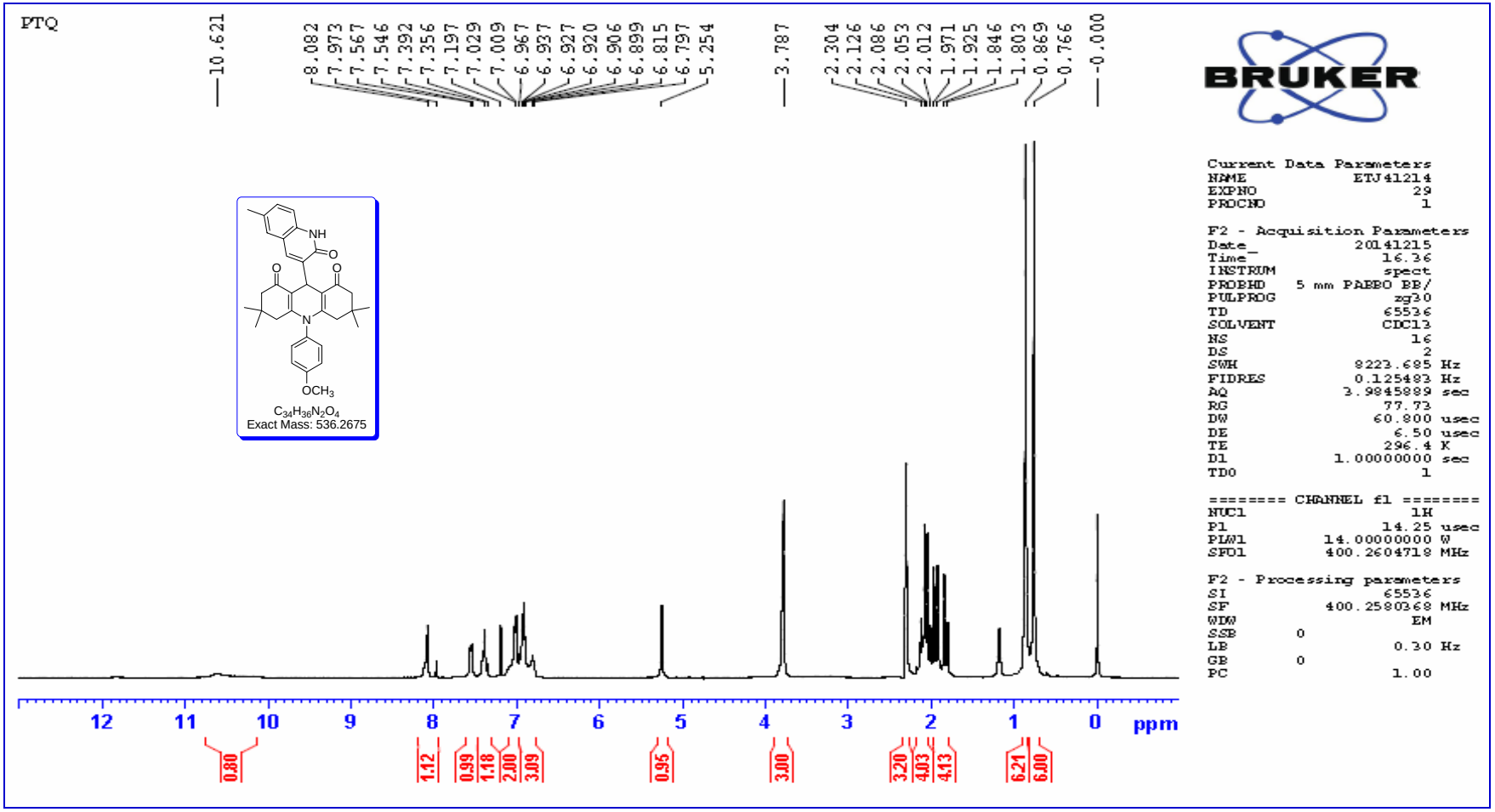

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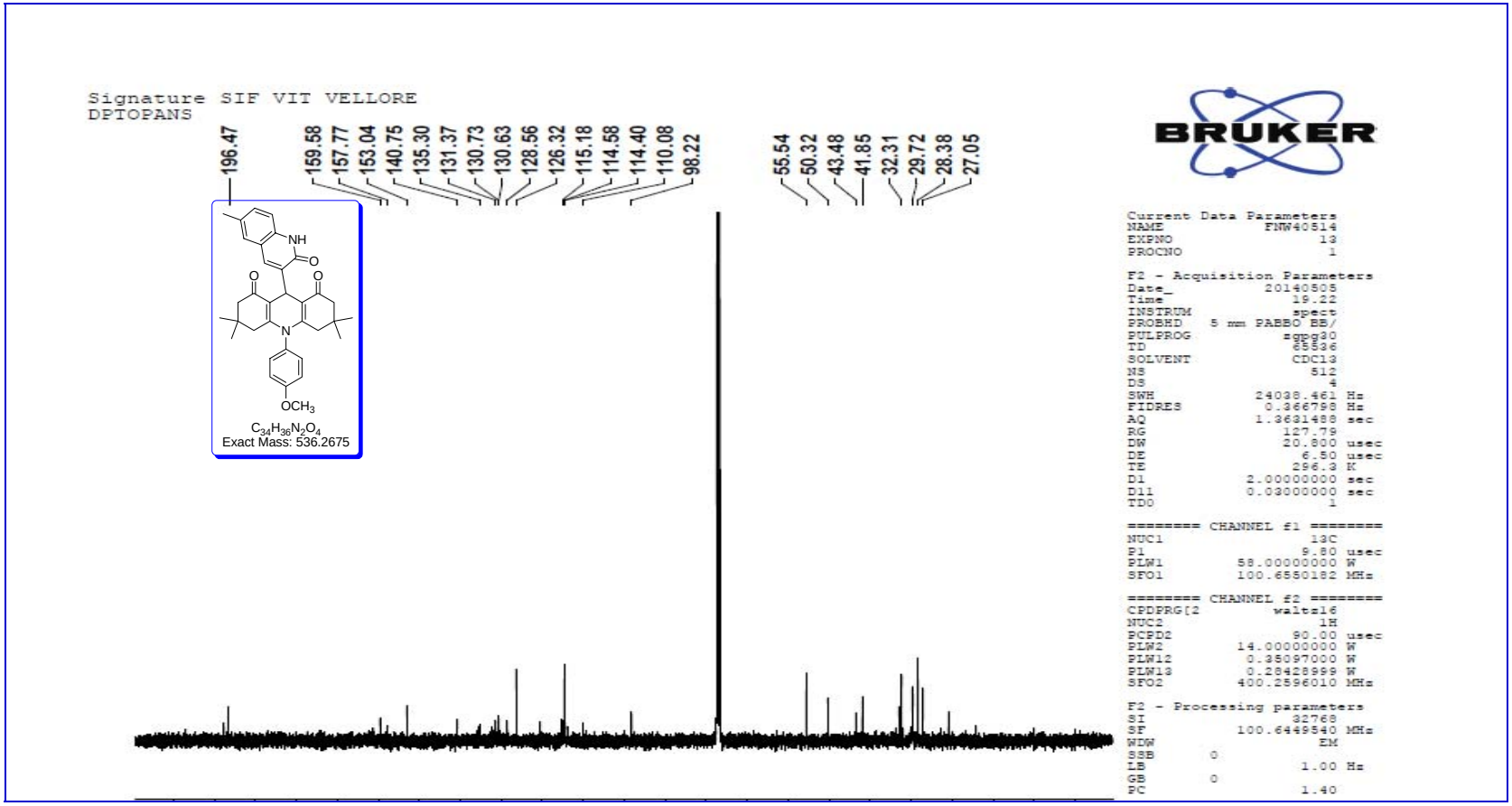

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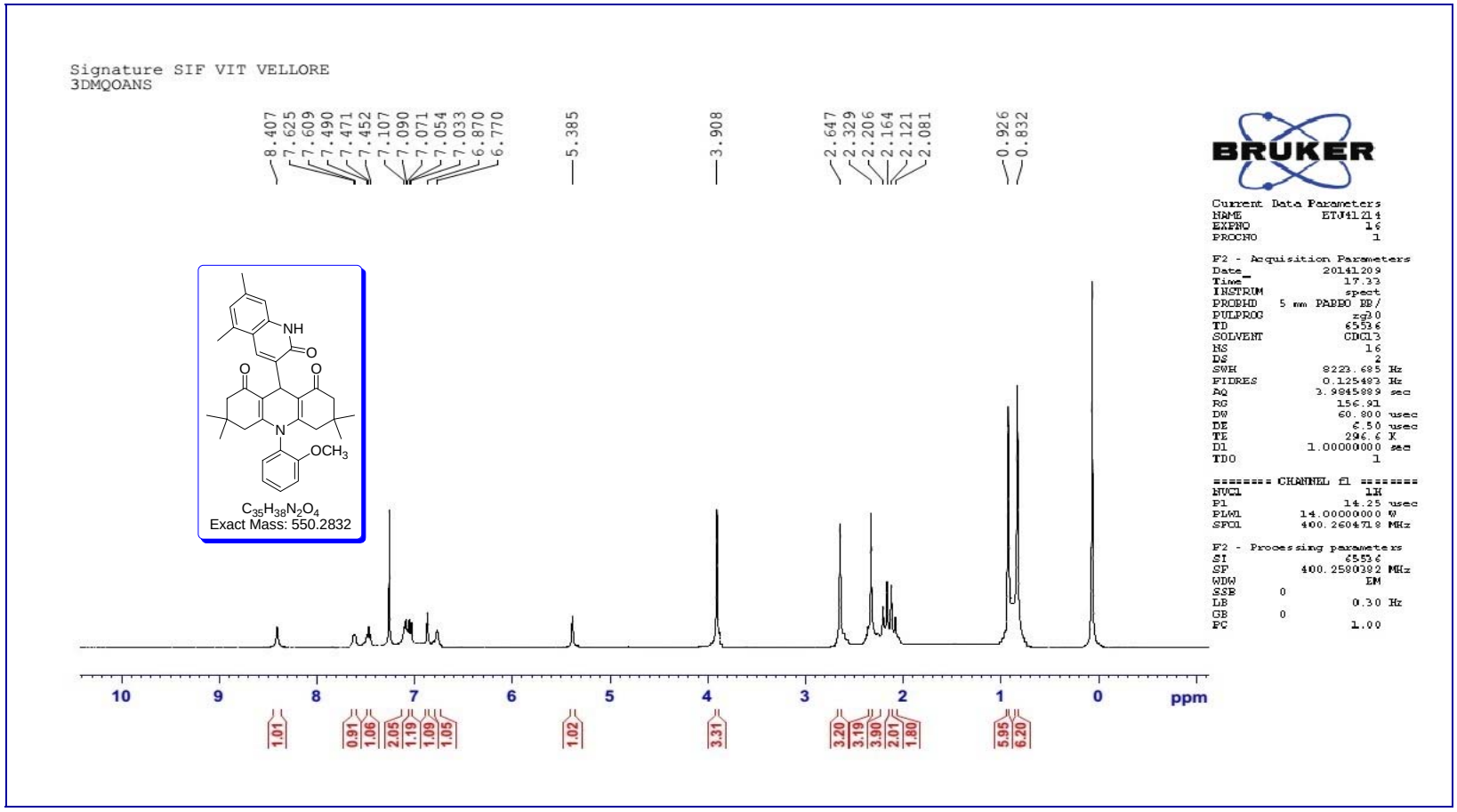

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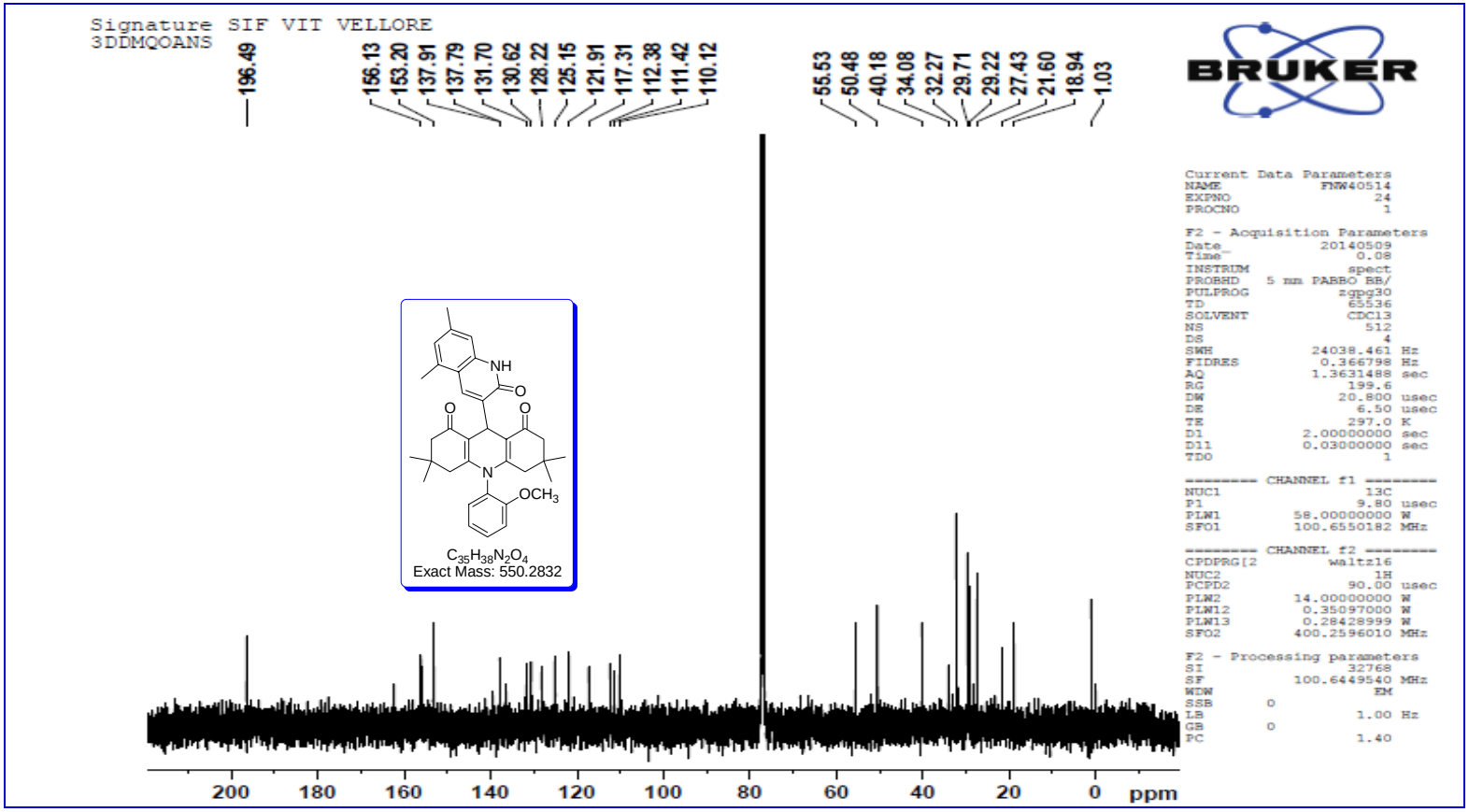


^{13}C NMR of 3,4,6,7-tetrahydro-9-(1,2-dihydro-5,7-dimethyl-2-oxoquinolin-3-yl)-10-(2-methoxyphenyl)-3,3,6,6-tetramethylacridine-1,8(2H,5H,9H,10H)-dione (4o)

9,10-dihydro-12-(pyridin-2yl)-8H-benzo[a]xanthen-11(12H)-one (7a)

White solid, Yield (80%), mp 260-262 $_{o}$C $_{1}$H NMR (400 MHz, $CDCl_3$) δ 8.42 - 8.40 (d, *J* = 4.8 Hz, 1H), 8.12-8.14 (d, *J* = 8.4 Hz, 1H), 7.73-7.77 (t, *J* = 17.6 Hz, 2H), 7.51-7.57 (m, 2H), 7.41-7.45 (t, *J* = 15.8 Hz, 1H), 7.25 – 7.38 (m, 2H), 6.96-6.93 (t, *J* = 13.2 Hz, 1H), 6.98 - 7.00 (d, *J* = 7.2 Hz, 1H), 5.40 (s, 1H), 2.25 - 2.35 (m, 4H), 5.87 (s, 1H), 2.79-2.85 (m, 1H), 2.65-2.73 (m, 1H), 2.35-2.49 (m,2H), 2.02-2.10 (m,1H), 1.96-2.01(m, 1H); $_{13}$C NMR (100MHz, $CDCl_3$) δ 197.40, 166.80, 163.34, 149.63, 147.82, 136.36, 131.69, 132.56, 129.07, 128.63, 127.09, 125.00, 123.74, 123.72, 121.49, 117.51, 117.25, 114.13, 37.97, 37.26, 20.05, 20.63ppm.

9,10-dihydro-12-(4-methoxyphenyl)-8H-benzo[a]xanthen-11(12H)-one (7b)

White solid, Yield (83%), mp 178-166 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.86 -7.89 (d, *J* = 8.4 Hz, 1H), 7.66-7.70 (t, 2H), 7.23-7.36 (m, 3H), 7.15-7.17 (d, *J* = 8.8 Hz, 2H), 6.61- 6.63 (d, *J* = 8.4 Hz, 2H), 5.61 (s, 1H), 2.57-2.67 (m, 2H), 2.54-2.47 (m, 2H), 1.89-1.98 (m, 2H): ^{13}C NMR (100MHz, CDCl3) δ 197.39, 165.61, 158.04, 147.93, 137.67, 131.70, 131.55, 129.64, 128.43, 128.58, 127.15, 125.06, 123.93, 118.11, 117.18, 115.95, 113.84, 55.30, 37.29, 33.97, 27.93, 20.53ppm

12-(4-chlorophenyl)-9,10-dihydro-8H-benzo[a]xanthen-11(12H)-one (7c)

White solid, Yield (88%), mp 179-181 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.86-7.88 (d, *J* = 8.4 Hz, 1H), 7.76-7.77 (m, 2H), 7.36-7.44 (m, 2H), 7.31-7.34 (d, , *J* = 9.2 Hz, 1H), 7.25 (s, 2H), 7.14 – 7.22 (d, *J* = 8.4 Hz, 2H), 5.79 (s, 1H), 2.64-2.77 (m, 2H), 2.38-2.62 (m, 2H), 1.92- 2.33 (m, 2H): ^{13}C NMR (100MHz, CDCl3) δ 197.30, 165.97, 147.95, 143.73, 132.16, 131.72, 131.40, 130.08, 129.32, 128.69, 128.64, 127.33, 125.24, 123.70, 117.27, 117.19, 115.33, 37.23, 34.34, 27.94, 20.48p

9,10-dihydro-12-p-tolyl-8H-benzo[a]xanthen-11(12H)-one (7d)

White solid, Yield (79%), mp 196-198 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.96-7.98 (d, *J* = 8.4 Hz, 1H), 7.74-7.78 (m, 2H), 7.40-7.44 (t, *J* = 14.8 Hz 1H), 7.31-7.38 (m, 2H), 7.21- 7.26 (m, 2H), 6.97-6.99 (d *J* = 7.6 Hz, 2H), 5.70 (s, 1H), 2.66-2.72 (m, 2H), 2.33-2.48 (m, 2H), 2.20 (s, 3H), 1.94-2.07 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 197.30, 165.97, 147.95, 143.95, 143.73, 132.16, 131.72, 131.40, 130.08, 129.32, 128.69, 128.64, 127.33, 125.24, 123.70, 117.27, 117.19, 115.33, 37.23, 34.34, 27.94, 20.48ppm.

9,10-dihydro-12-(thiophen-2-yl)-8H-benzo[a]xanthen-11(12H)-one (7e)

White solid, Yield (84%), mp 188-190 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 8.00-8.02 (d, *J* = 9.2 Hz, 1H), 7.76-7.78 (m, 2H), 7.38-7.48 (m, 2H), 7.24-7.31 (m,1H), 6.99- 7.01 (m, 1H), 6.74-6.75 (t, *J* = 5.2 Hz, 2H), 6.05 (s, 1H), 2.61-2.76 (m, 2H), 2.50-2.55 (m, 1H), 2.44-2.36 (m, 1H), 2.05-2.06 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 197.06, 166.24, 148.82, 147.75, 131.42, 131.40, 129.16, 128.45, 127.20, 126.40, 125.09, 125.05, 124.10, 123.55, 117.16, 117.05, 114.99, 36.99, 29.29, 27.72, 20.33ppm.

9,10-dihydro-12-phenyl-8H-benzo[a]xanthen-11(12H)-one (7f)

White solid, Yield (81%), mp 169-170 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.95-7.97 (d, *J* = 8.3 Hz, 1H), 7.75-7.78 (t, *J* = 5.6 Hz, 2H), 7.40-7.74 (m, 1H), 7.36-7.38 (dd, *J* = 7.9, 1.0 Hz, 1H), 7.32-7.34 (d, *J* = 8.5 Hz , 3H), 7.15-7.19 (t, *J* = 7.4 Hz, 2H), 7.04-7.08 (t, *J* = 7.2 Hz, 1H) 5.74 (s, 1H), 2.62-2.78 (m, 2H), 2.33-2.49 (m, 2H), 1.94-2.08 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 197.08, 165.62, 147.80, 143.06, 131.51, 131.41, 129.84, 128.50, 128.30, 128, 28, 127.26, 124.90, 117.71, 117.73, 116.99, 115.58, 37.06, 34.65, 27.76, 20.30ppm.

7-(4-chlorophenyl)-10,11-dihydro-7H-benzo[c]xanthen-8(9H)-one (7g)

White Solid, Yield (75%), mp 203-205 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.85 - 7.87 (d, *J* = 8.3 Hz, 1H), 7.75-7.78 (m, 2H), 7.35-7.43 (m, 2H), 7.30-7.32 (d, *J* = 8.9 Hz, 1H), 7.23-7.24 (d, *J* = 1.7 Hz, 2H), 7.10-7.12 (d, *J* = 8.4 Hz, 2H) 5.69 (s, 1H), 2.60-2.76 (m, 2H), 2.32-2.48 (m, 2H) 1.90-2.09 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 205.03, 145.32, 142.72, 133.29, 132.36, 131.33, 130.24, 128.66, 127.58, 127.42, 126.25, 125.72, 124.94, 121.43, 121.29, 119.25, 99.22, 59.13, 41.32, 37.36, 37.06ppm.

14-(p-methylphenyl)-14H-dibenzo[a.j]xanthene (7h)

White solid, Yield (88%), mp 92-95 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 8.30-8.32 (d, *J* = 8.0 Hz, 2H), 7.78-7.84 (m, 4H), 7.57-7.59 (t, , *J* = 8.4 Hz, 2H), 7.39-7.48 (m,6H), 7.08- 7.10 (d, 2H), 6.46 (s, 1H), 1.55 (s, 3H); ^{13}C NMR (100MHz, CDCl3) δ 148.70, 143.46, 132.09, 131.25, 131.06, 130.92, 129.099, 129.049, 129.10, 128.92, 128.70, 128.65, 126.92, 124.38, 122.41, 118.02, 116.76, 37.39ppm

14-(phenyl)-14H-dibenzo[a.j]xanthene (7i)

White solid, Yield (80%), mp 148-150 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 8.35-8.37 (d, *J* = 8.4 Hz, 2H), 7.70-7.84 (m, 4H), 7.45-7.57 (m, 6H), 7.36-7.39 (t, *J* = 14.8 Hz, 2H), 7.10- 7.13 (t, , *J* = 15.8 Hz, 2H), 6.94-6.98 (t, *J* = 14.4 Hz ,1H), 6.45 (s, 1H); ^{13}C NMR (100MHz, CDCl3) δ 14.74, 145.01, 131.47, 131.06, 129.68, 128.87, 128.81, 128.49, 128.27, 126.80, 129.25, 122.70, 118.03, 117.33, 36.05ppm

9-(4-chlorophenyl)-3,4,6,7-tetrahydro-10-phenylacridine-1,8(2H,5H,9H,10H)-dione. (8a)

White solid, Yield (85%), mp 256-258 ^{o} C ^{1}H NMR (400 MHz, CD.Cl3) δ 7.48-7.53 (m, 3H), 7.34-7.36 (m, 3H), 7.20- 7.22 (m, 3H), 5.34 (s, 1H), 2.34-2.39 (m, 2H), 2.26-2.29 (m, 2H), 2.23-2.25 (m, 2H), 2.20.- 2.22 (m, 2H), 2.16- 2.18 (m, 2H), 2.01– 2.05 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 194.08, 151.51, 146.54, 139.15, 129.91, 129.69, 129.38, 128.20, 127.76, 126.02, 115.57, 36.81, 32.03, 28.34, 21.14ppm.

3,4,6,7-tetrahydro-9,10-diphenylacridine-1,8(2*H*, 5*H*, 9*H*, 10*H*)-dione. (8b)

White solid, Yield (85%), mp 256-258 ^{o} C ^{1}H NMR (400 MHz, CD.Cl3) δ 7.48-7.56 (m, 3H), 7.41-7.42 (d, *J* = 7.2 Hz 2H), 7.27 (s, 2H), 7.23-7.25 (d, *J* = 7.6 Hz, 2H), 7.10- 7.14 (t, *J* = 14.8 Hz, 1H), 5.39 (s, 1H), 2.33-2.39 (m, 2H), 2.15-2.29 (m, 4H), 1.99-2.06 (m, 2H), 1.72-1.91 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 196.08, 151.51, 146.54, 139.15, 129.91, 129.69, 129.38, 128.20, 127.76, 126.02, 115.57, 36.81, 32.03, 28.34, 21.14ppm.

3,4,6,7-tetrahydro-10-phenyl-9-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (8c)

White solid, Yield (76 %), mp 255-258 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.48-7.55 (m, 3H), 7.30-7.32 (d, *J* = 8.0 Hz, 2H), 7.25 (s, 1H), 7.27 (s, 1H), 7.05-7.07 (d, *J* = 7.6 Hz, 2H), 5.35 (s, 1H), 2.32-2.39 (m, 2H), 2.27 (s, 3H), 2.14-2.24 (m, 4H), 1.98-2.05 (m, 2H), 1.84-1.90 (m, 2H), 1.75-1.81 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 196.06, 151.33, 143.72, 139.22, 135.42, 129.99, 129.33, 128.94, 127.67, 115.74, 36.82, 31.66, 28.32, 21.15, 21.10ppm.

3,4,6,7-tetrahydro-9-(4-methoxyphenyl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (8d)

White solid, Yield (87%), mp 196-198 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.48-7.55 (m, 3H), 7.32-7.34 (d, *J* = 8.4 Hz, 2H), 7.27 (s, 1H), 7.25 (s, 1H), 6.79-6.81 (d, *J* = 8.8 Hz, 2H), 5.32 (s, 1H), 3.75 (s, 3H), 2.24-2.35 (m, 2H), 214-2.22 (m, 4H), 1.98-2.05 (m, 2H), 1.86-1.91 (m, 2H), 1.71-1.84 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 196.18, 157.80, 151.28, 139.19, 139.10, 129.97, 129.73, 115.81, 113.60, 55.19, 36.82, 31.26, 28.32, 21.17ppm.

3,4,6,7-tetrahydro-10-phenyl-9-(thiophen-2-yl)acridine-1,8(2H,5H,9H,10H)-dione (8e)

White solid, Yield (80%), mp 260-262 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.54-7.48 (m, 3H), 7.28 (s, 2H), 7.03-7.04 (d, *J* = 5.2 Hz, 1H), 6.98 (s, 1H), 6.87-6.89 (t, *J* = 8.4 Hz, 1H), 5.71 (s, 1H), 2.39-2.46 (m, 2H), 2.25-2.33 (m, 2H), 216-2.23 (m, 3H), 2.03-2.05 (t, *J* = 8.4 Hz 1H), 1.99-2.01 (t, *J* = 9.2 Hz 1H), 1.89-1.94 (m, 2H), 1.80-1.94 (m, 1H); ^{13}C NMR (100MHz, CDCl3) δ 195.89, 151.64, 151.17, 138.98, 130.34, 129.79, 129.57, 129.42, 127.12, 123.80, 122.70, 115.22, 36.78, 28.0, 27.05, 21.15ppm.

3,4,6,7-tetrahydro-9-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (8f)

White solid, Yield (90%), mp 216-218 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 9.43 (s, 1H, NH), 7.06-7.08 (d, *J* = 8.8 Hz, 2H), 6.73-6.75 (d, *J* = 5.2 Hz, 2H), 4.87 (s, 1H), 3.69 (s, 3H), 2.53 (s, 5H), 2.13-2.25 (m, 3H), 1.91-1.97 (m, 2H), 1.76-1.83 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 194.77, 157.11, 150.99, 139.68, 128.36, 113.10, 112.70, 54.85, 36.78, 31.15, 26.29, 20.81ppm

3,4,6,7-tetrahydro-9-(2,4-dinitrophenyl)acridine-1,8(2H,5H,9H,10H)-dione (8g)

White solid, Yield (72%), mp 166-168 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 7.64 (s, 1H), 7.42 (s, 1H), 7.64 (s, 1H), 5.40 (s, 1H), 2.52-2.66 (m, 4H), 2.32 (s, 4H), 2.00 (m, 4H); ^{13}C NMR (100MHz, CDCl3) δ 196.69, 164.84, 150.33, 137.27, 132.33, 131.87, 127.40, 124.39, 115.10, 36.96, 31.09, 29.85, 27.29, 20.30ppm

3,4,6,7-tetrahydro-9-(naphthalen-1-yl)acridine-1,8(2H,5H,9H,10H)-dione (8h)

White solid, Yield (66%), mp 224-226^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 8.89-8.87 (d, *J* = 8.8 Hz 1H), 7.82- 7.80 (d, *J* = 8.0 Hz, 1H), 7.65-7.67 (d, *J* = 8.0 Hz, 1H), 7.54-7.57 (t, *J* = 12.8 Hz 1H), 7.47-7.561 (m, 1H), 7.38-7.46 (m, 1H), 7.27-7.29 (d, *J* = 7.2 Hz 1H), 5.64 (s, 1H), 2.58-2.61 (m, 4H), 2.17-2.25 (m, 2H), 2.07-2.14 (m, 2H), 1.92-1.94 (m, 2H), 1.90-1.91 (m, 2H); ^{13}C NMR (100MHz, CDCl3) δ 194.81, 150.87,

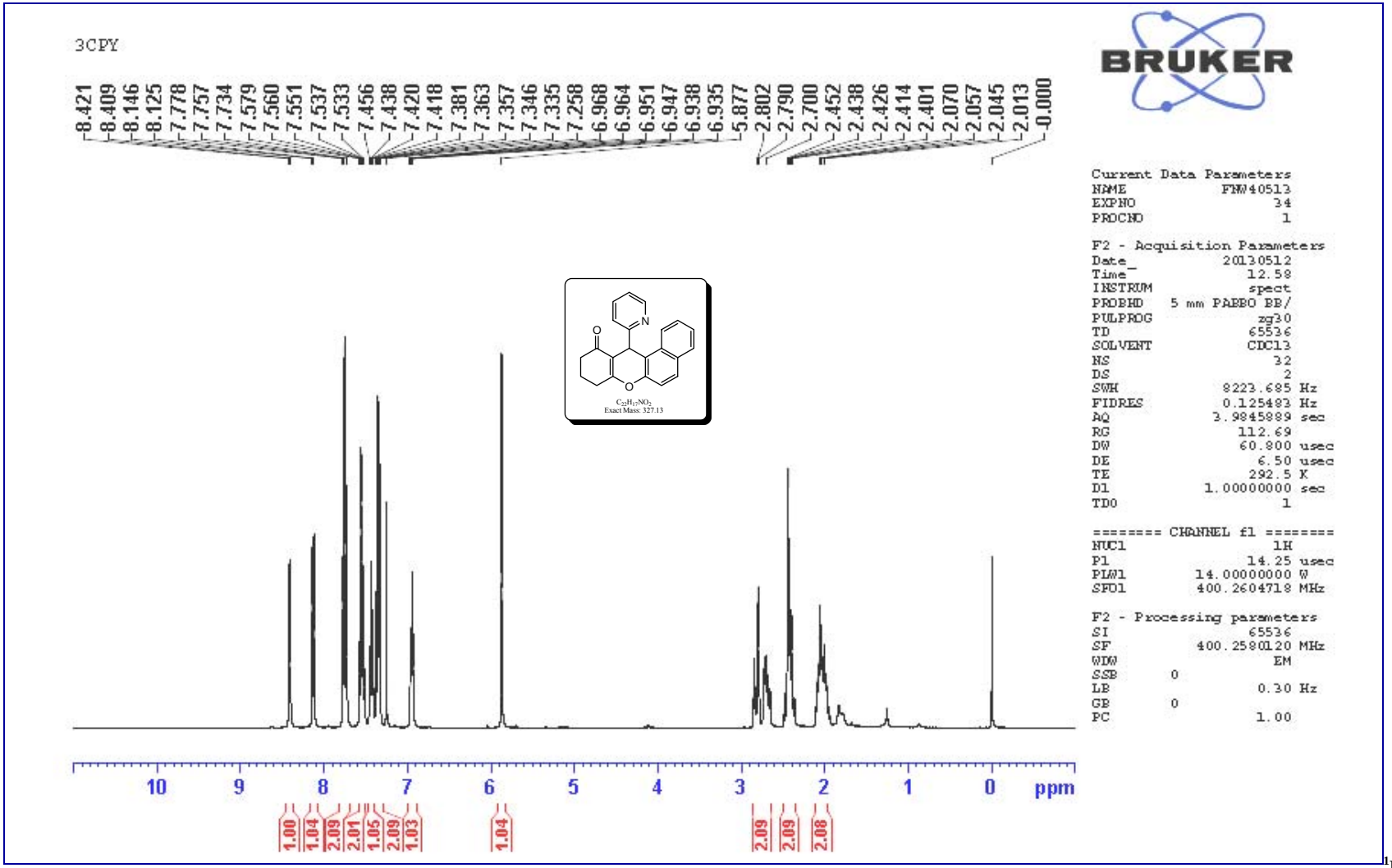
146.58, 132.74, 130.64, 127.61, 127.46, 127.28, 127.19, 126.10, 125.94, 125.85, 125.76, 125.06, 124.86, 114.40, 36.73, 28.06, 26.42, 20.75ppm.

3,4,6,7-tetrahydro-9-phenylacridine-1,8(2H,5H,9H,10H)-dione (8i)

White solid, Yield (86%), mp 230-232 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 9.50 (s, 1H), 7.18 (s, 5H), 7.07 (s, 1H), 4.94 (s, 1H), 2.23 (s, 5H), 1.81-1.91 (d, *J* = Hz 7H), ^{13}C NMR (100MHz, CDCl3) δ 194.81, 151.33, 147.35, 127.75, 127.49, 125.43, 112.43, 36.78, 32.09, 26.32, 20.79

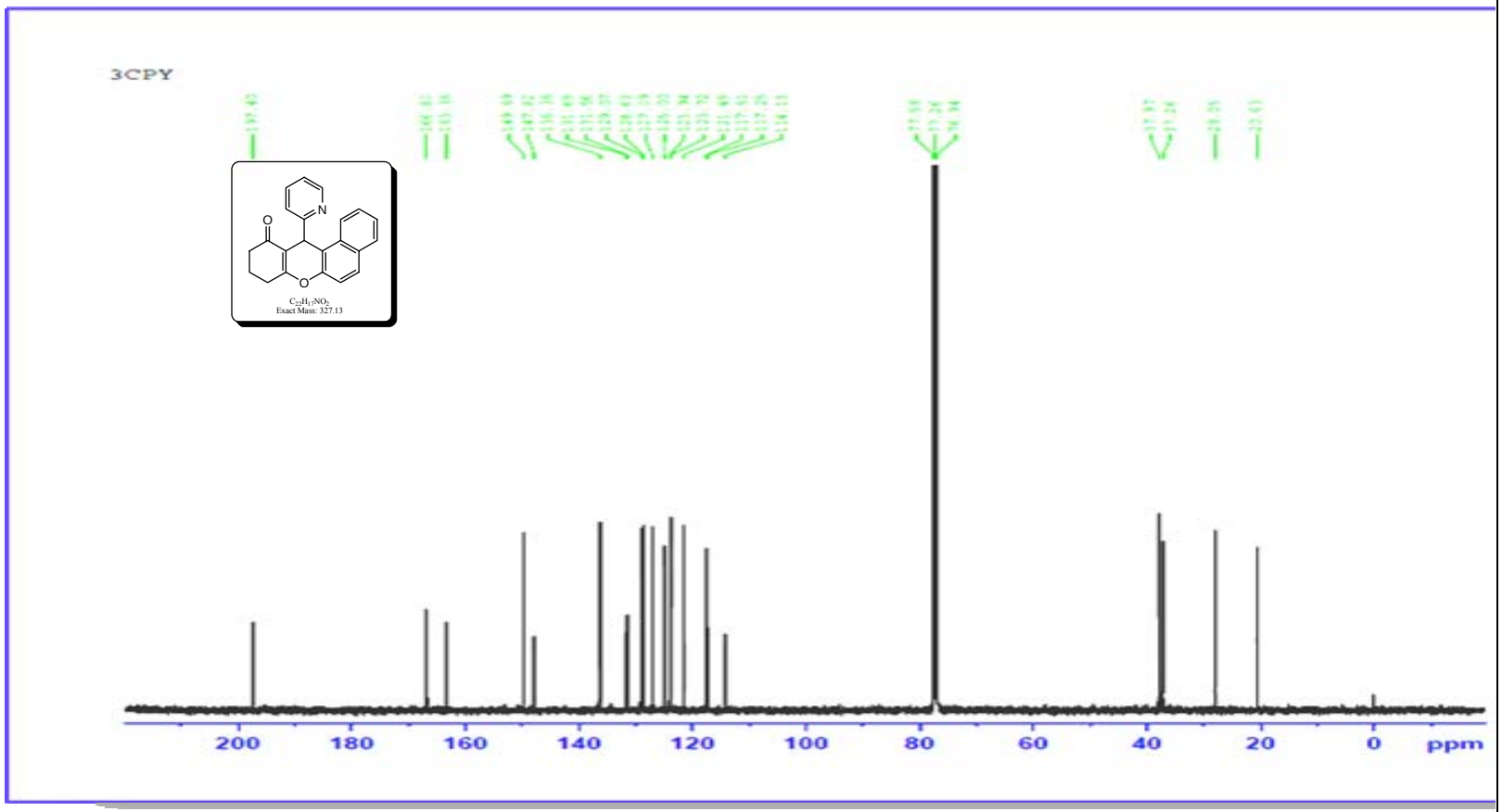
3,4,6,7- tetrahydro-9-p-tolylacridine-1,8(2*H*, 5*H*, 9*H*, 10*H*)-dione (8j)

White solid, Yield (78%), mp 263-265 ^{o} C ^{1}H NMR (400 MHz, CDCl3) δ 9.45 (s, 1H), 7.04 (s,2H), 6.984 (s, 2H), 4.88 (s, 1H), 2.21 (s, 9H), 1.79-1.92(m, 5H), ^{13}C NMR (100MHz, CDCl3) δ 194.76, 151.12, 144.50, 134.28, 128.31, 127.39, 112.60, 36.80, 31.66, 26.32, 20.82, 20.57ppm

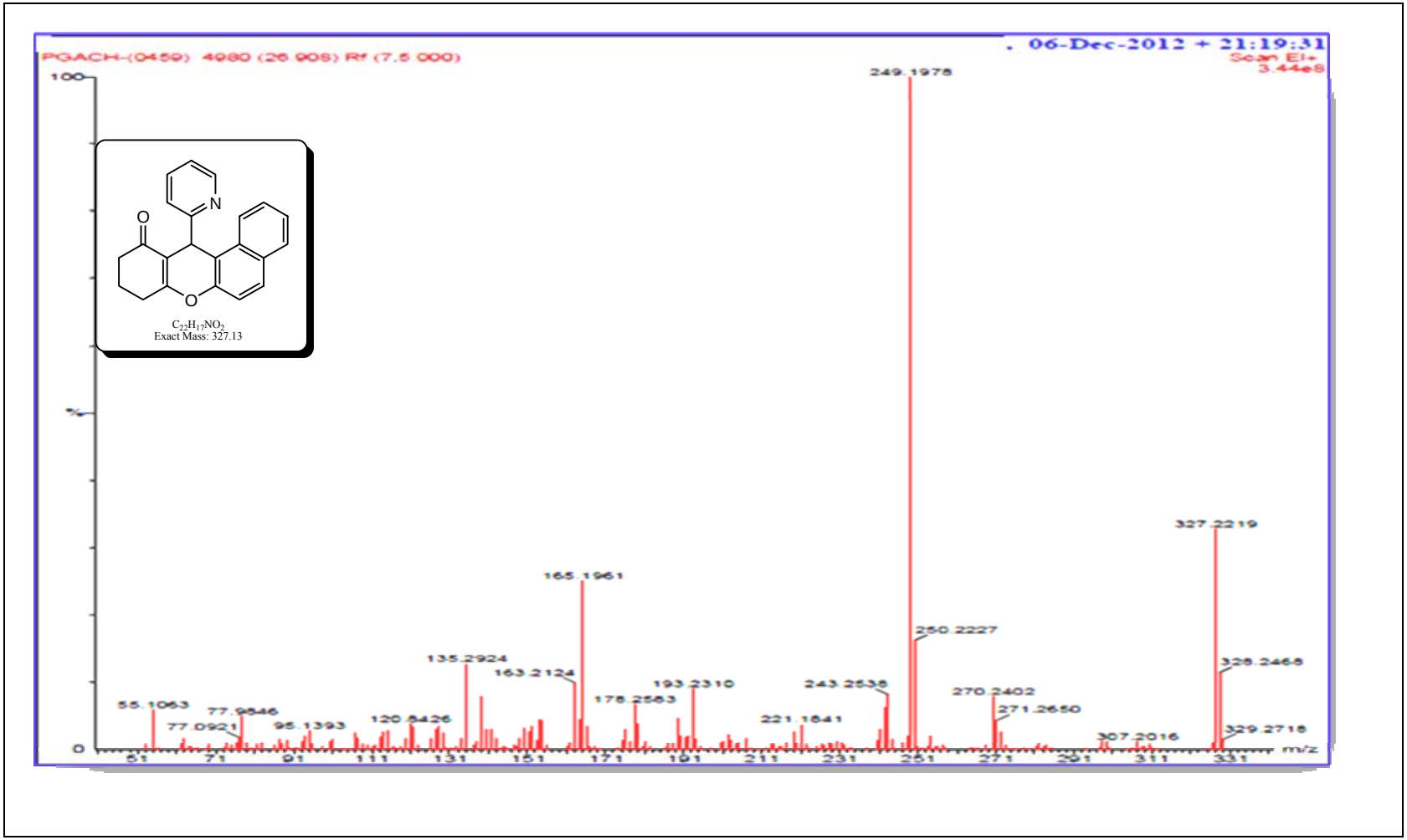


NMR of 9,10-dihydro-12-(pyridin-2yl)-8H-benzo[a]xanthen-11(12H)-one (7a)

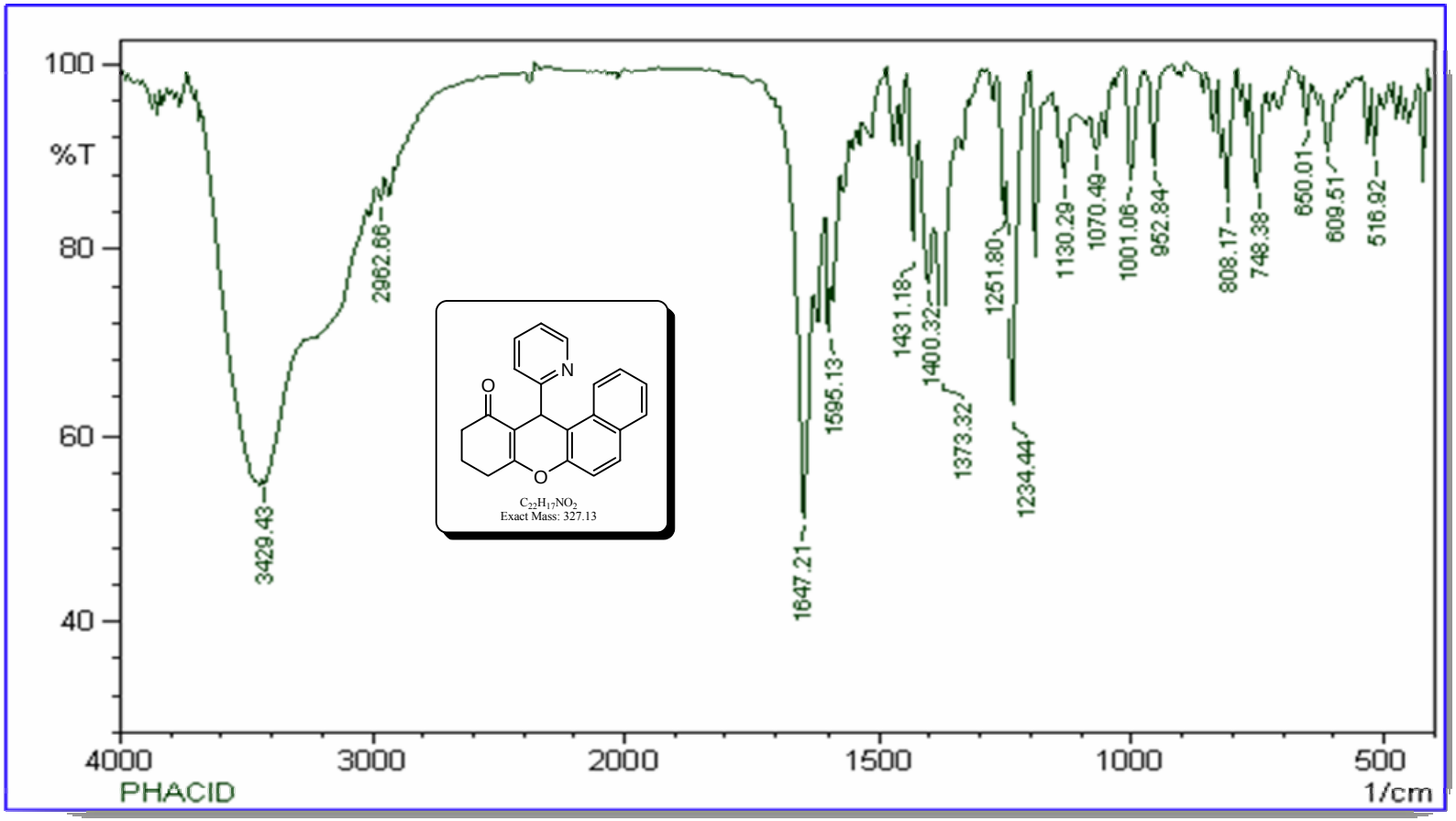
^{1}H



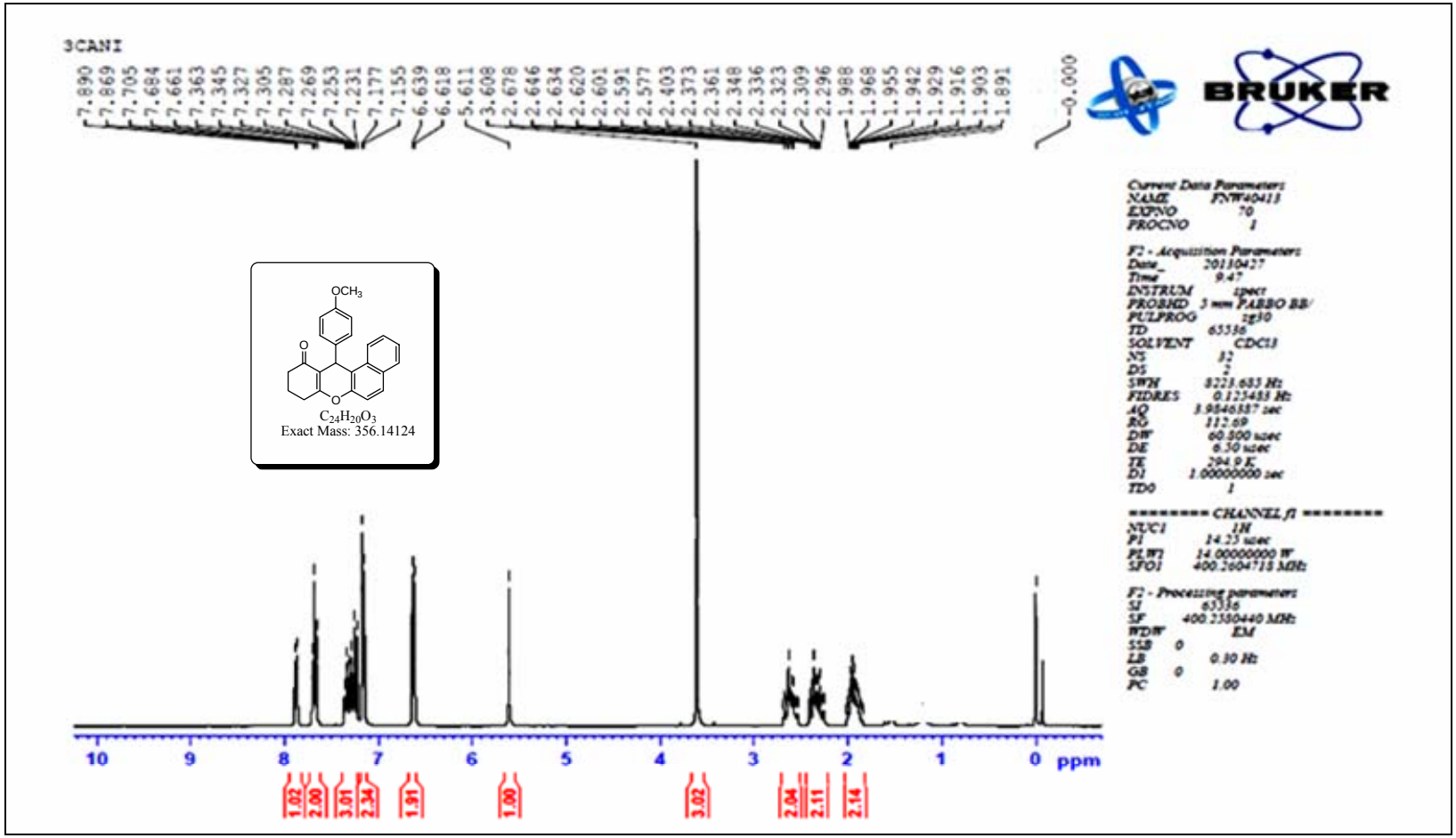
^{13}C NMR of 9,10-dihydro-12-(pyridin-2yl)-8H-benzo[a]xanthen-11(12H)-one (7a)



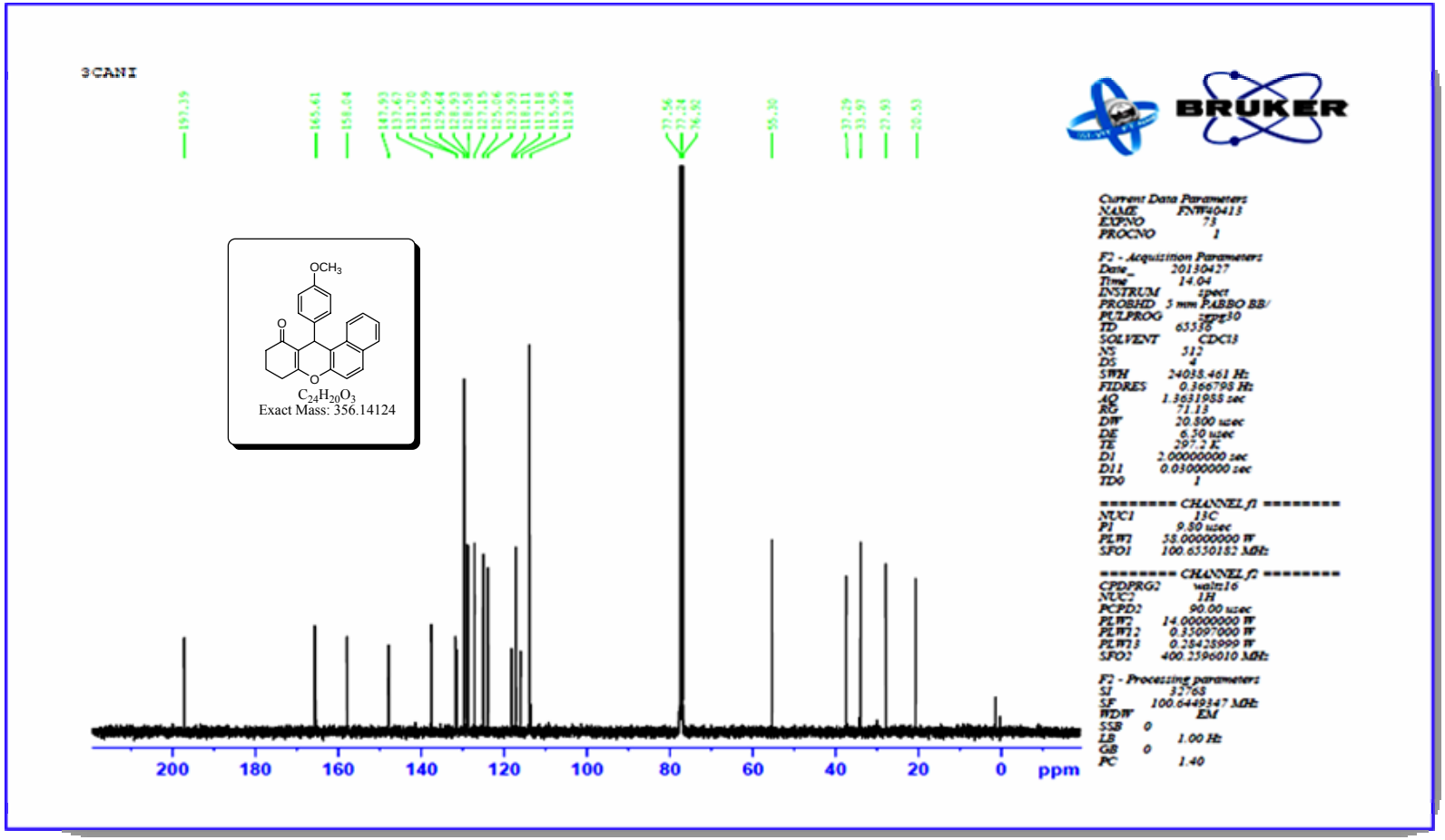
GC-MS of 9,10-dihydro-12-(pyridin-2yl)-8H-benzo[a]xanthen-11(12H)-one (7a)



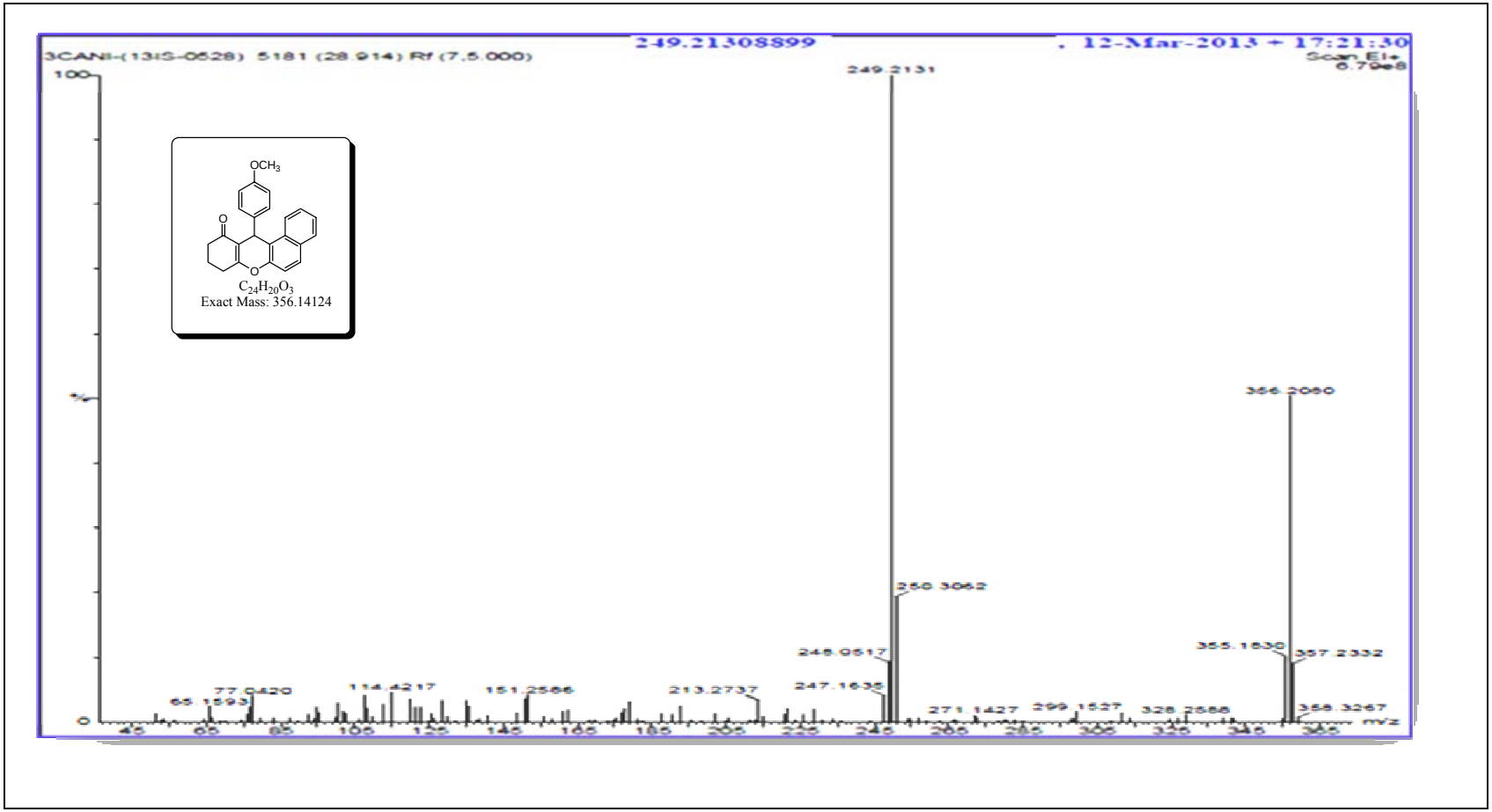
IR spectrum of 9,10-dihydro-12-(pyridin-2yl)-8H-benzo[a]xanthen-11(12H)-one (7a)



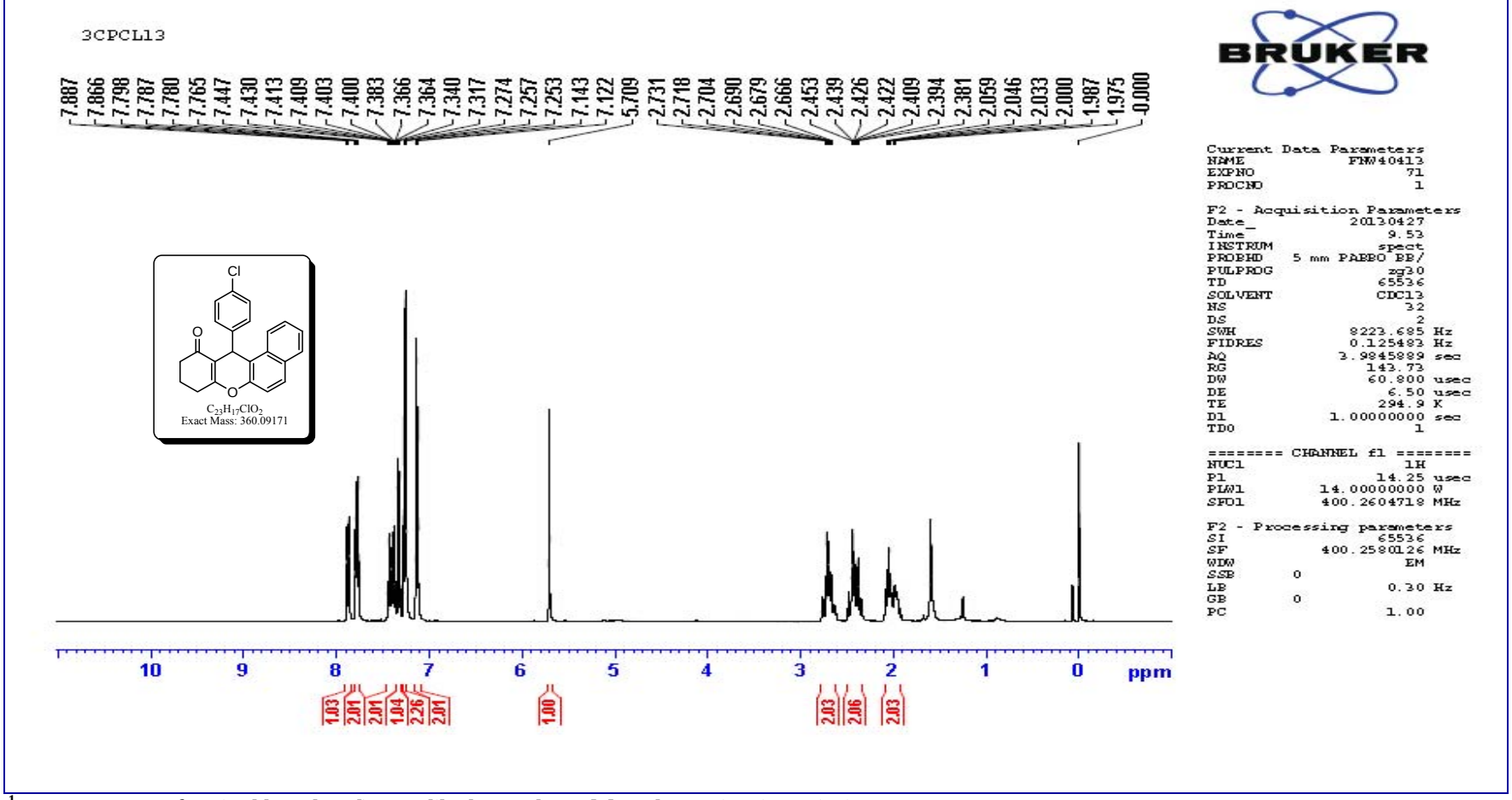
[1]H NMR Spectra of 9,10-dihydro-12-(4-methoxyphenyl)-8H-benzo[a]xanthen-11(12H)-one (7b)



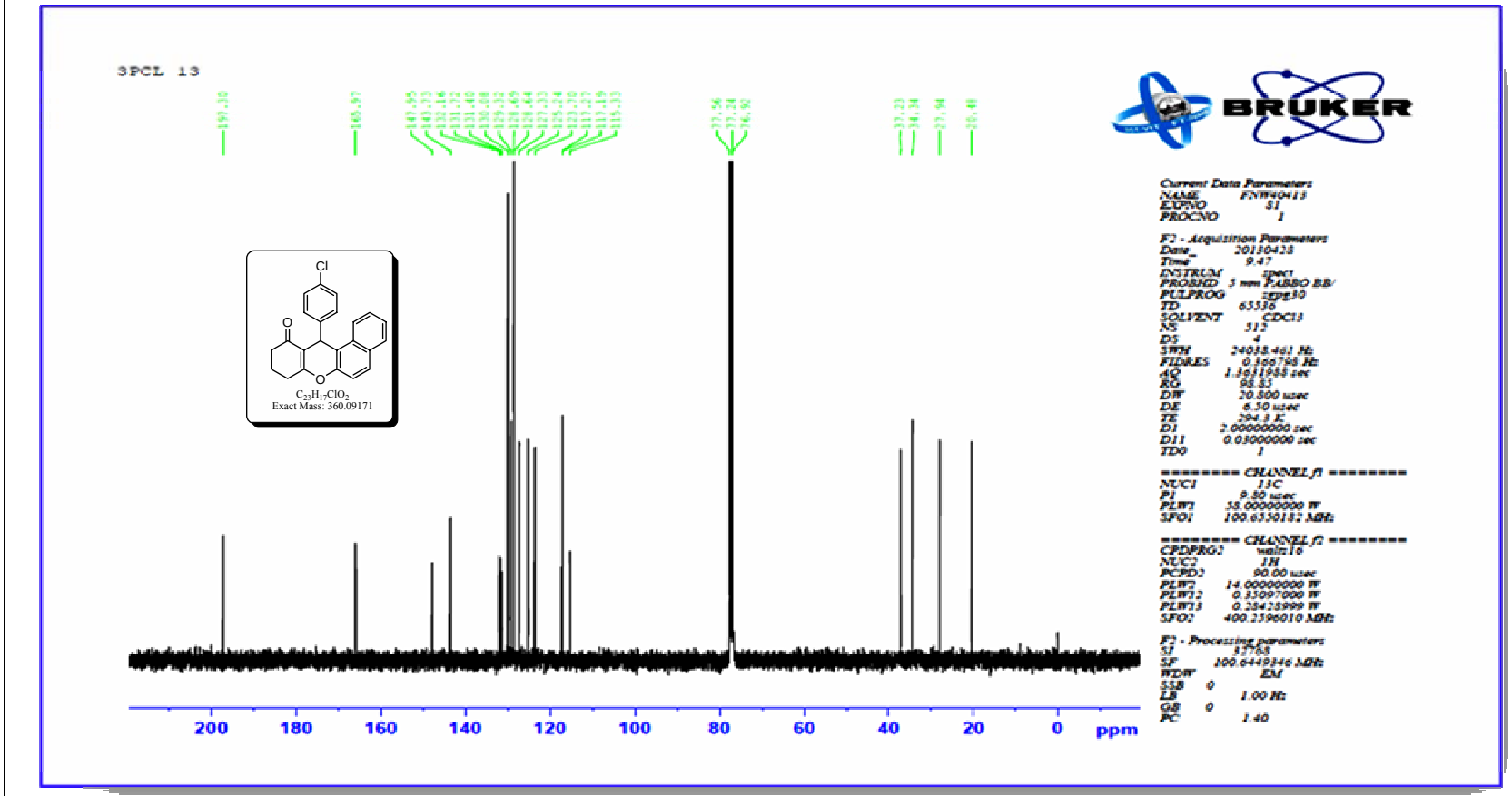
^{13}C NMR Spectra of 9,10-dihydro-12-(4-methoxyphenyl)-8H-benzo[a]xanthen-11(12H)-one (7b)



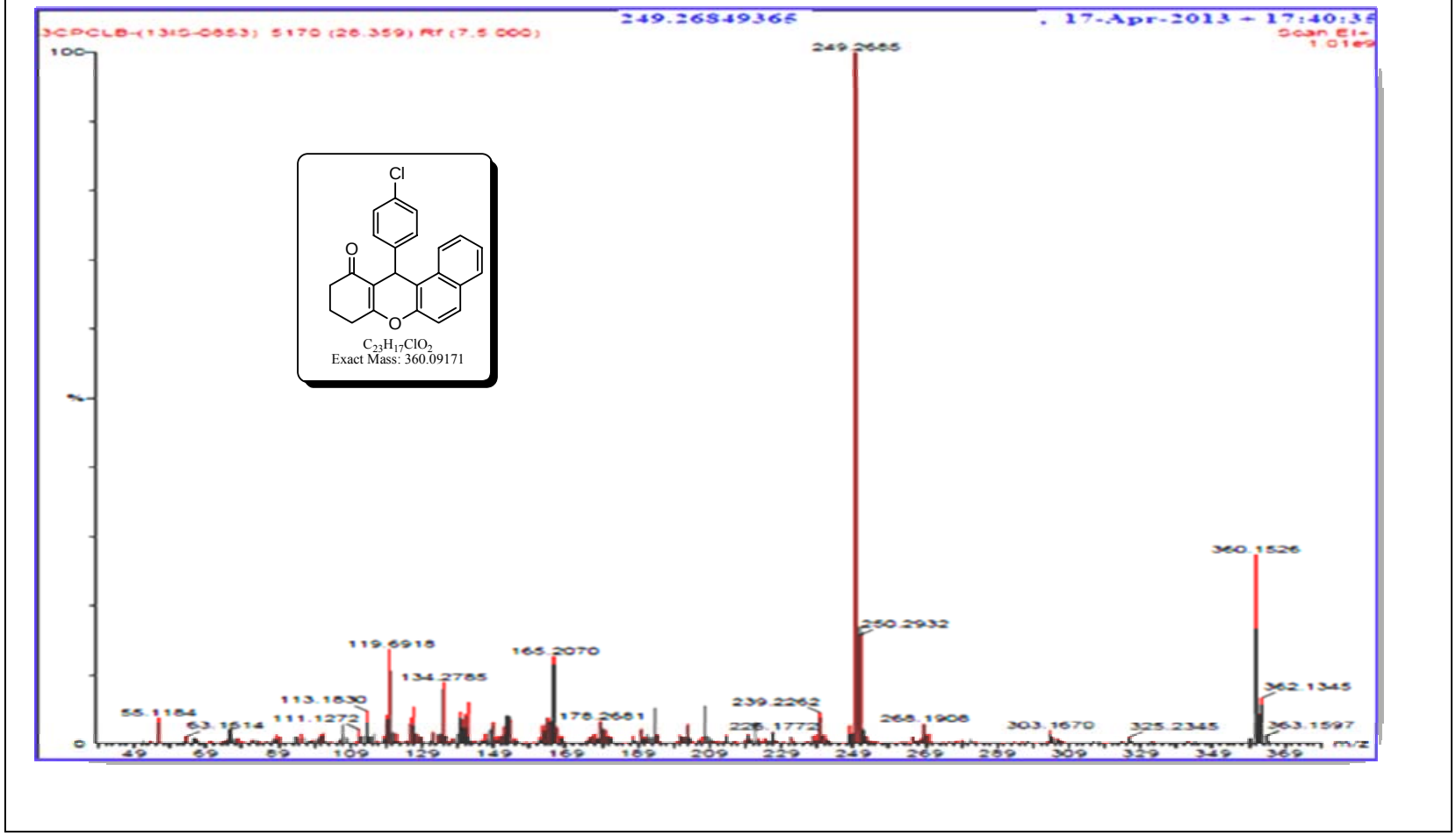
GC-MS Spectra of 9,10-dihydro-12-(4-methoxyphenyl)-8H-benzo[a]xanthen-11(12H)-one (7b)



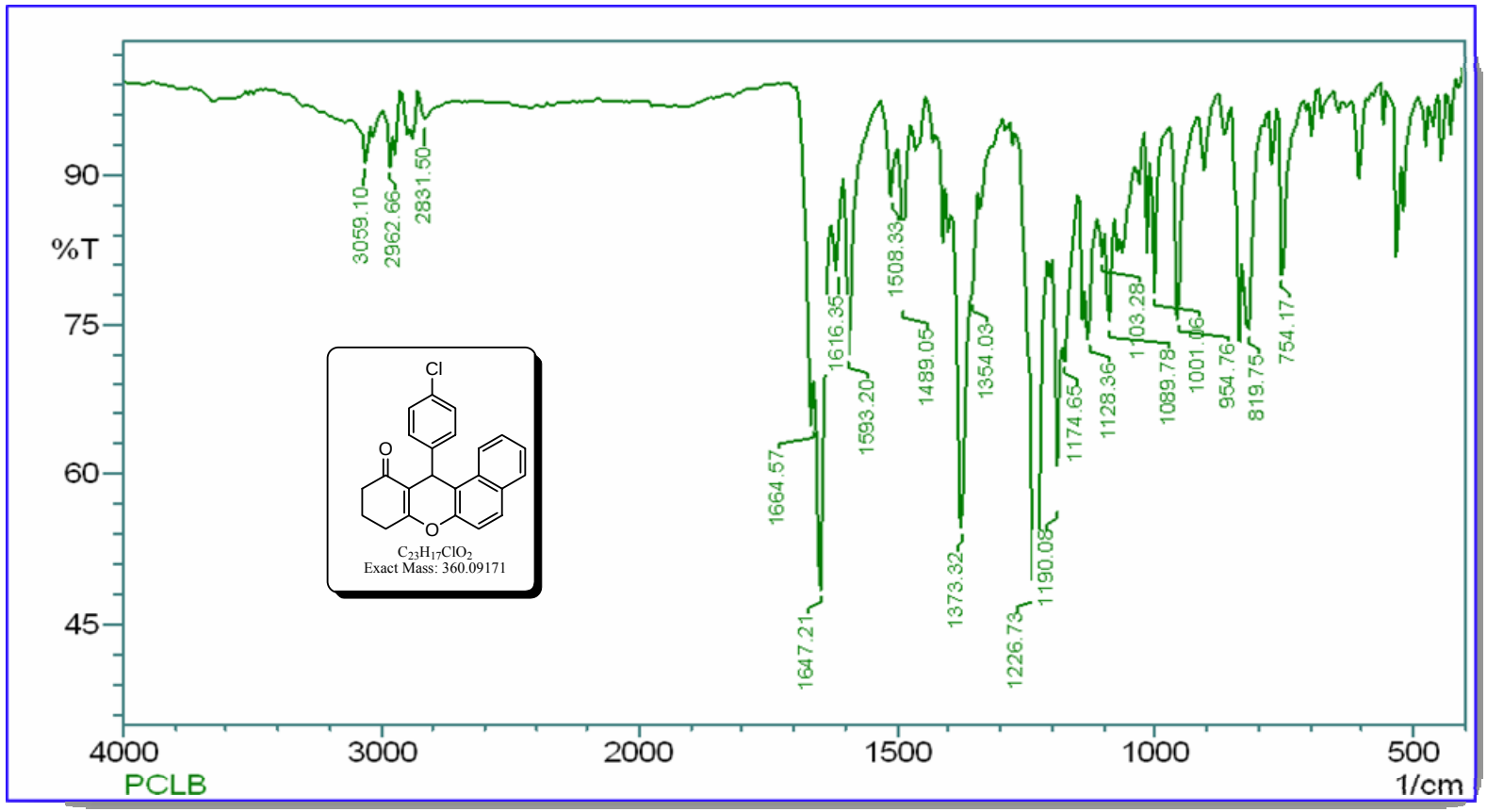
^{1}H NMR spectra of 12-(4-chlorophenyl)-9,10-dihydro-8H-benzo[a]xanthen-11(12H)-one (7c)



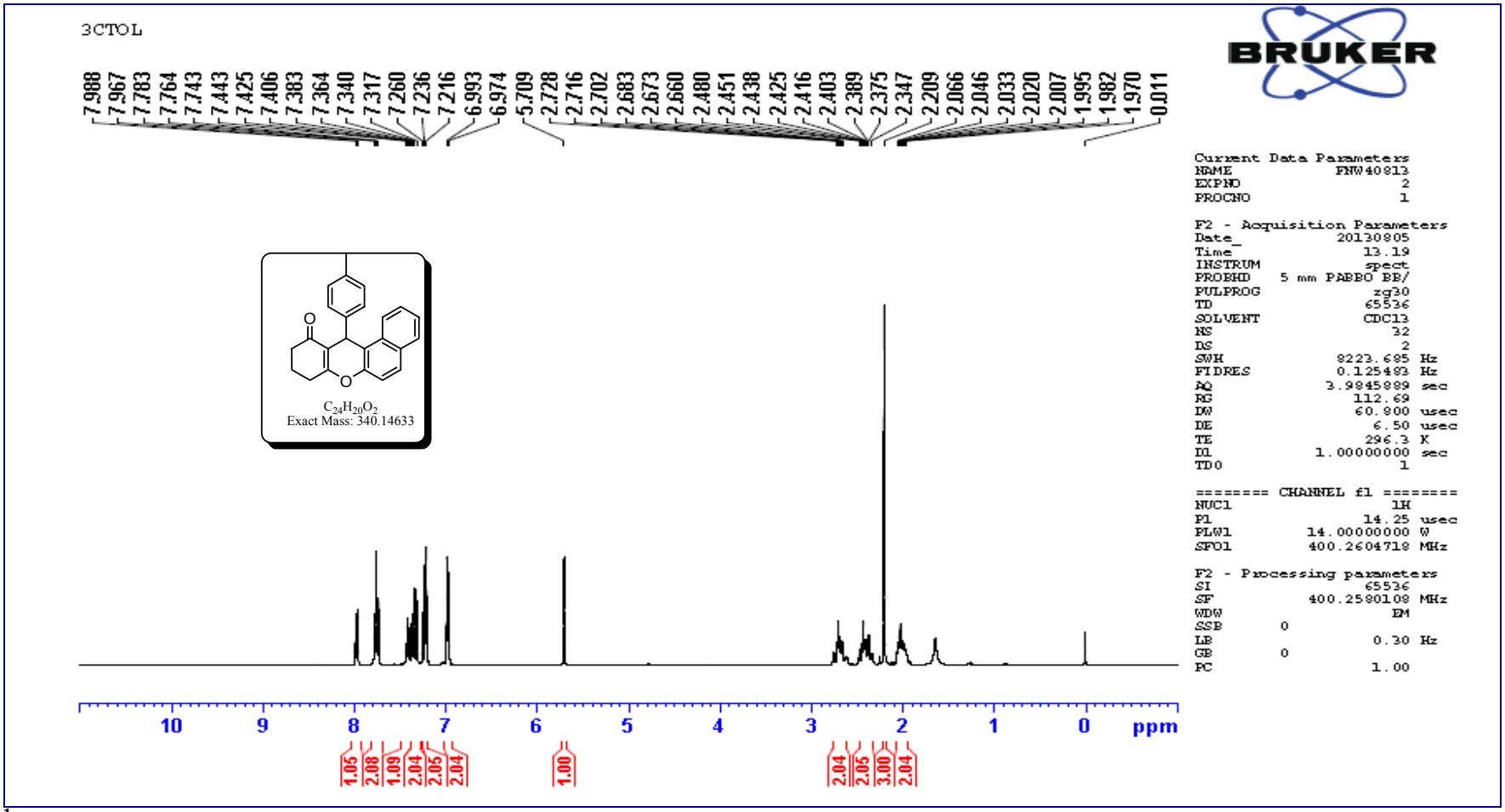
^{13}C NMR Spectra of 12-(4-chlorophenyl)-9,10-dihydro-8H-benzo[a]xanthen-11(12H)-one (7c)



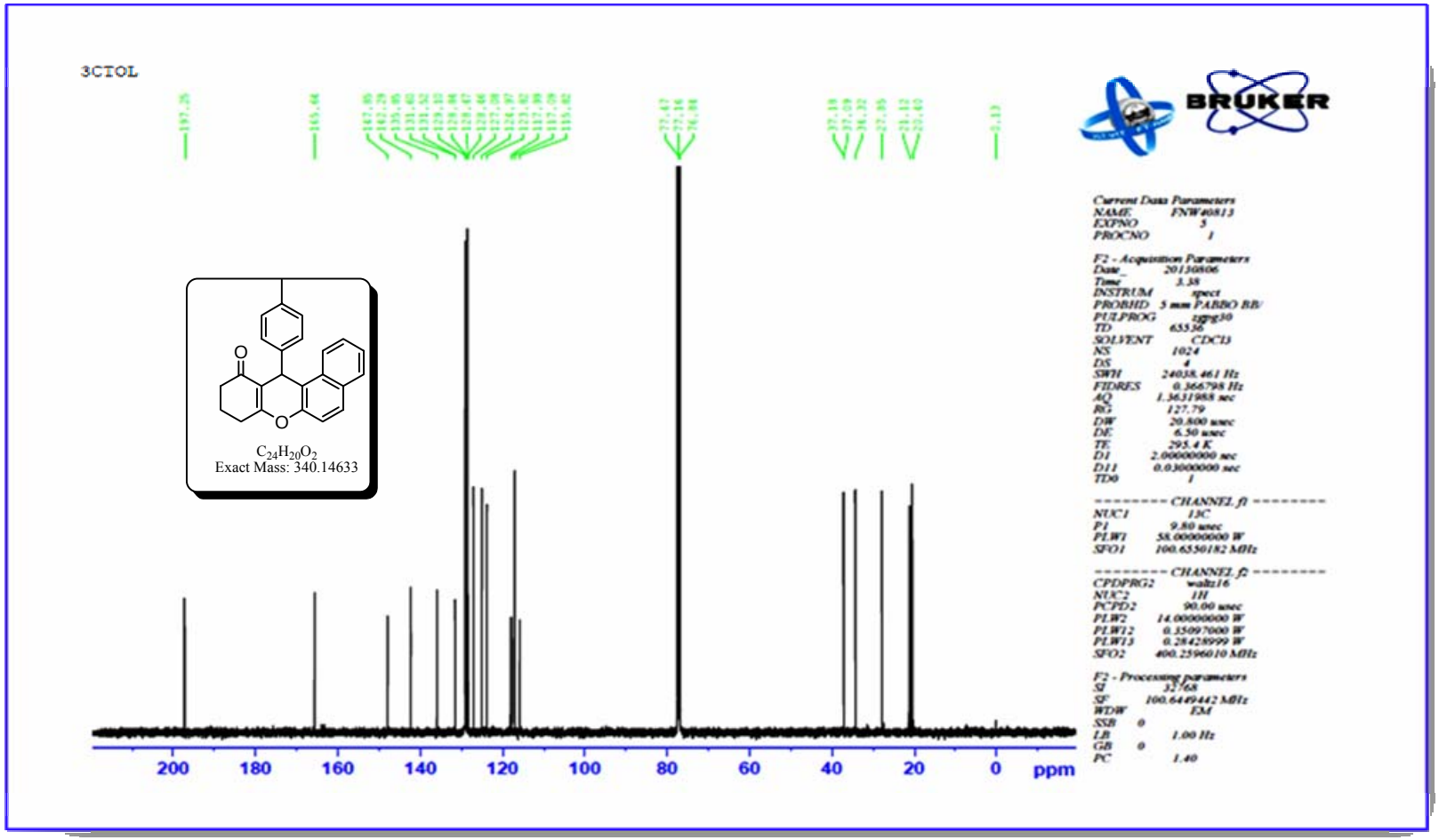
GC-MS Spectra of 12-(4-chlorophenyl)-9,10-dihydro-8H-benzo[a]xanthen-11(12H)-one (7c)



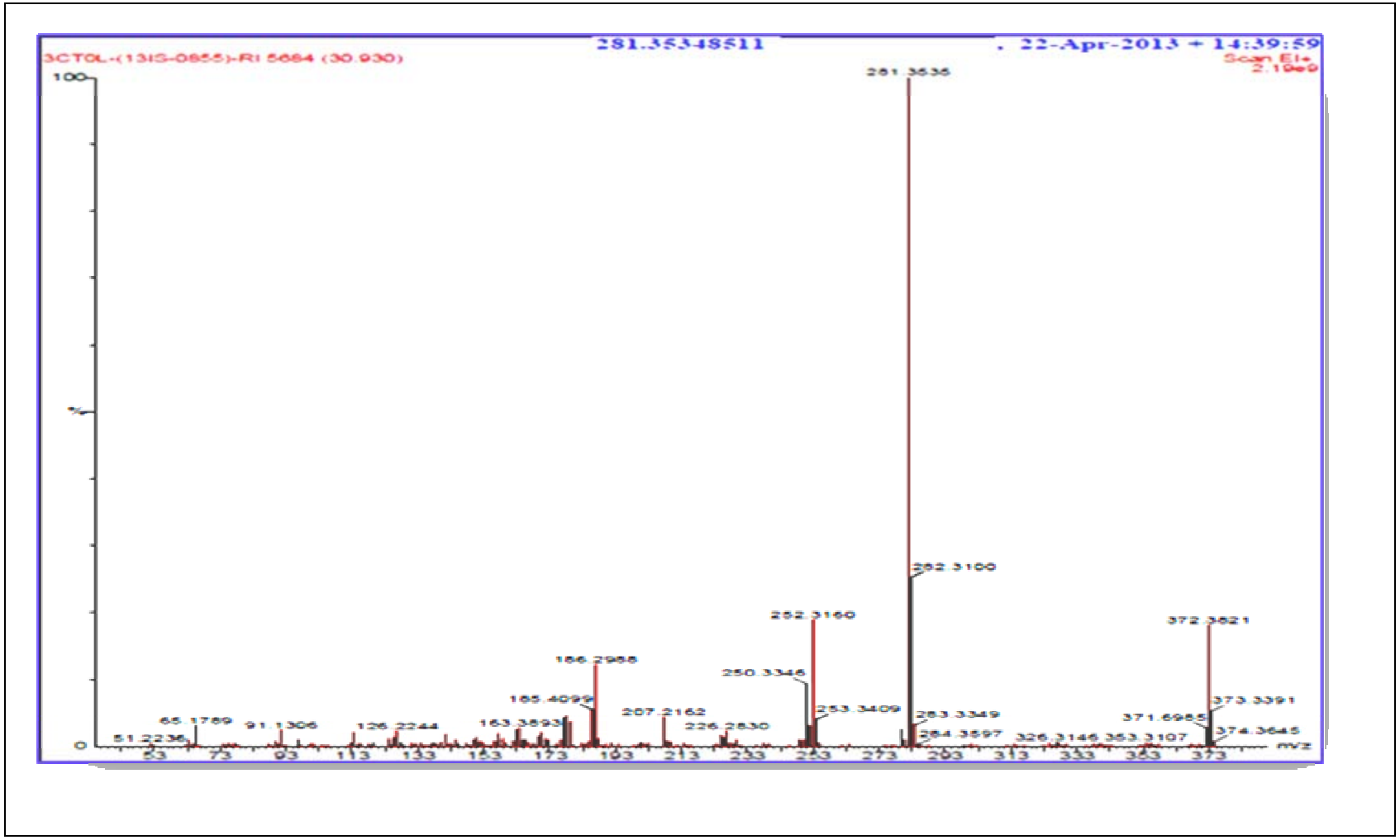
IR Spectra of 12-(4-chlorophenyl)-9,10-dihydro-8H-benzo[a]xanthen-11(12H)-one (7c)



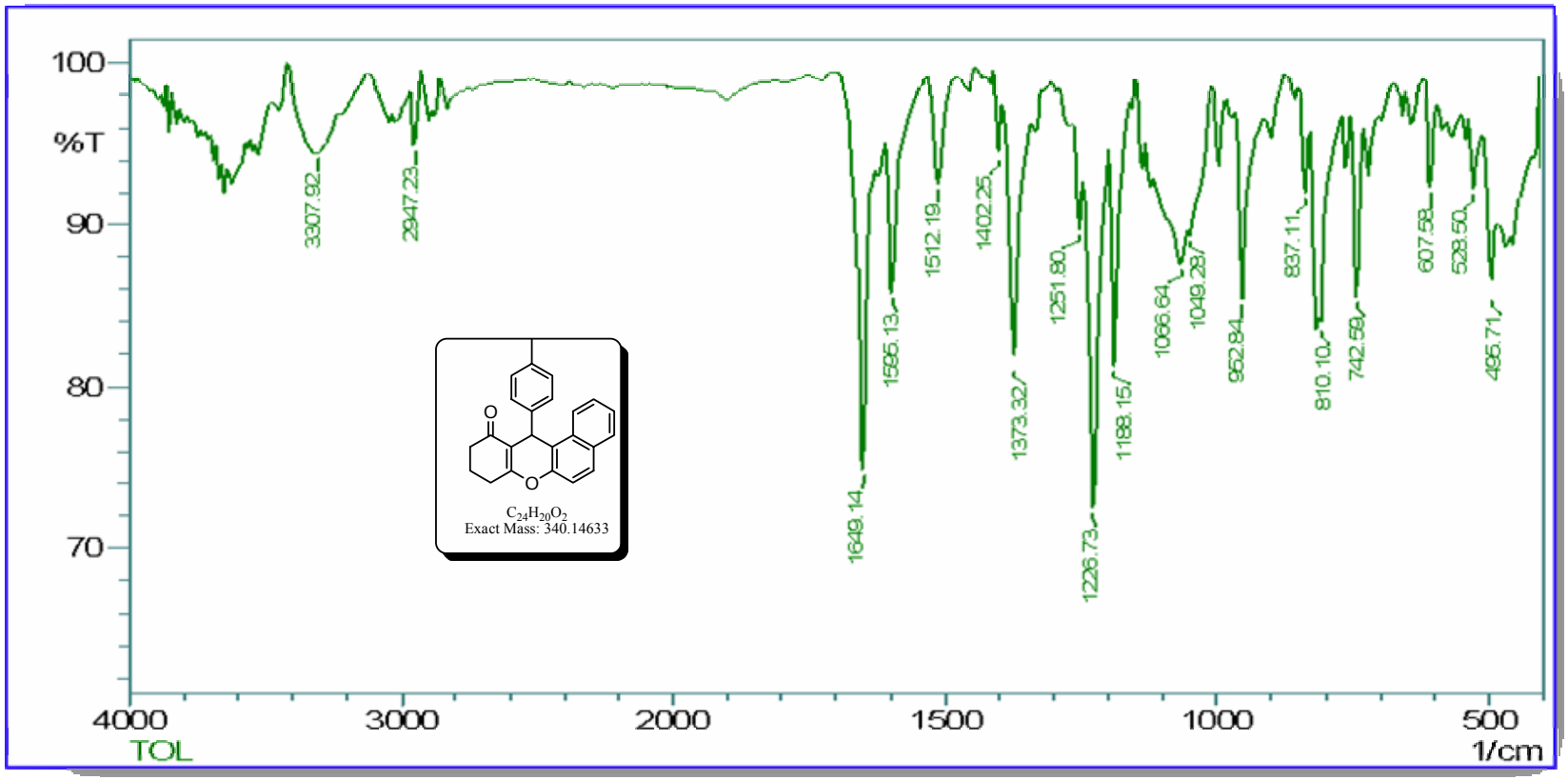
^{1}H NMR Spectra of 9,10-dihydro-12-p-tolyl-8H-benzo[a]xanthen-11(12H)-one (7d)



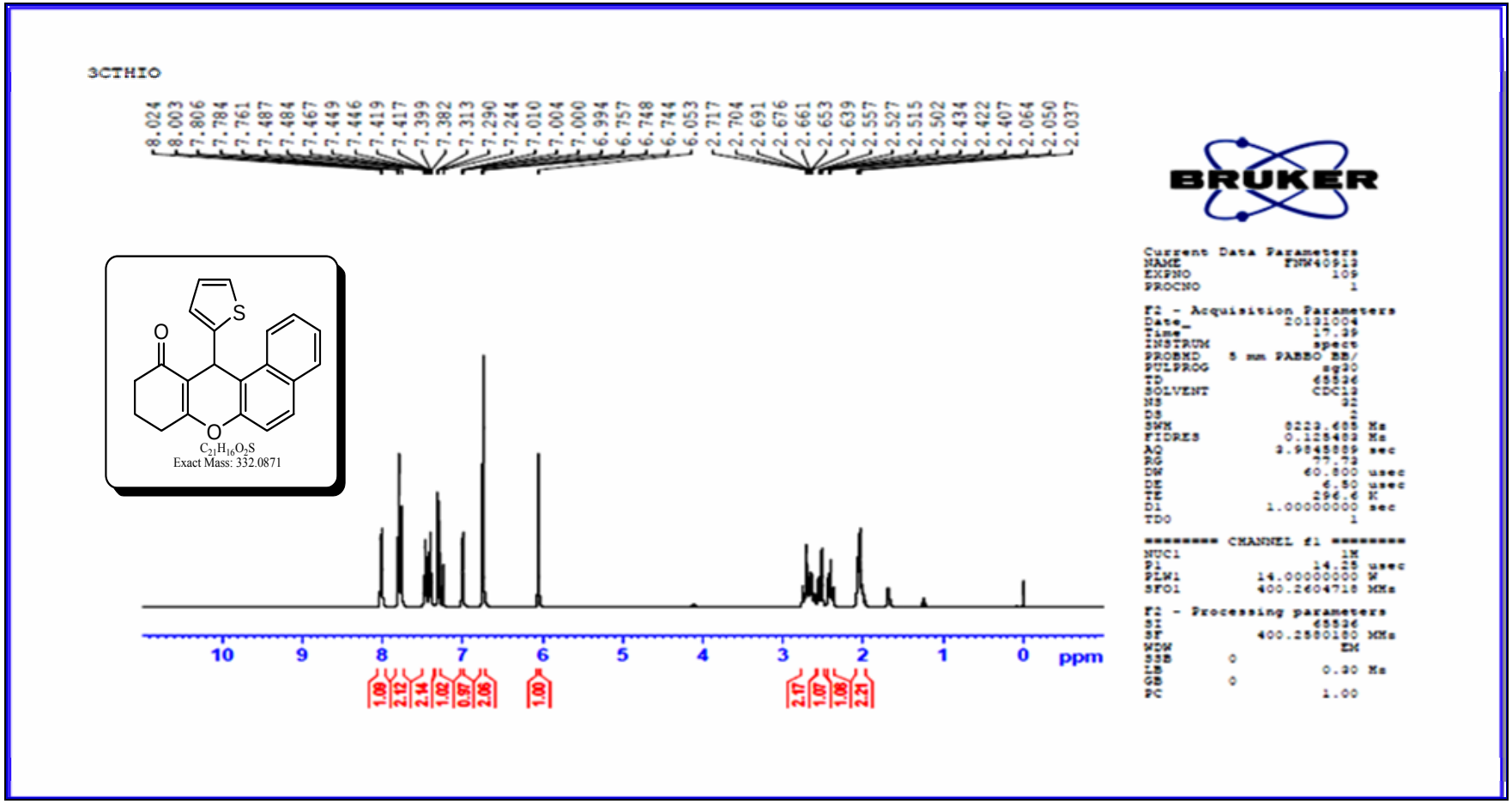
^{13}C NMR Spectra of 9,10-dihydro-12-p-tolyl-8H-benzo[a]xanthen-11(12H)-one (7d)



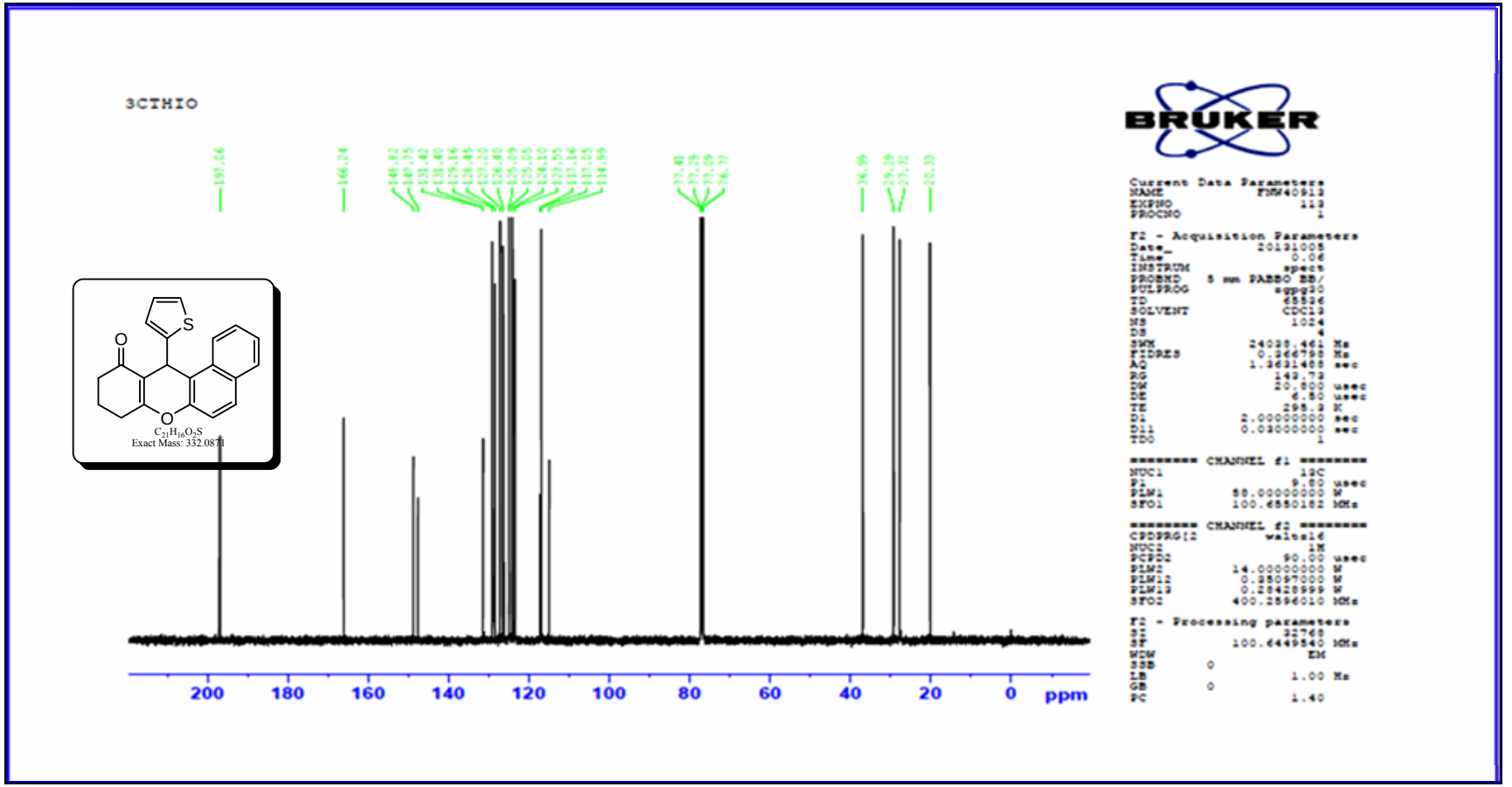
GC-MS Spectra of 9,10-dihydro-12-p-tolyl-8H-benzo[a]xanthen-11(12H)-one (7d)



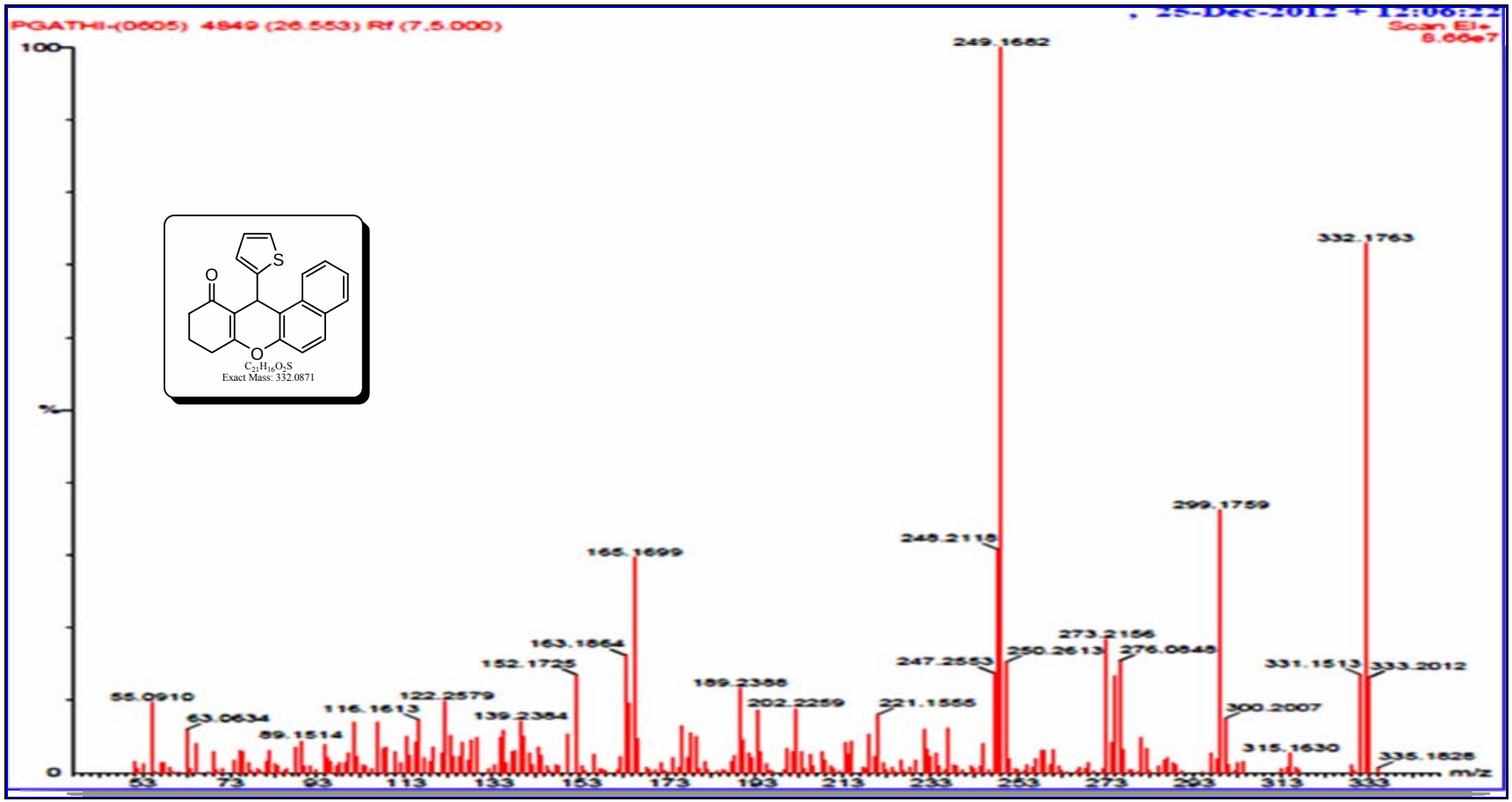
IR Spectra of 9,10-dihydro-12-p-tolyl-8H-benzo[a]xanthen-11(12H)-one (7d)



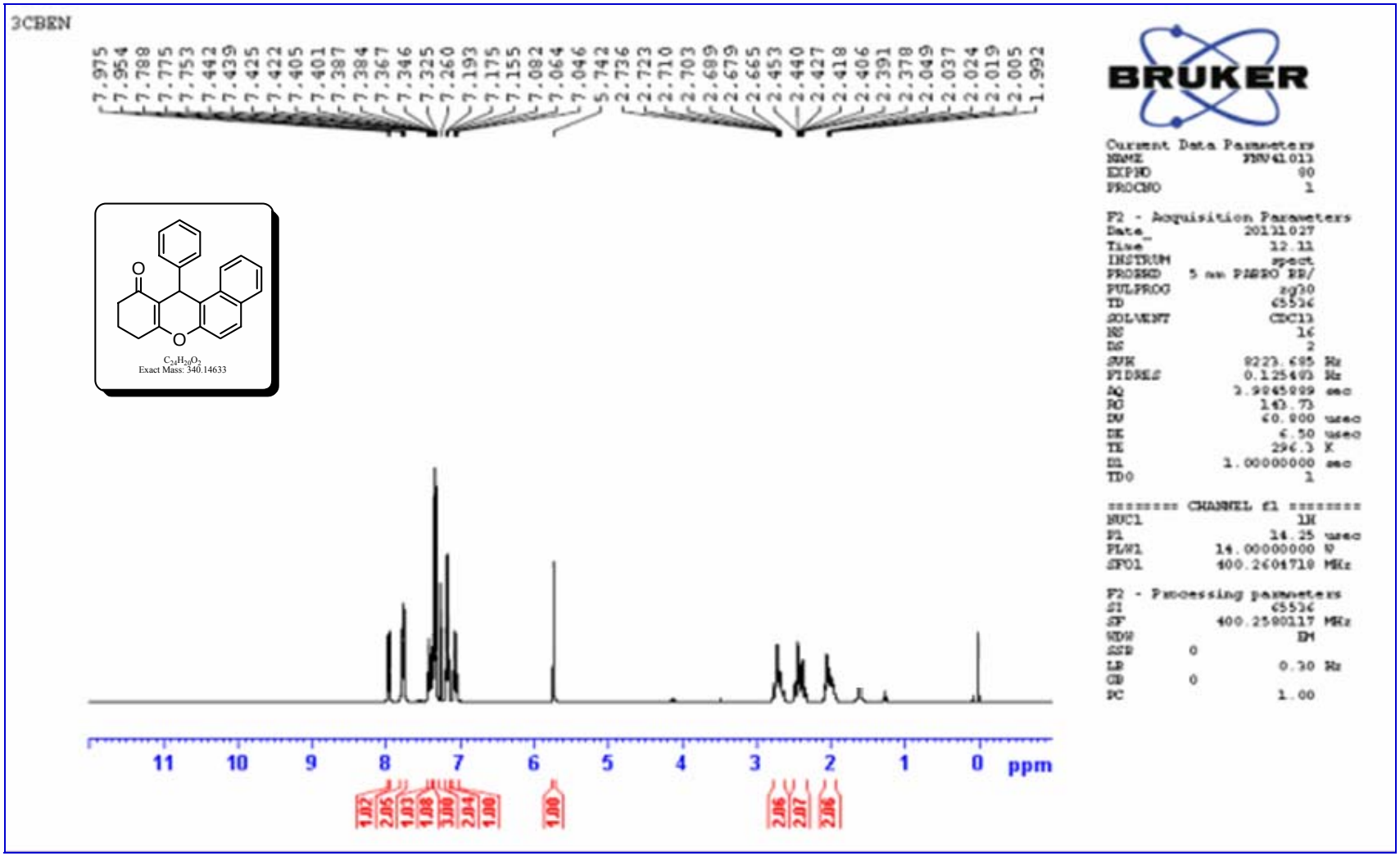
[1]H NMR Spectra of 9,10-dihydro-12-(thiophen-2-yl)-8H-benzo[a]xanthen-11(12H)-one (7e)



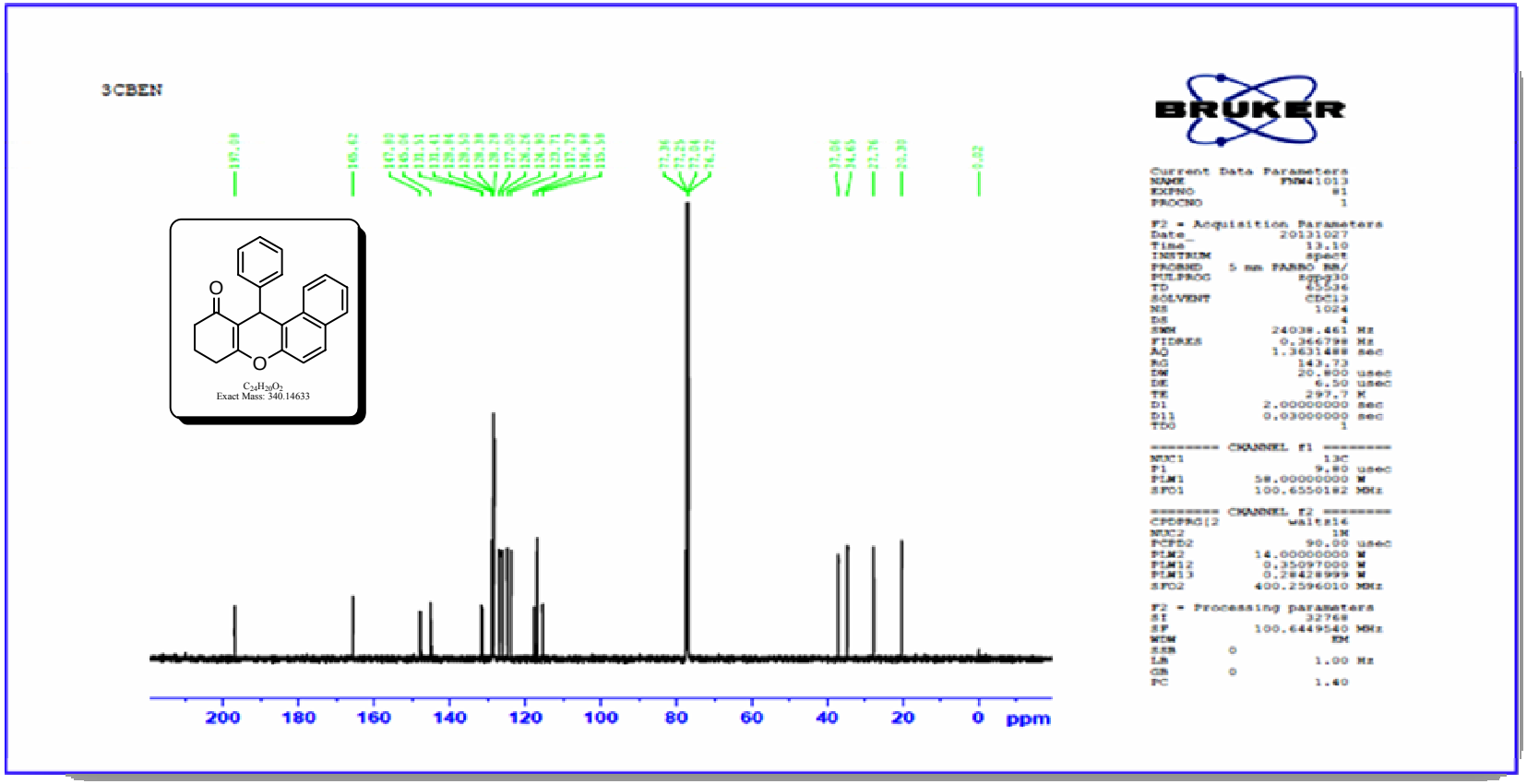
^{13}C NMR Spectra of 9,10-dihydro-12-(thiophen-2-yl)-8H-benzo[a]xanthen-11(12H)-one(7e)



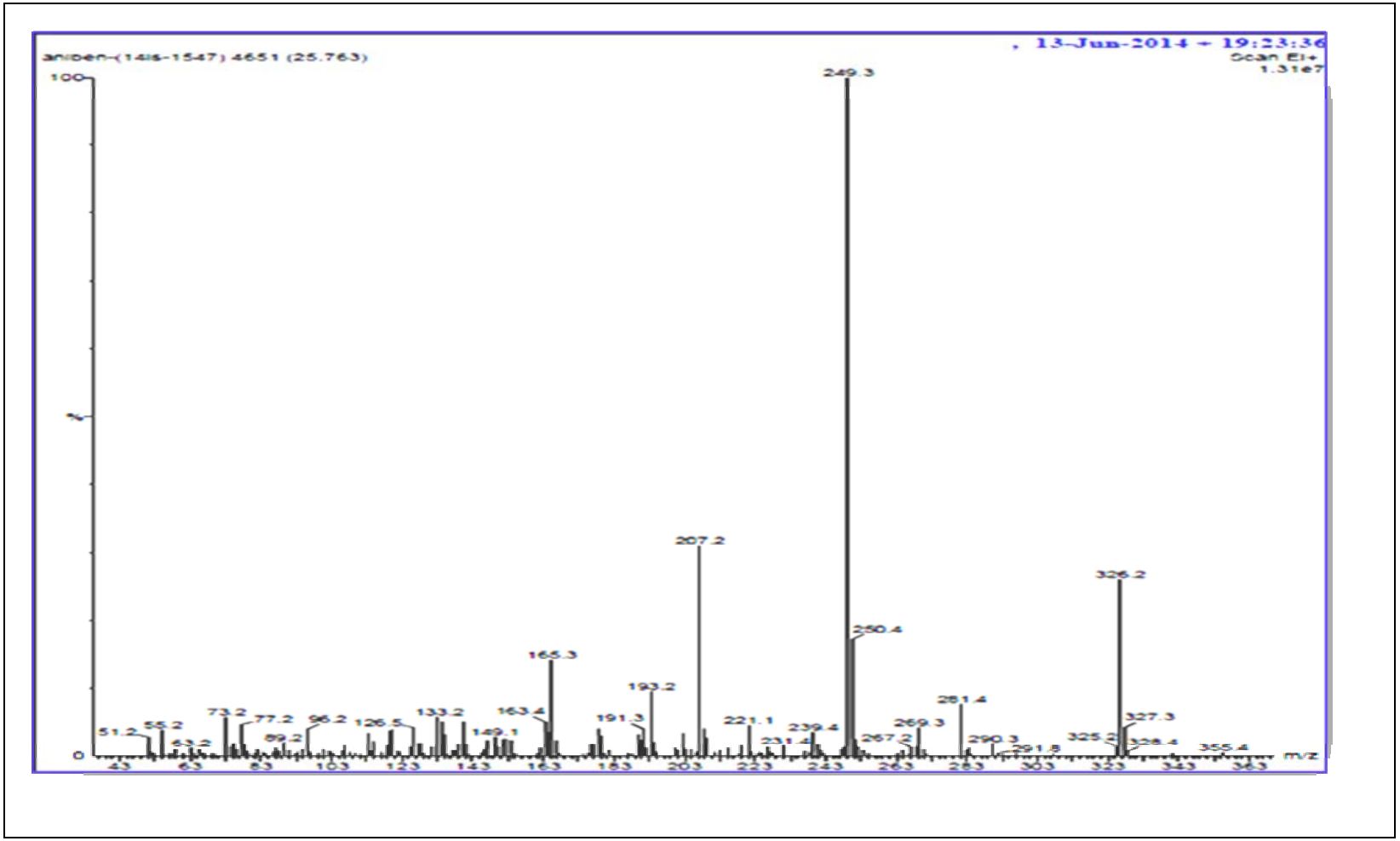
GC-MS of NMR Spectra of 9,10-dihydro-12-(thiophen-2-yl)-8H-benzo[a]xanthen-11(12H)-one(7e)



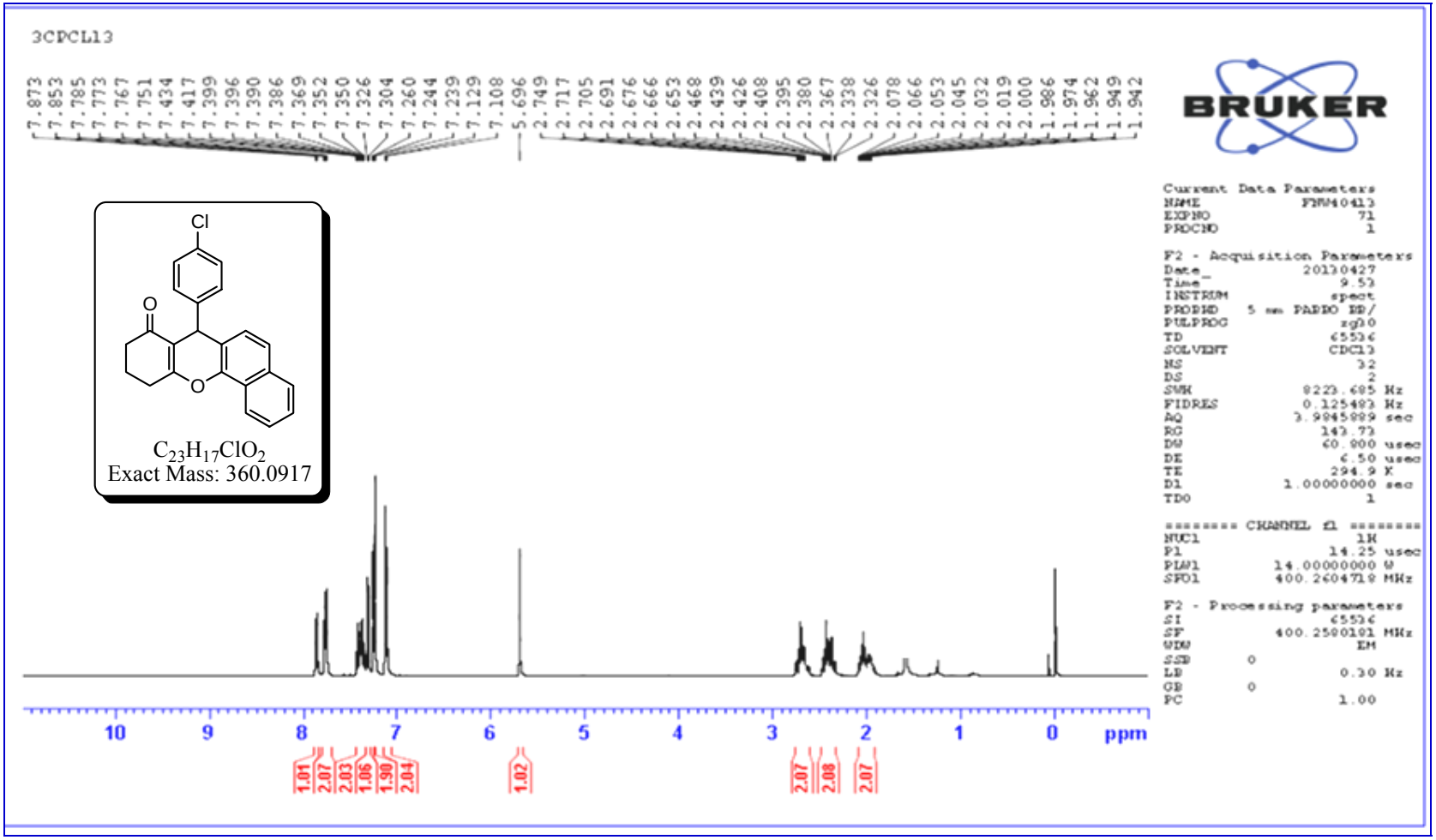
[1]H NMR Spectra of 9,10-dihydro-12-phenyl-8H-benzo[a]xanthen-11(12H)-one (7f)



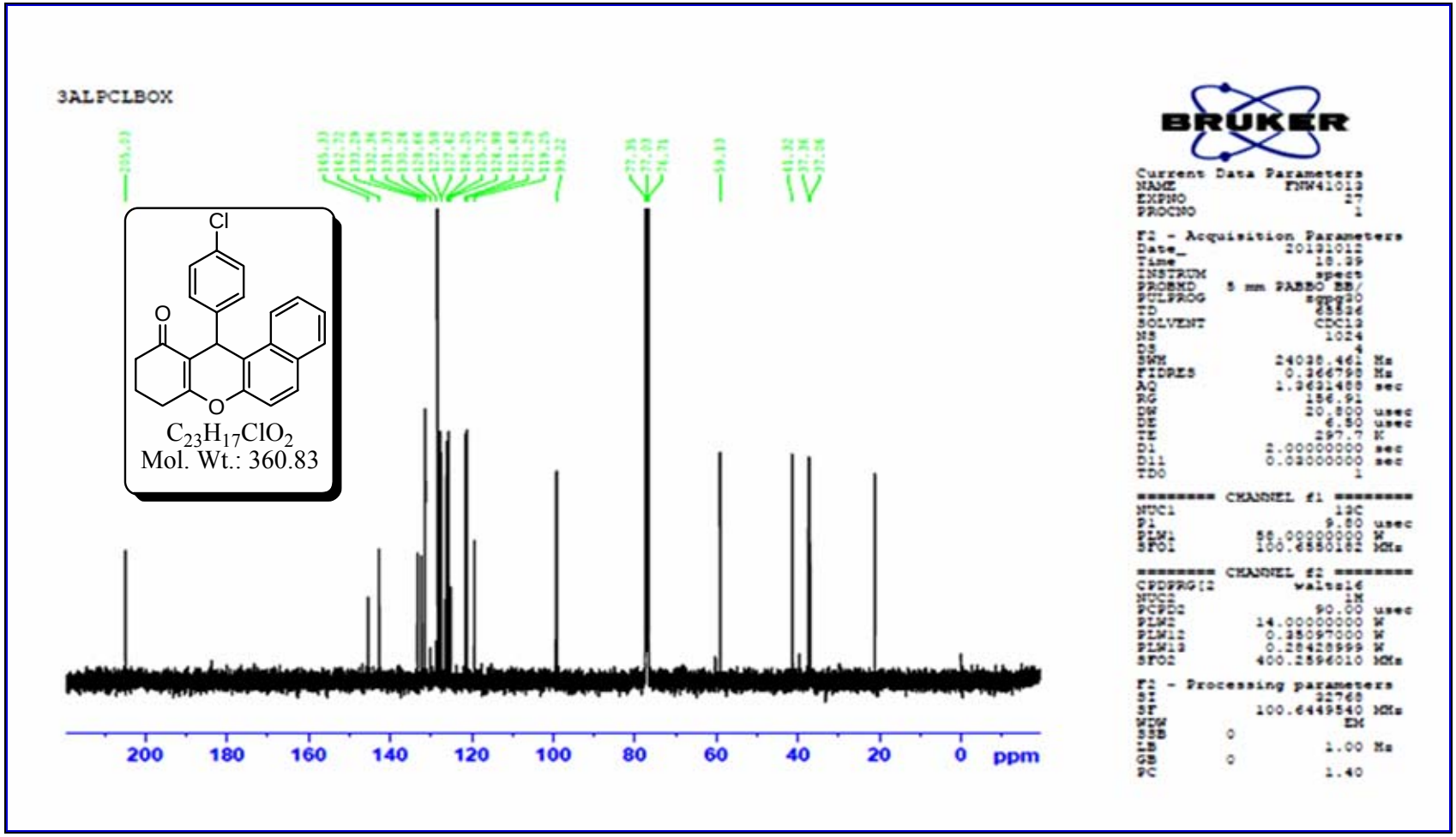
^{13}C NMR Spectra of 9,10-dihydro-12-phenyl-8H-benzo[a]xanthen-11(12H)-one (7f)



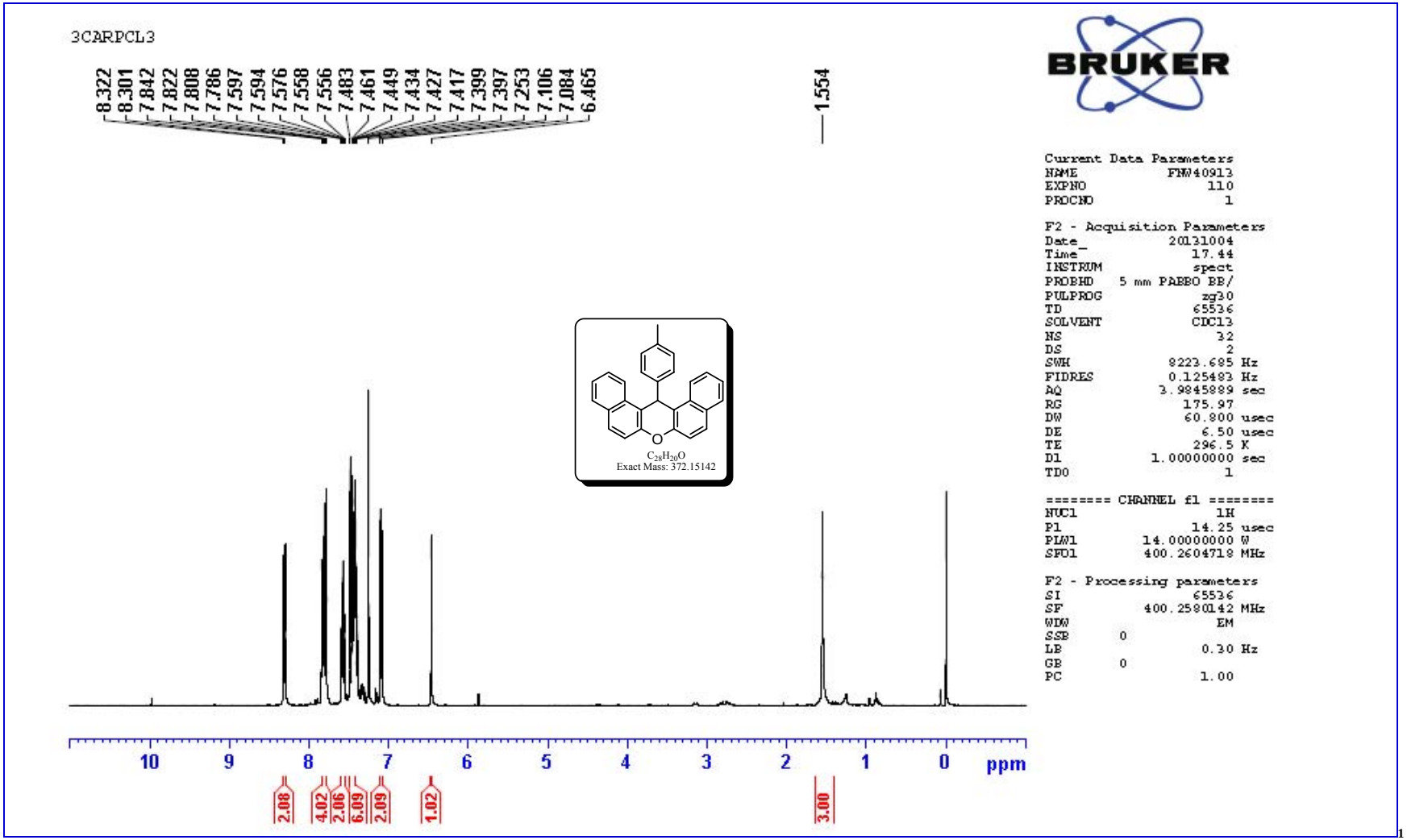
GC-MS Spectra of 9,10-dihydro-12-phenyl-8H-benzo[a]xanthen-11(12H)-one (**7f)**



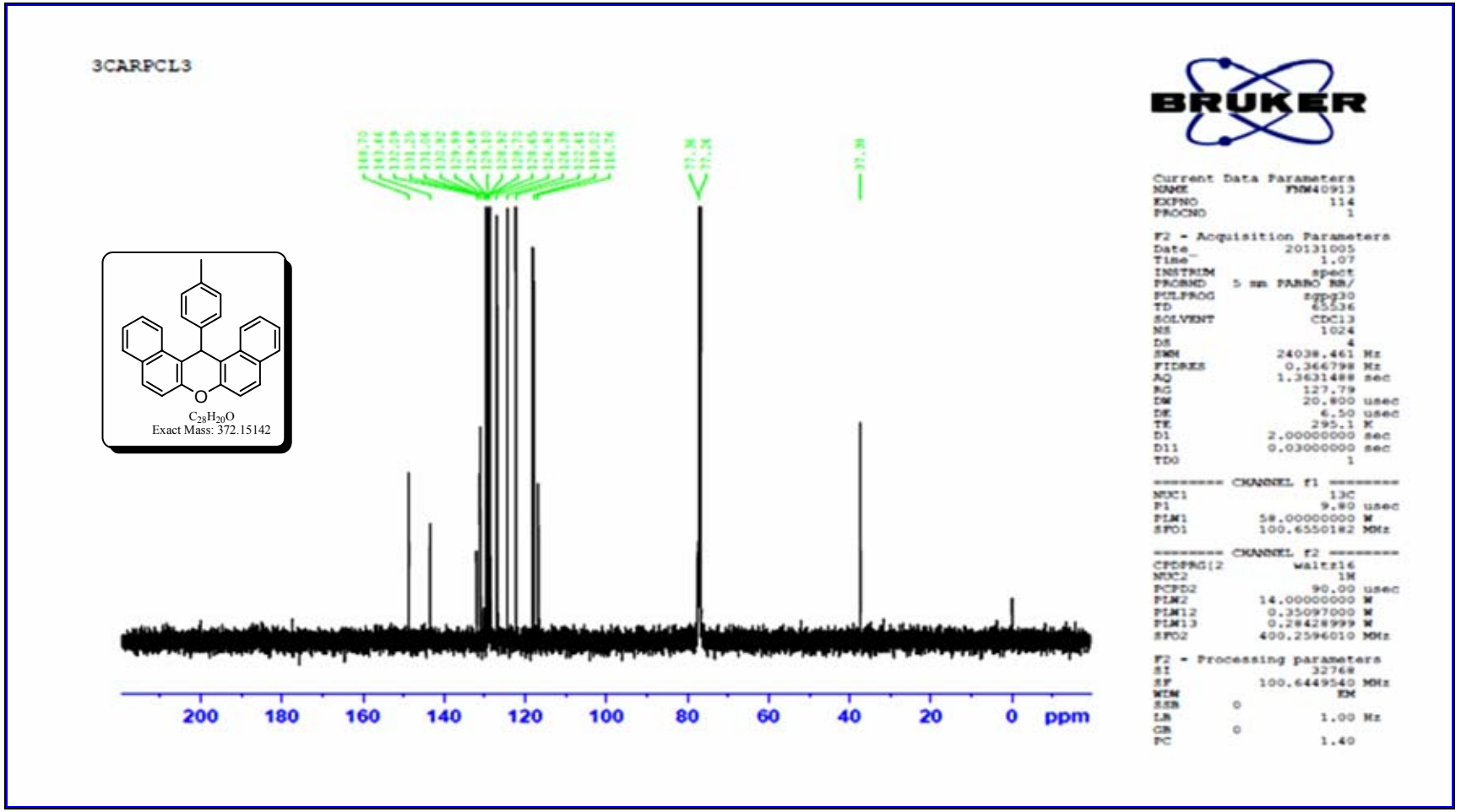
[1]HNMR Spectra of 7-(4-chlorophenyl)-10,11-dihydro-7H-benzo[c]xanthen-8(9H)-one (7g)



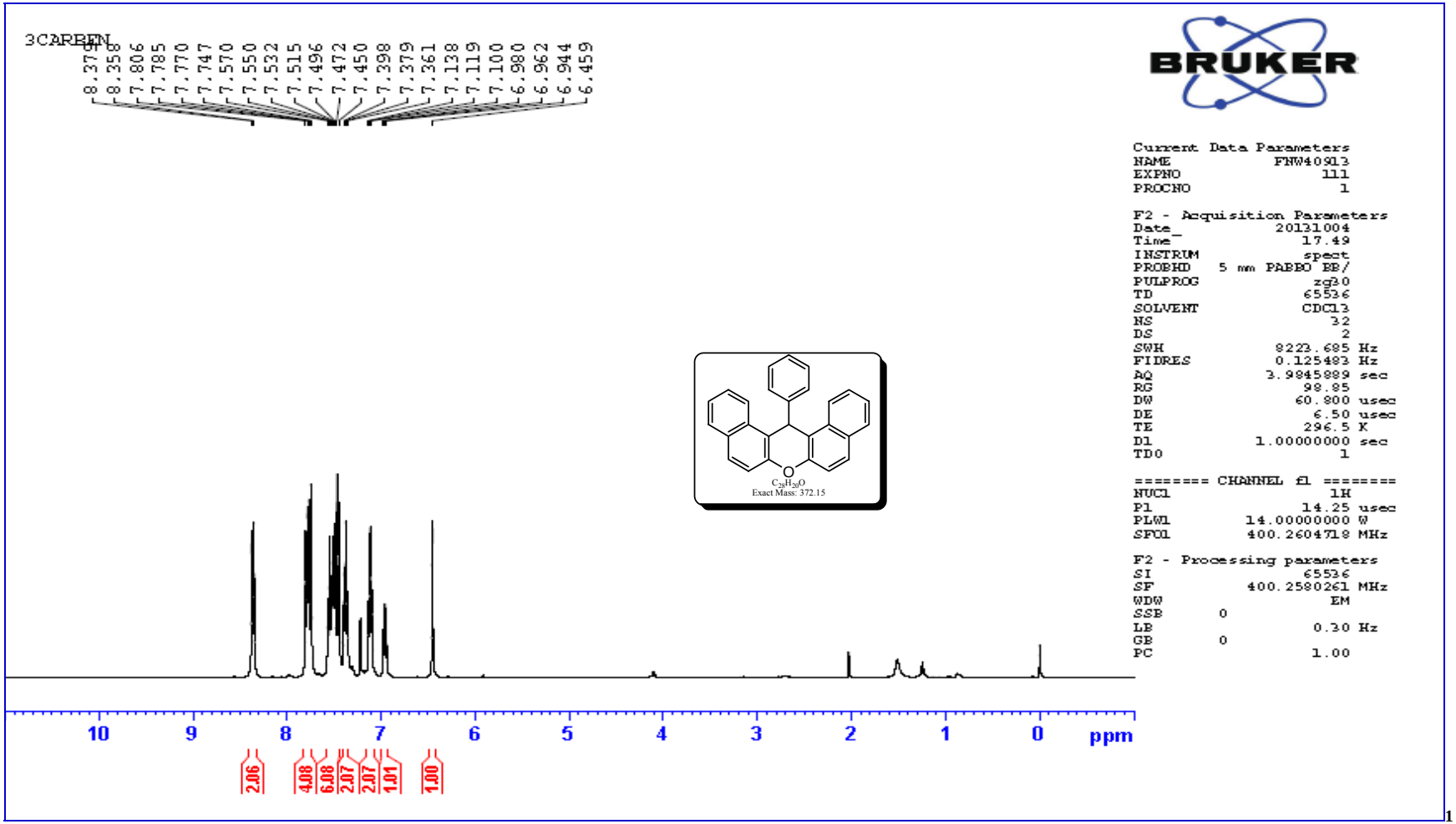
^{13}C NMR Spectra of 7-(4-chlorophenyl)-10,11-dihydro-7H-benzo[c]xanthen-8(9H)-one (7g)



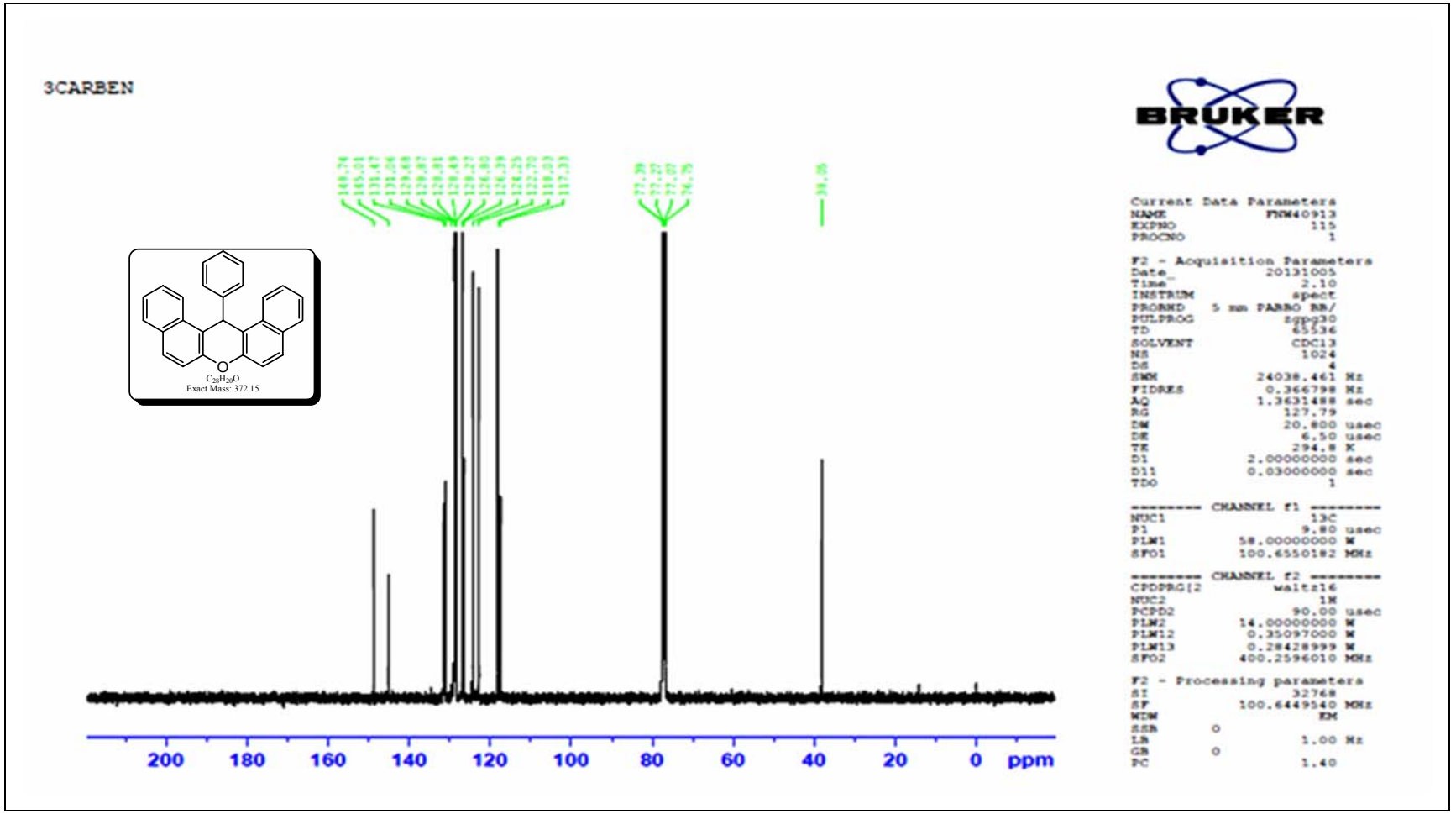
H NMR of 14-(p-methylphenyl)-14H-dibenzo[a.j]xanthene (7h)



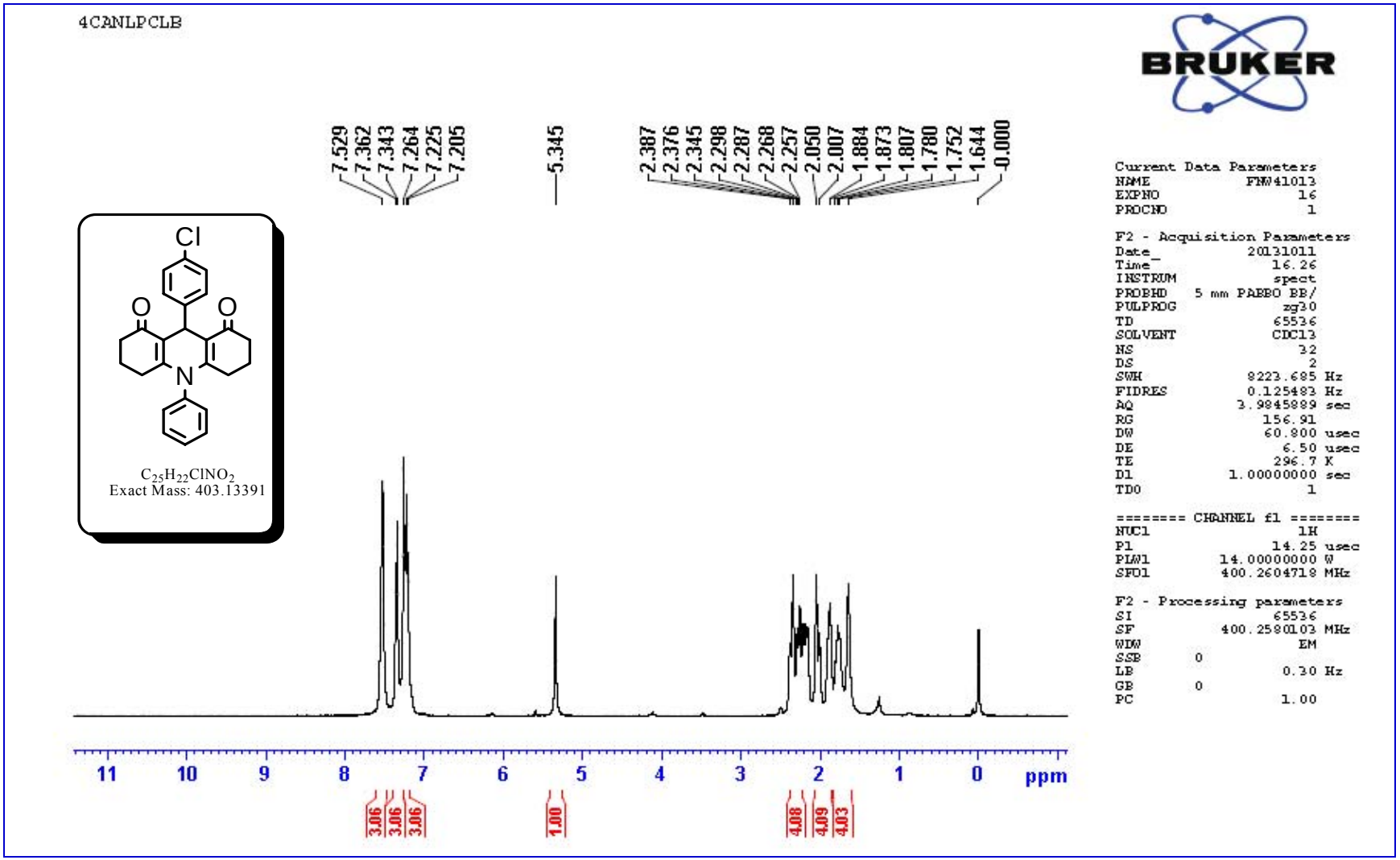
^{13}C NMR of 14-(p-methylphenyl)-14H-dibenzo[a.j]xanthene (7h)



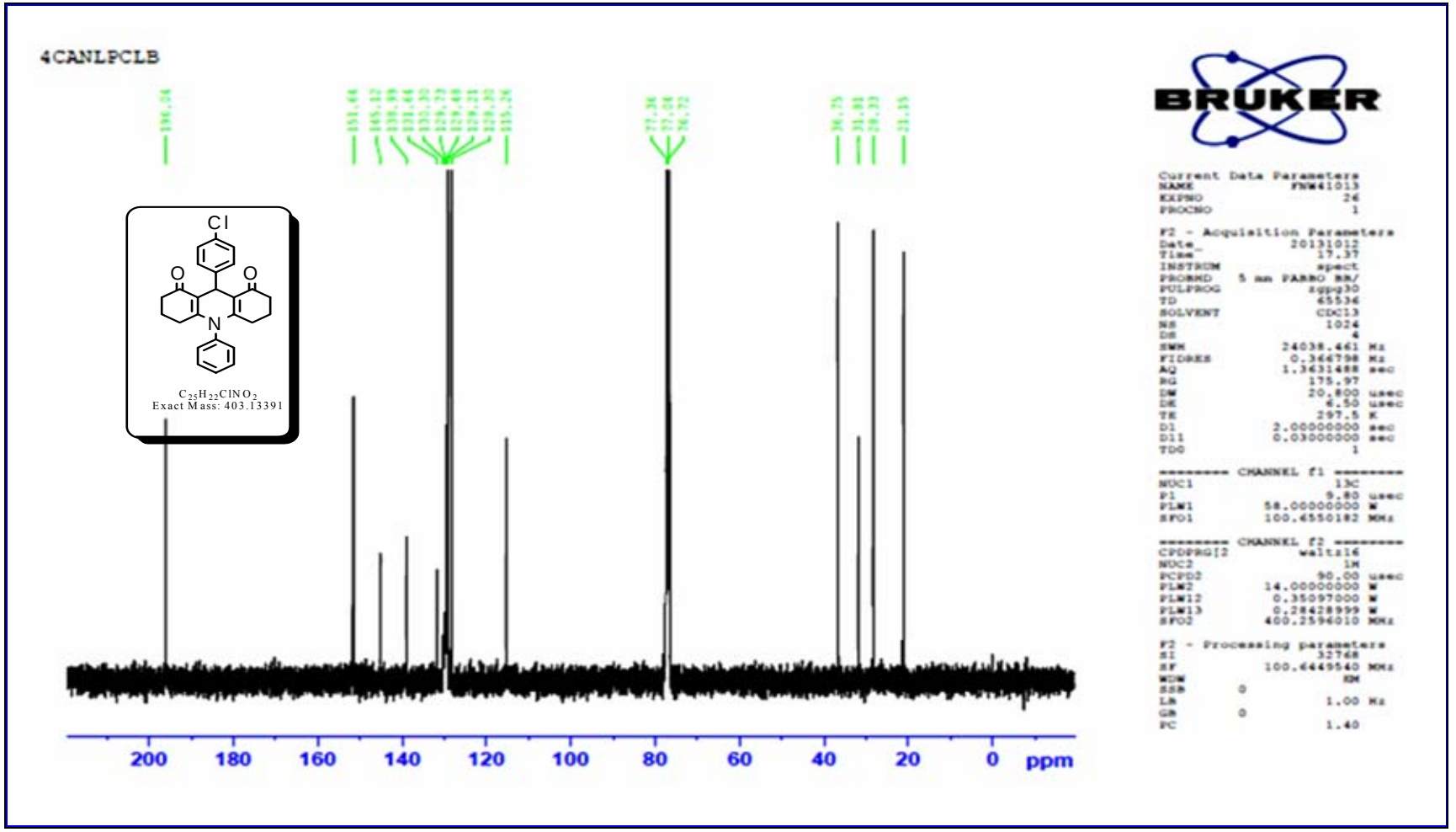
H NMR of 14-(phenyl)-14H-dibenzo[a.j]xanthenes (7i)



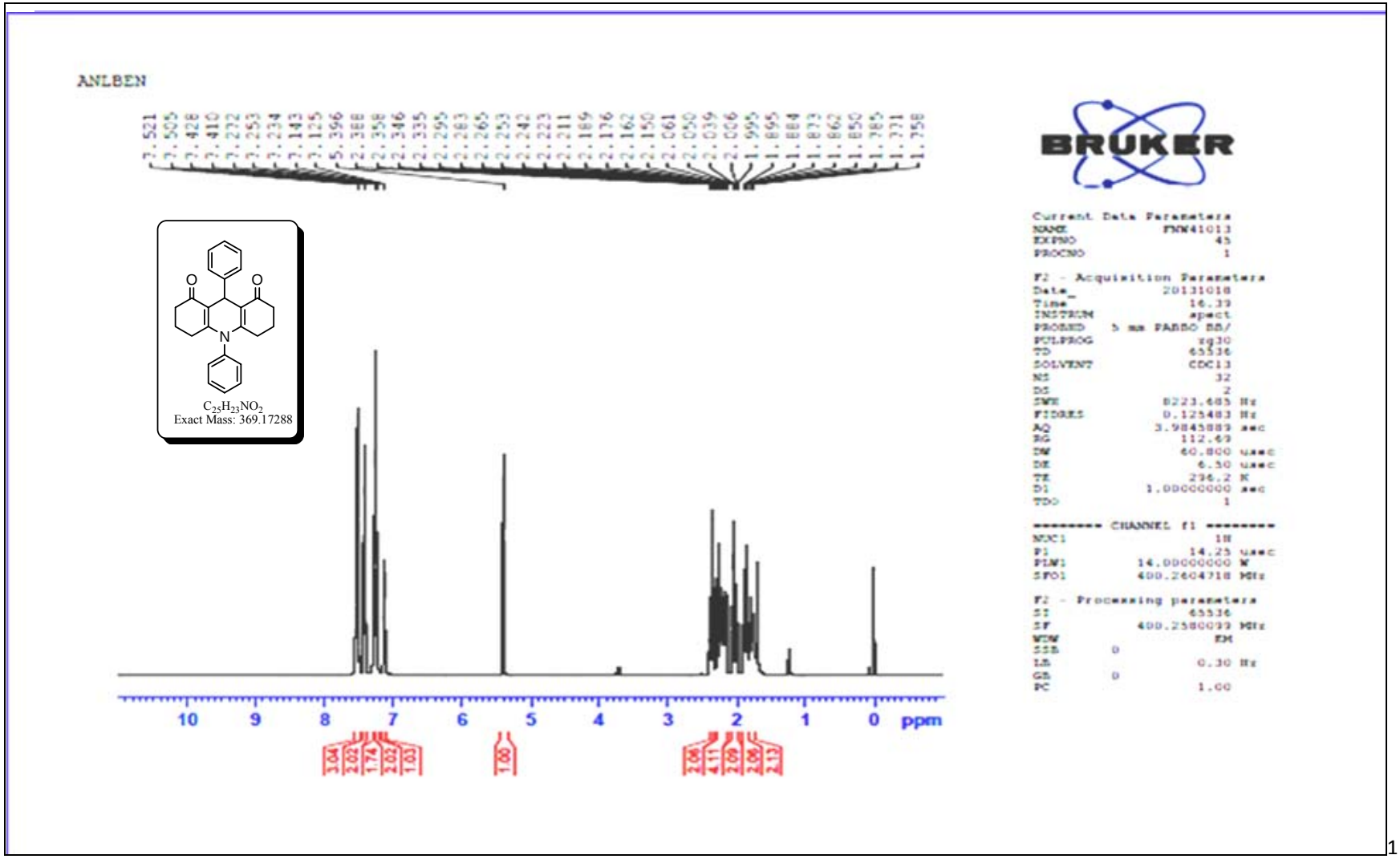
^{13}C NMR of 14-(phenyl)-14H-dibenzo[a.j]xanthenes (7i)



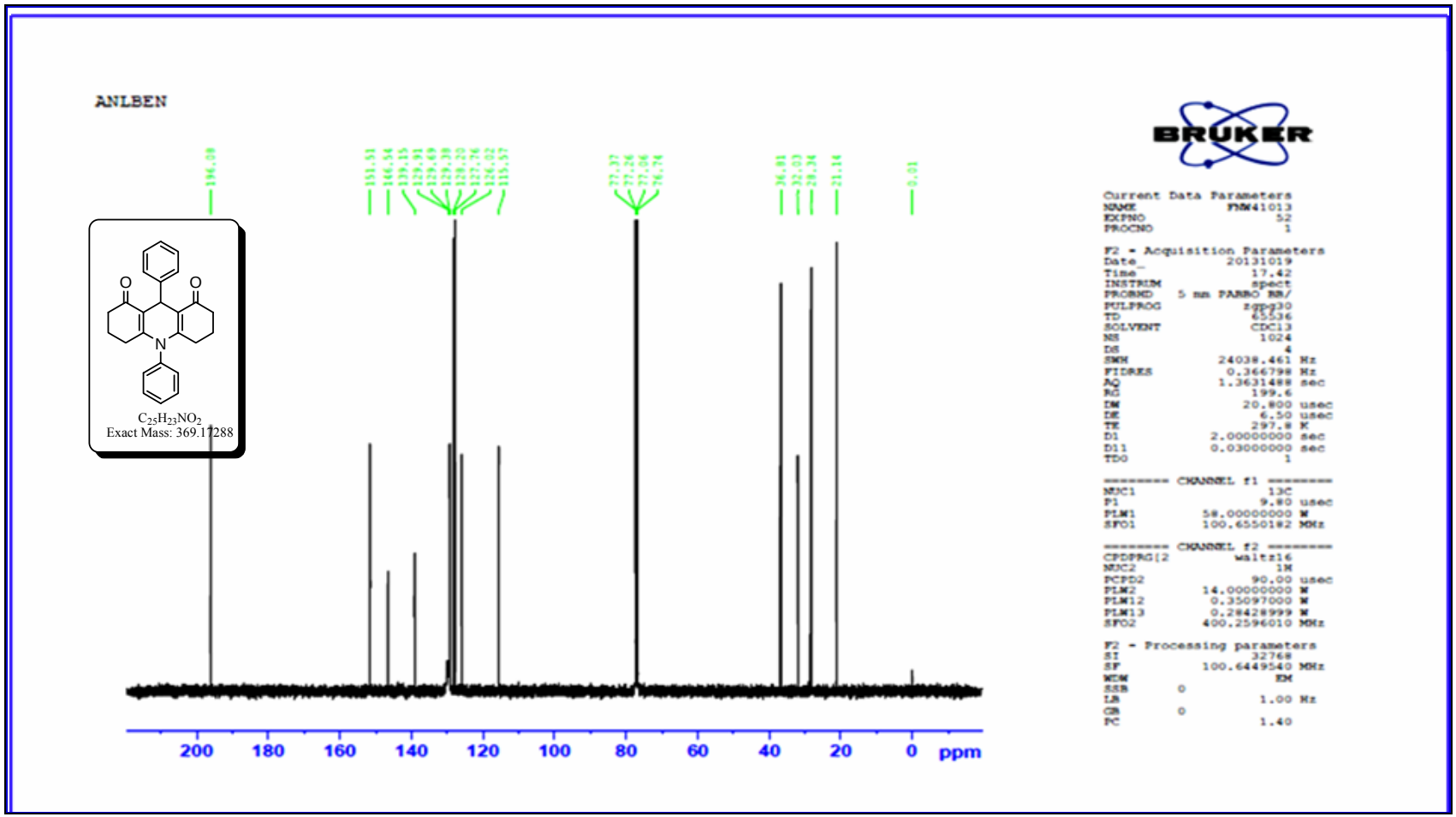
[1]H NMR of 9-(4-chlorophenyl)-3,4,6,7-tetrahydro-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (8a)



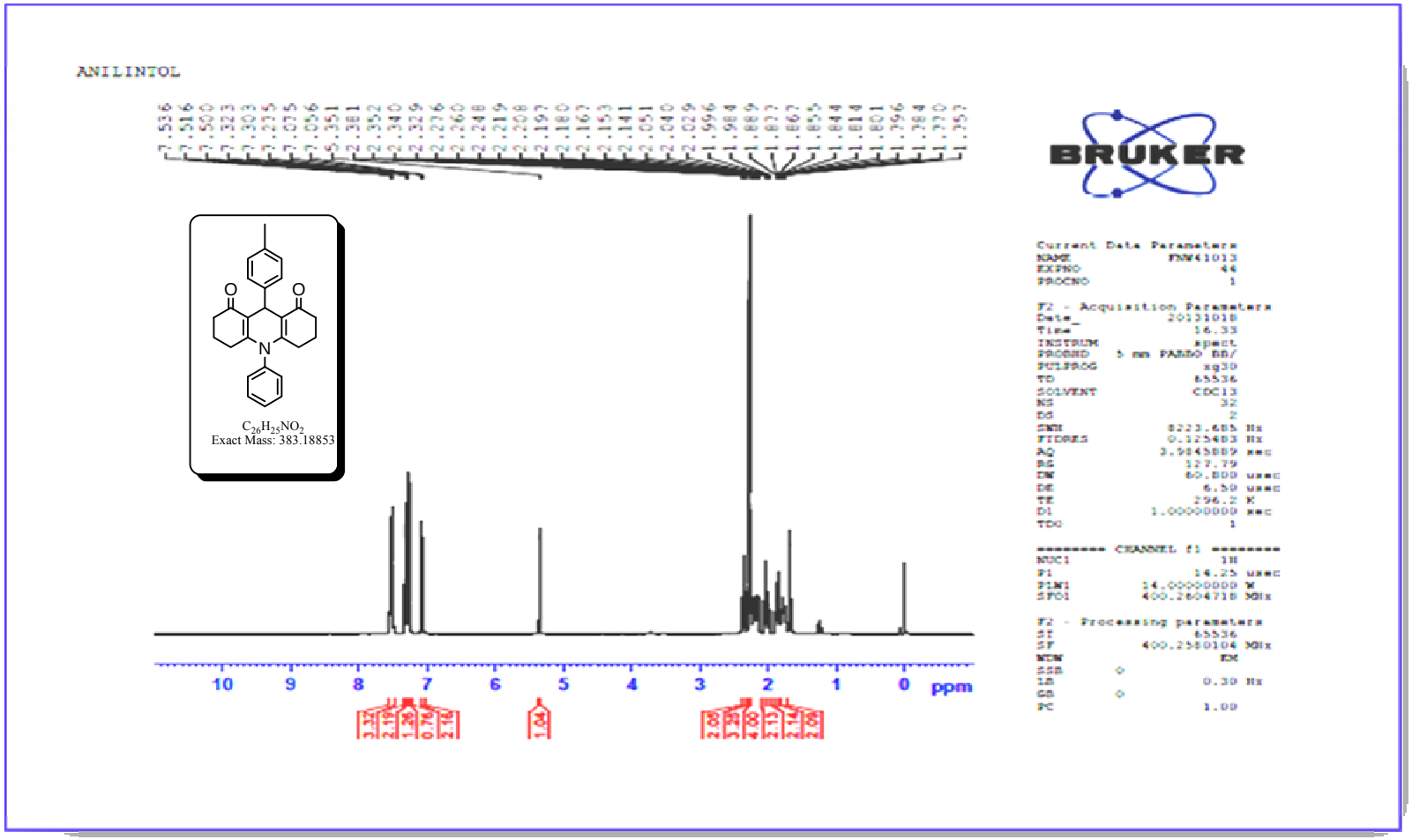
^{13}C NMR of 9-(4-chlorophenyl)-3,4,6,7-tetrahydro-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (8a)



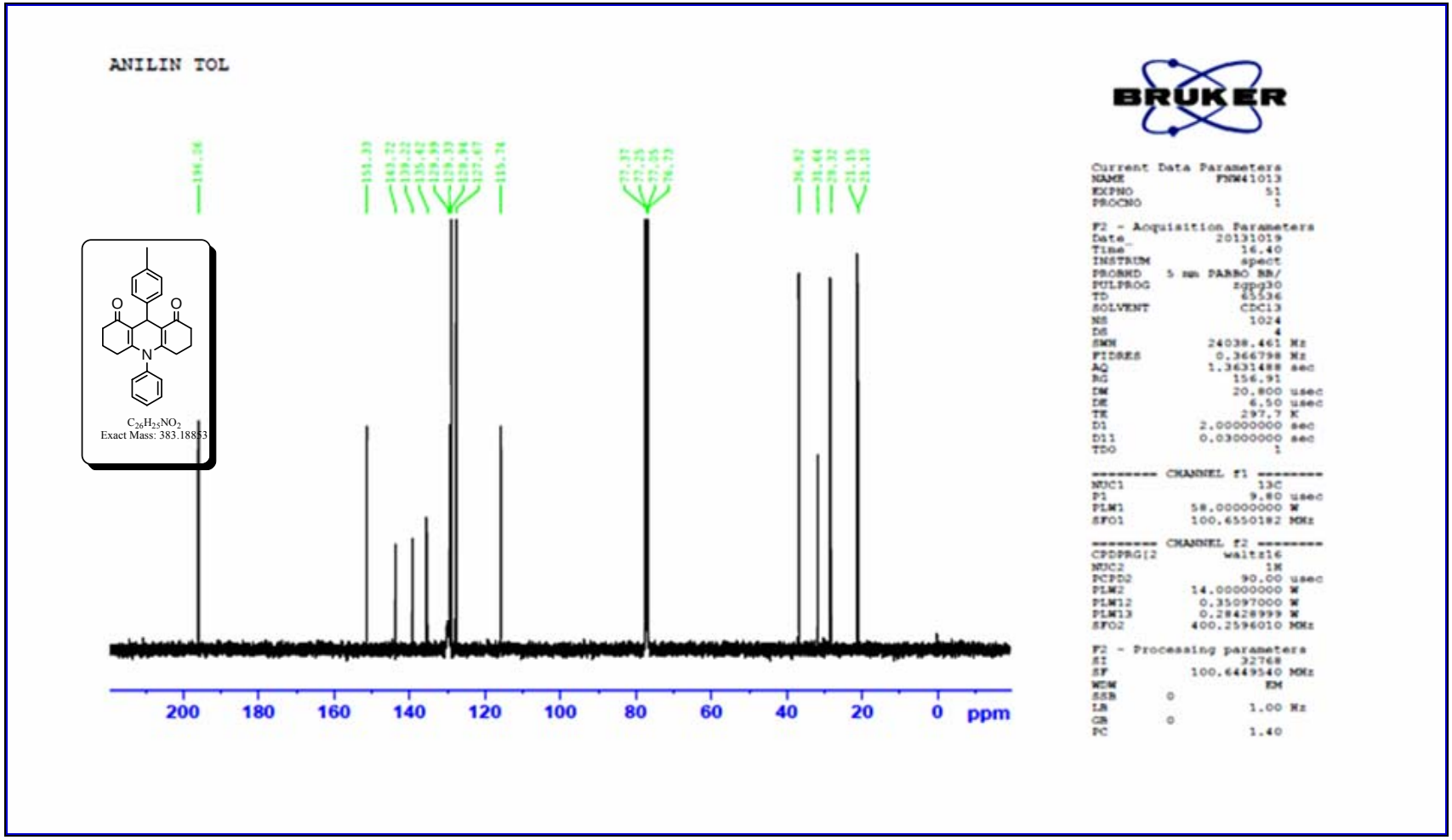
H ^{1}H NMR of 3,4,6,7-tetrahydro-9,10-diphenylacridine-1,8(2H,5H,9H,10H)-dione (8b)



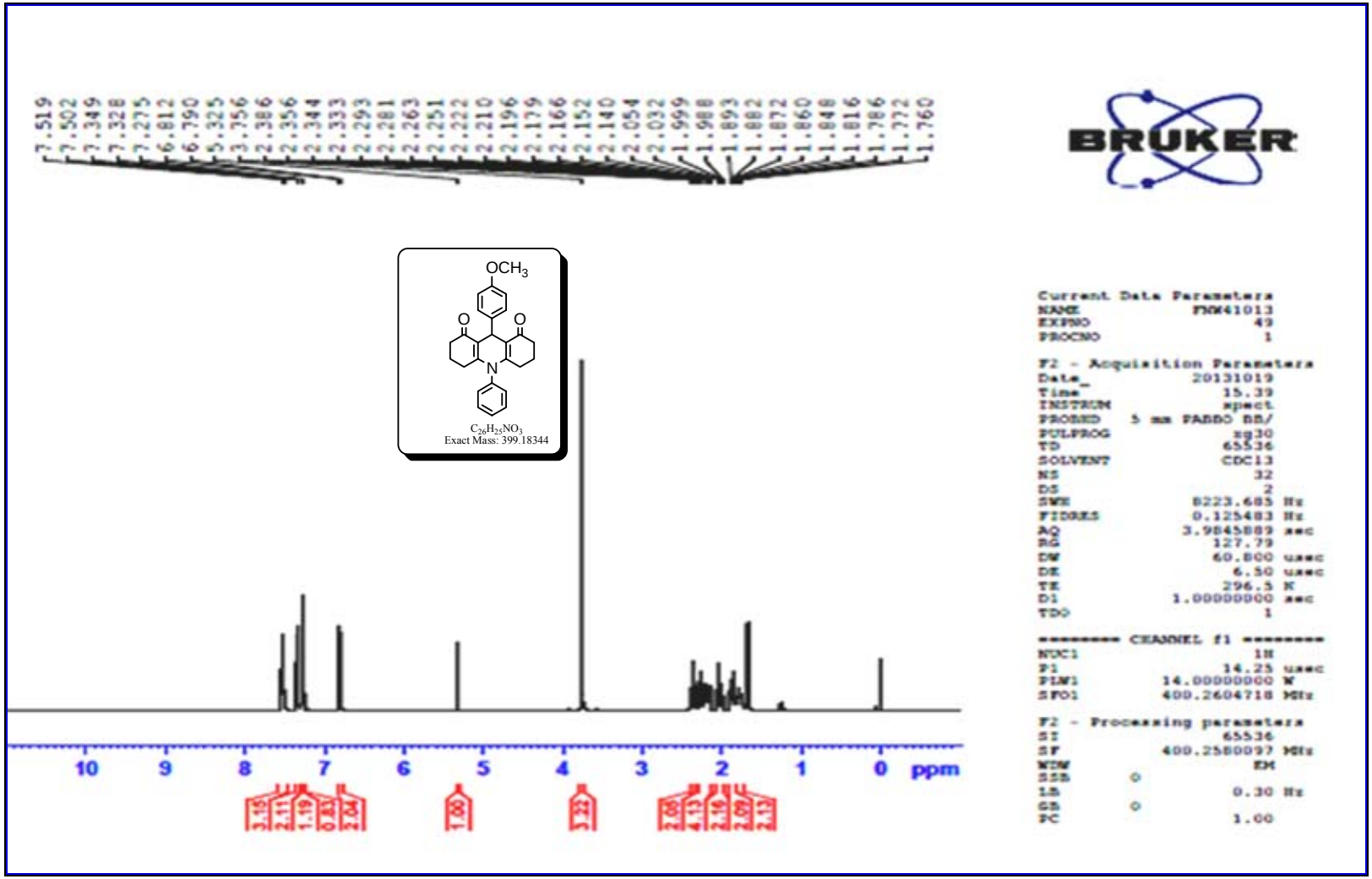
^{13}C NMR of 3,4,6,7-tetrahydro-9,10-diphenylacridine-1,8(2H,5H,9H,10H)-dione (8b)



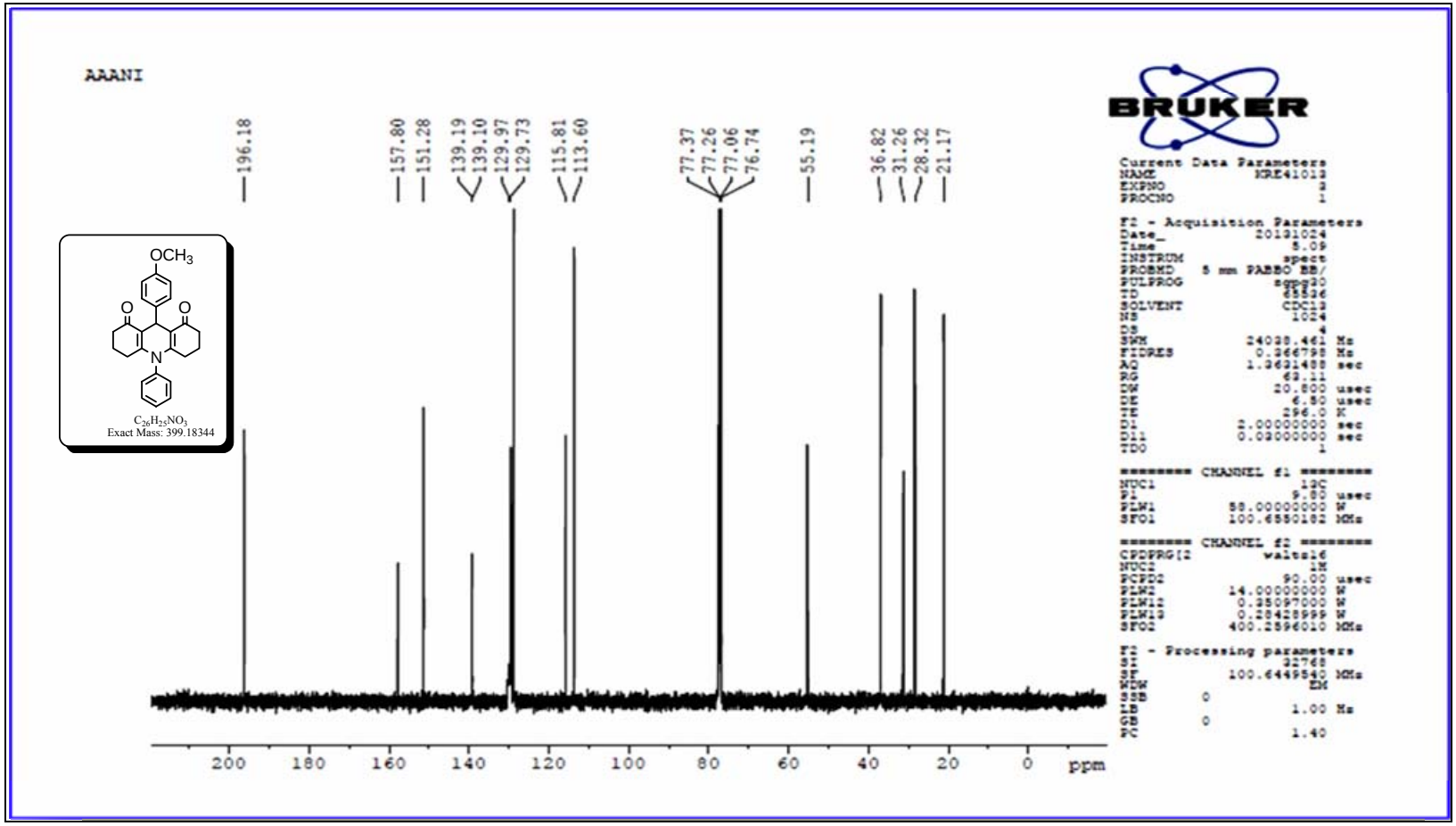
[1]H NMR of 3,4,6,7-tetrahydro-10-phenyl-9-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (8c)



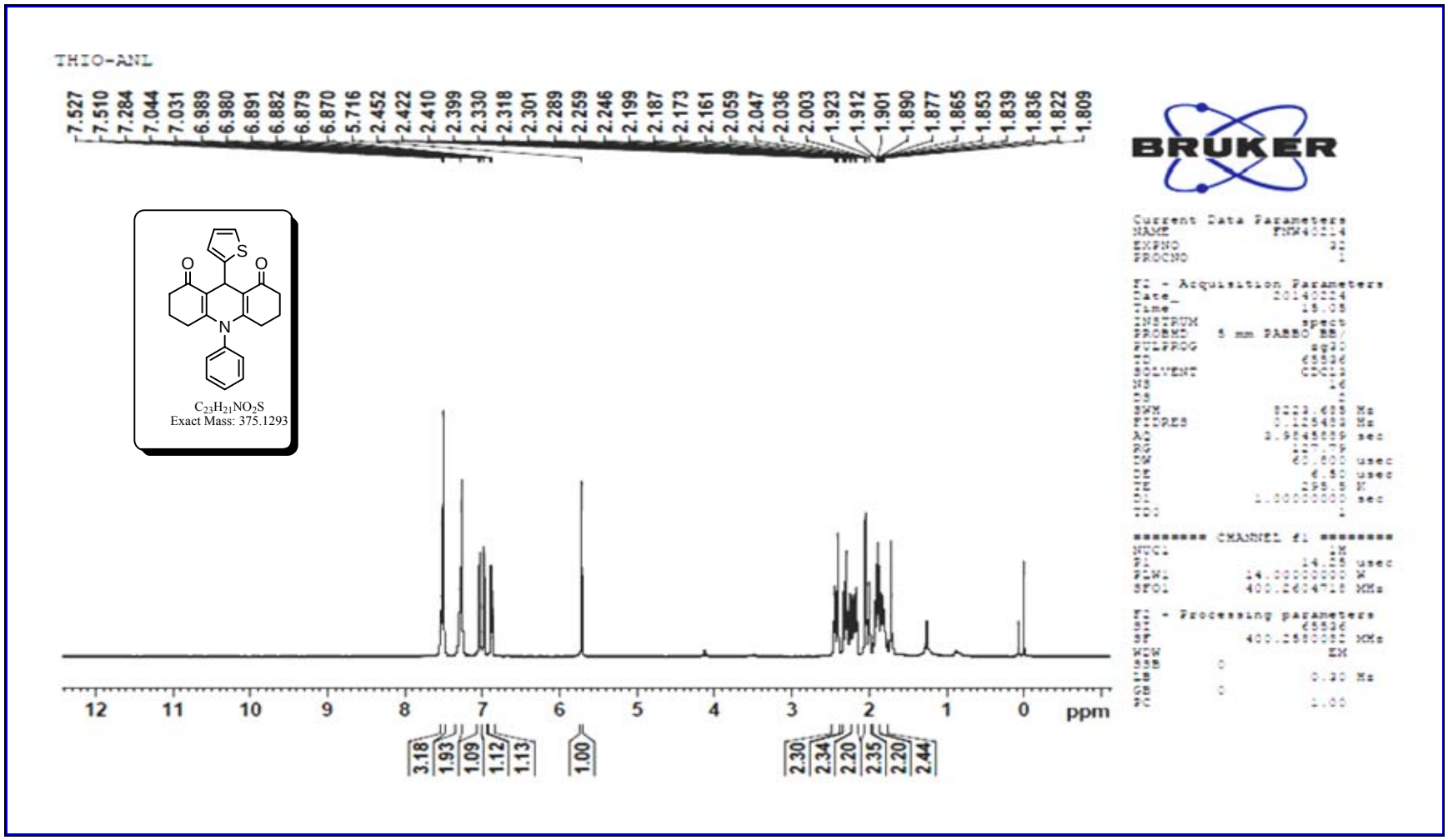
^{13}C NMR of 3,4,6,7-tetrahydro-10-phenyl-9-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (8c)



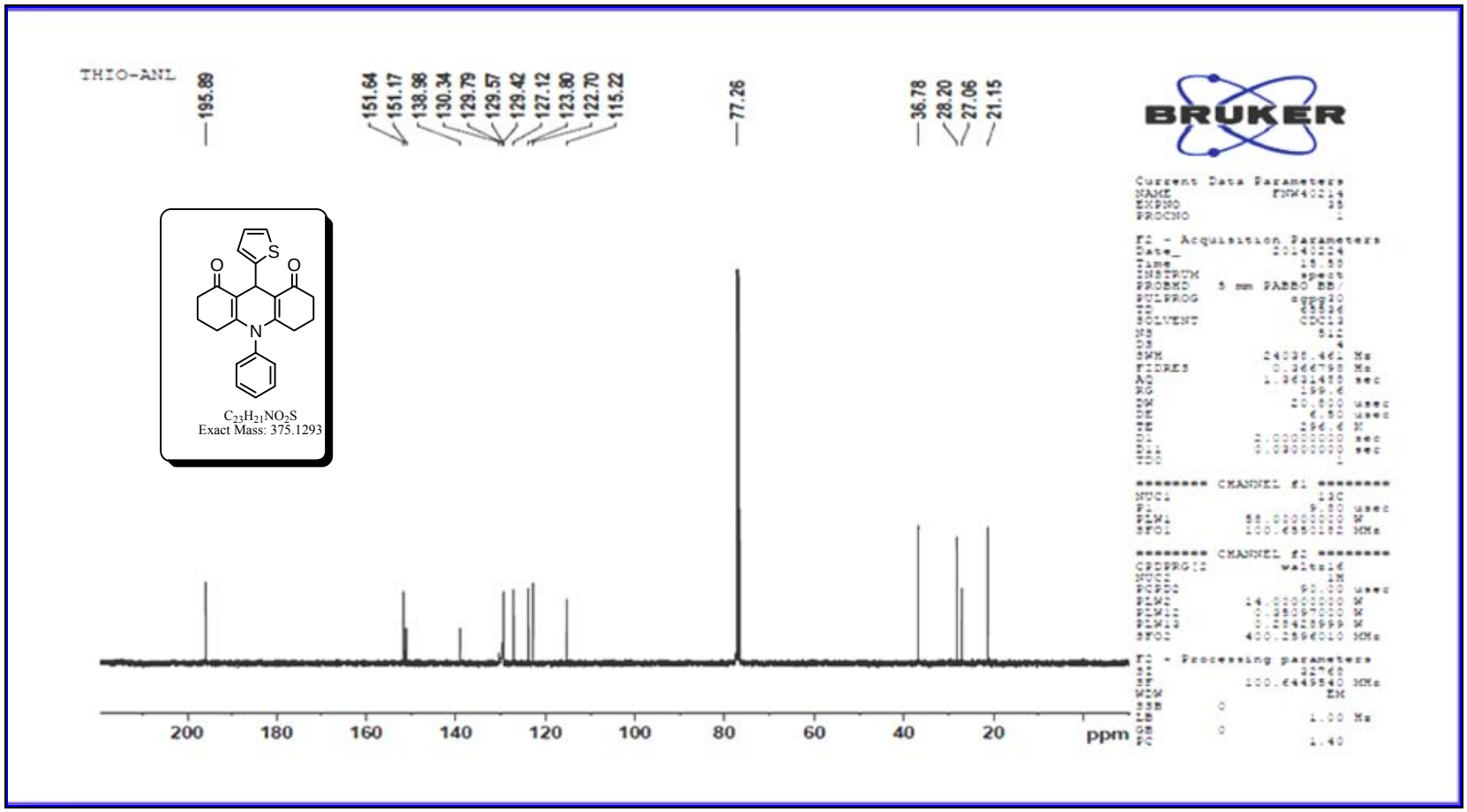
^{1}H NMR of 3,4,6,7-tetrahydro-9-(4-methoxyphenyl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (8d)



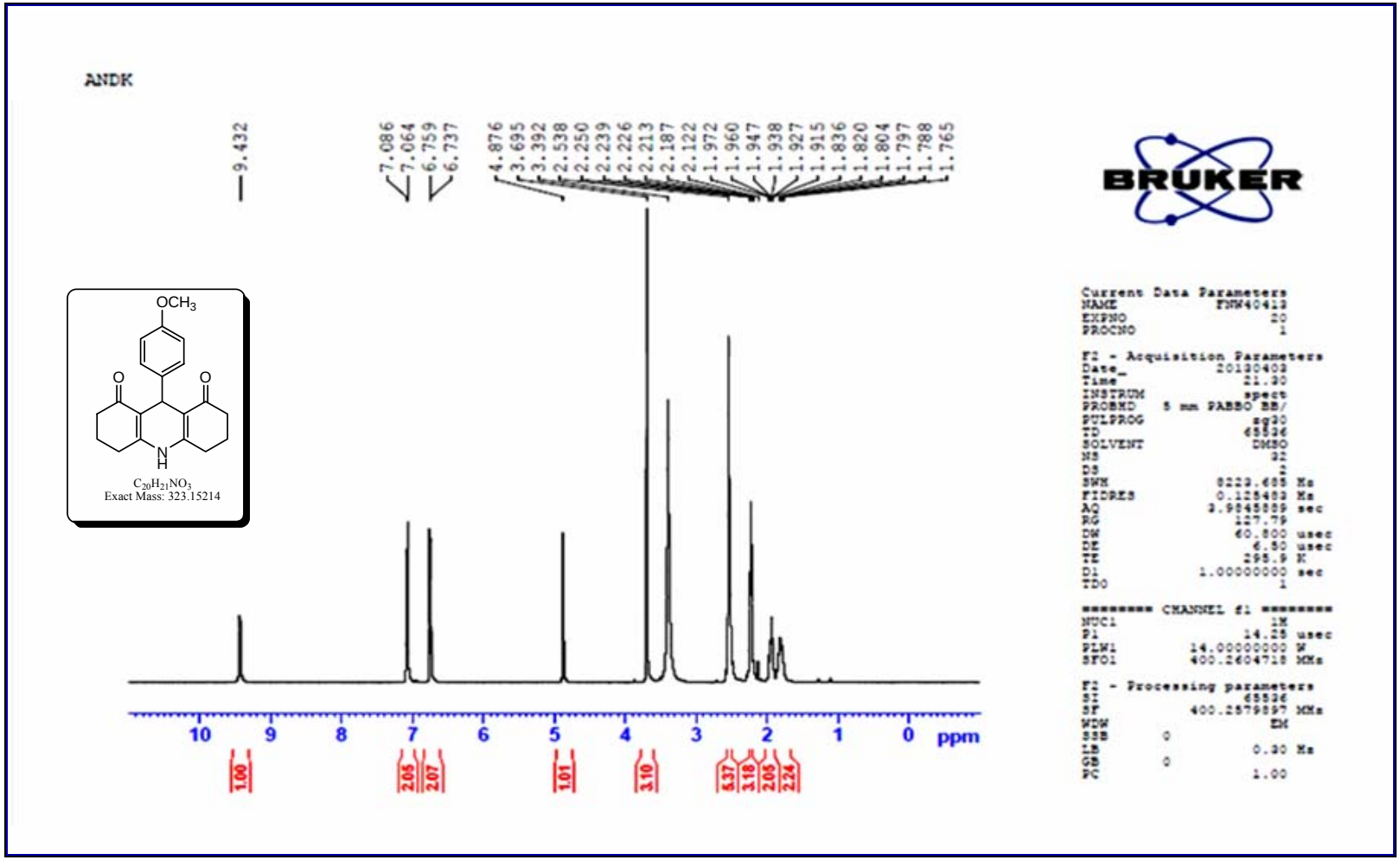
^{13}C NMR of 3,4,6,7-tetrahydro-9-(4-methoxyphenyl)-10-phenylacridine-1,8(2H,5H,9H,10H)-dione (8d)



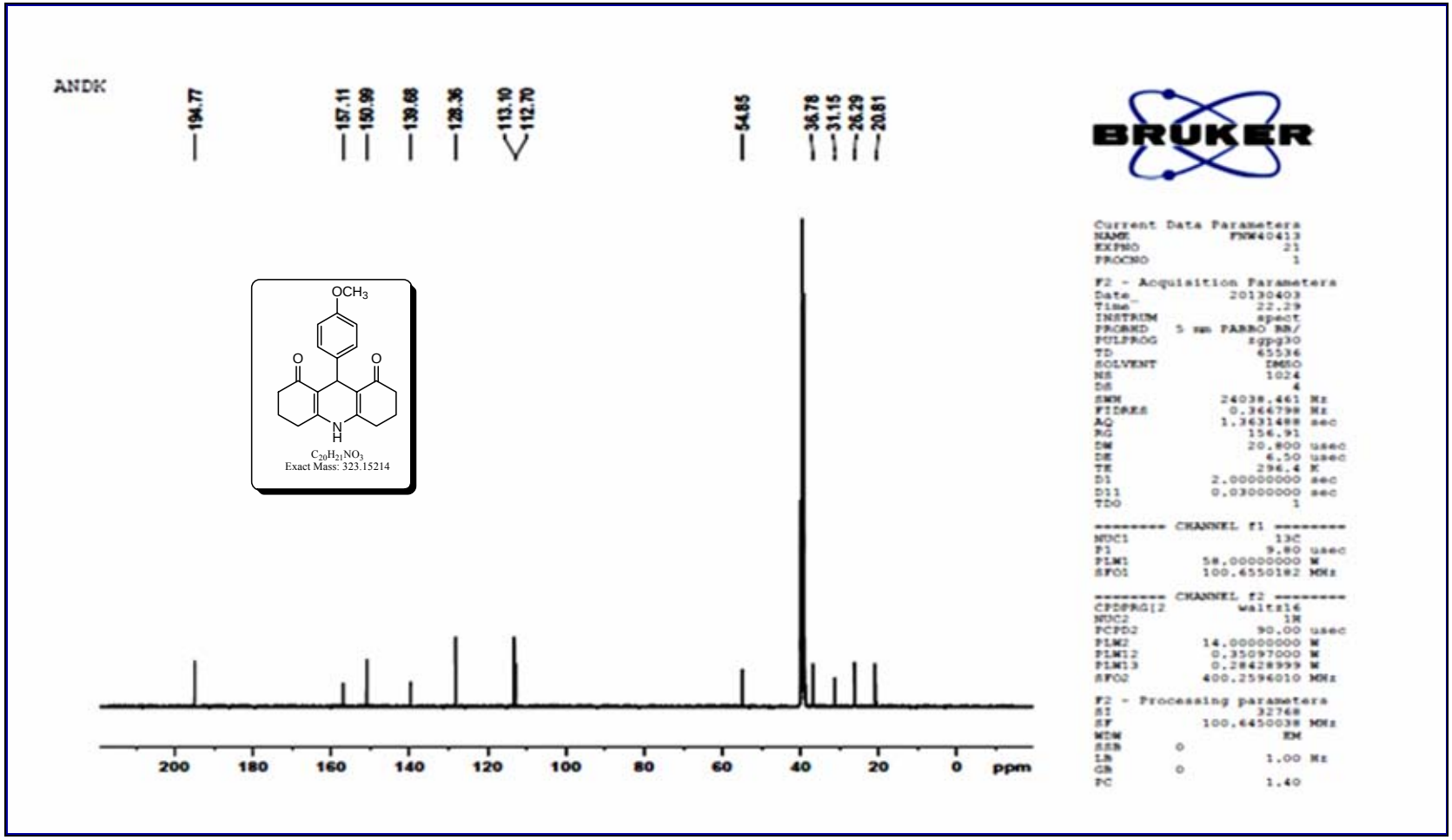
[1]H NMR of 3,4,6,7-tetrahydro-10-phenyl-9-(thiophen-2-yl)acridine-1,8(2H,5H,9H,10H)-dione (8e)



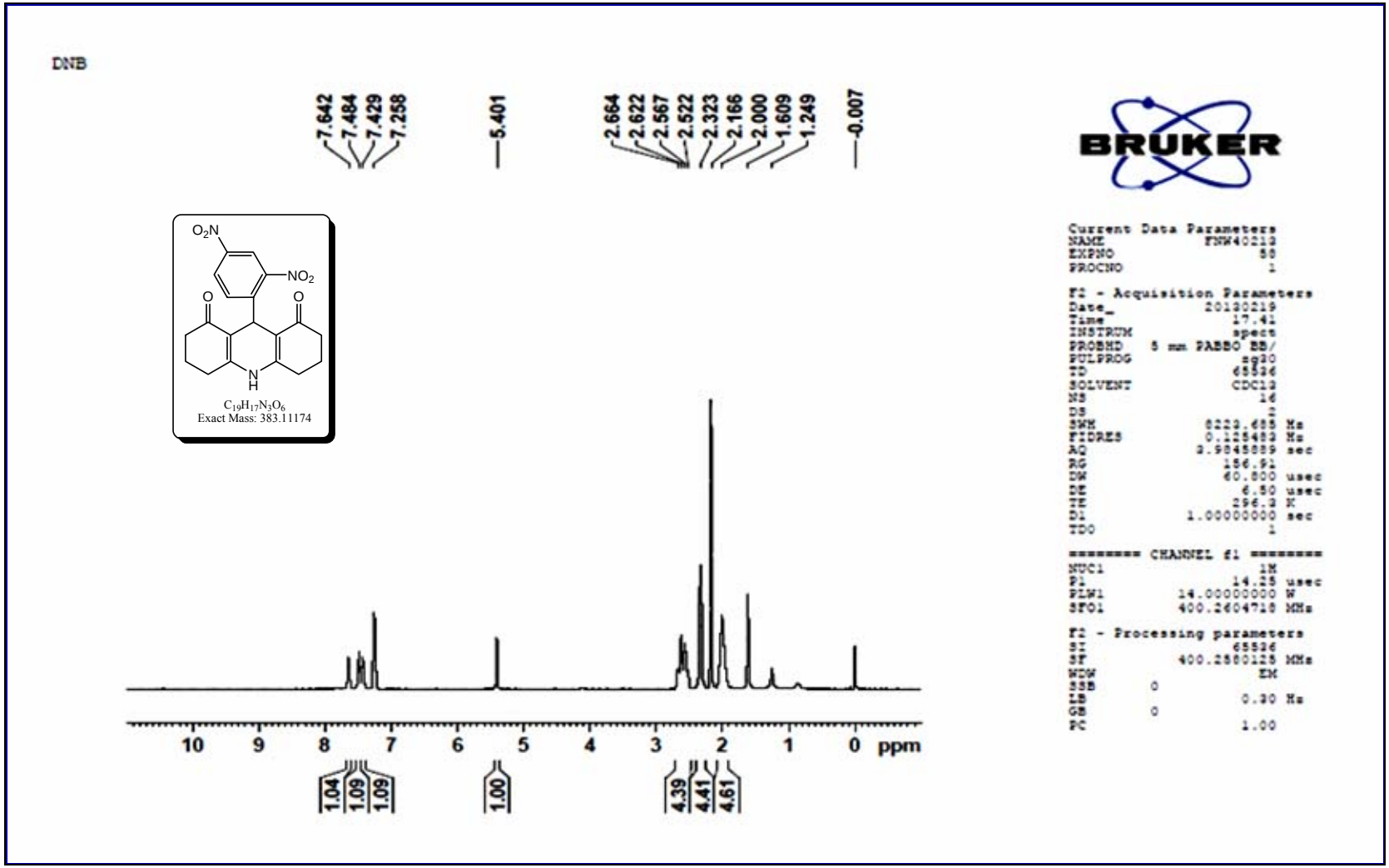
^{13}C NMR of 3,4,6,7-tetrahydro-10-phenyl-9-(thiophen-2-yl)acridine-1,8(2H,5H,9H,10H)-dione (8e)



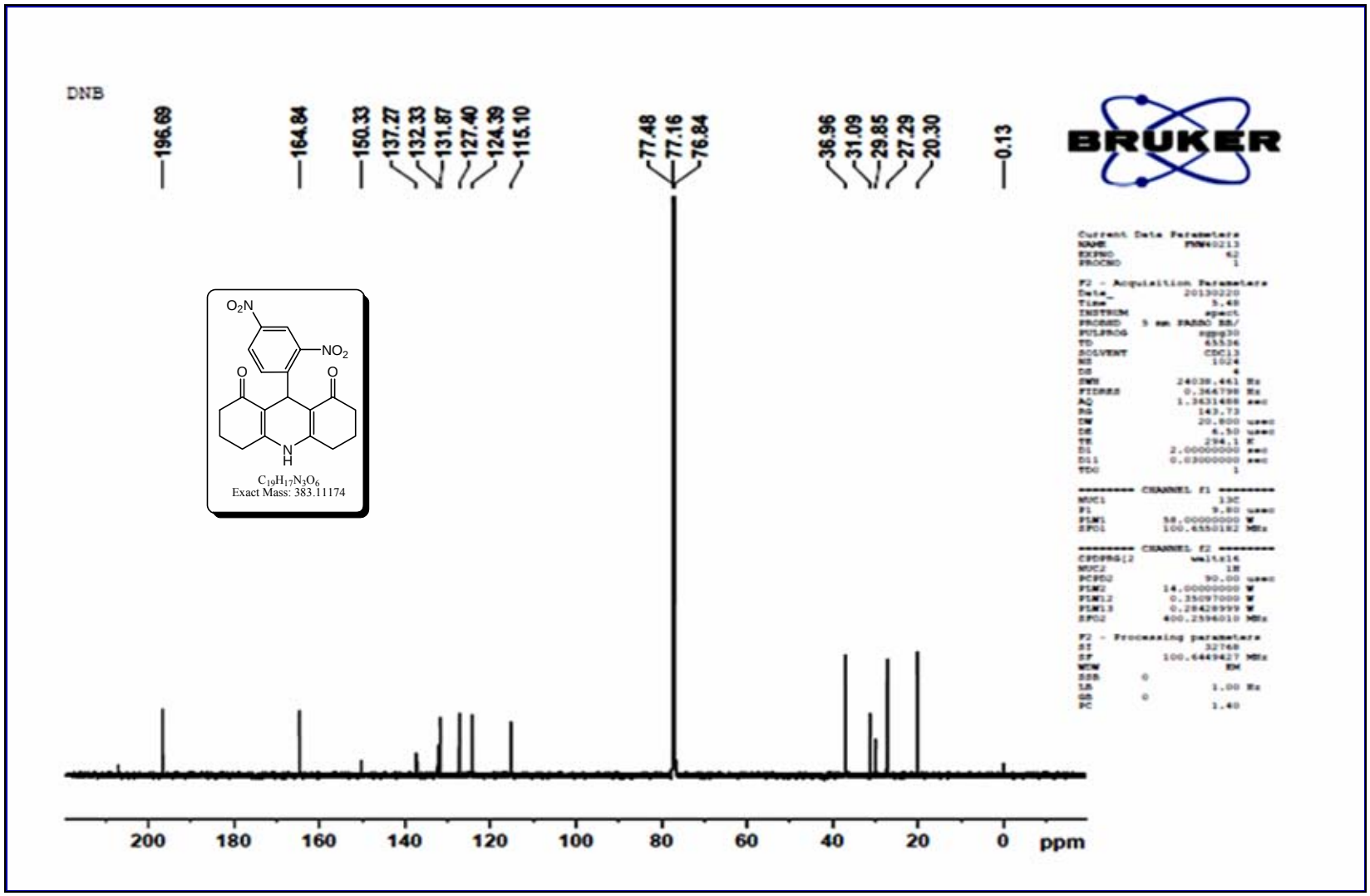
[1]H NMR Spectra of 3,4,6,7-tetrahydro-9-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (8f)



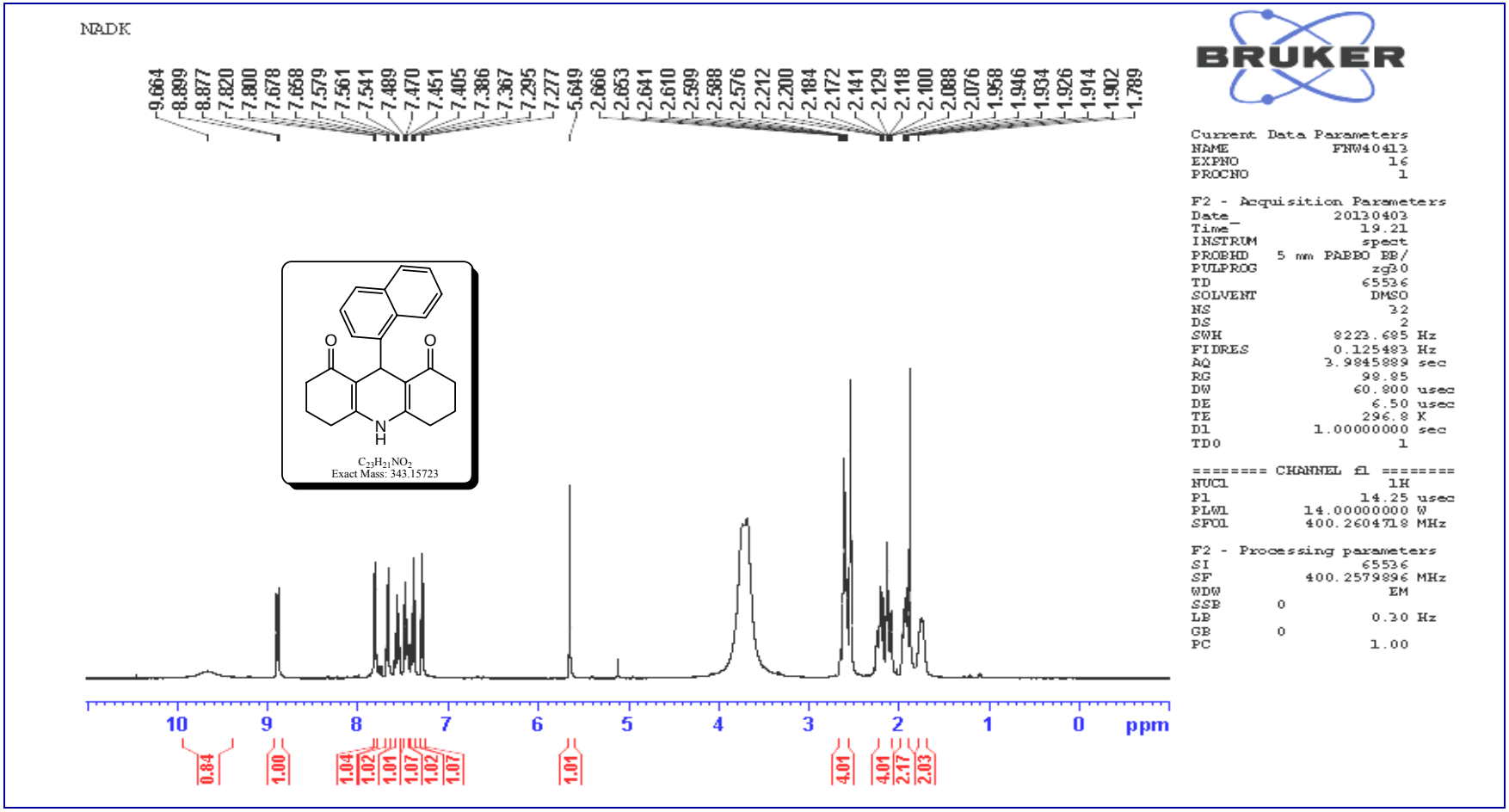
^{13}C NMR Spectra of 3,4,6,7-tetrahydro-9-(4-methoxyphenyl)acridine-1,8(2H,5H,9H,10H)-dione (8f)



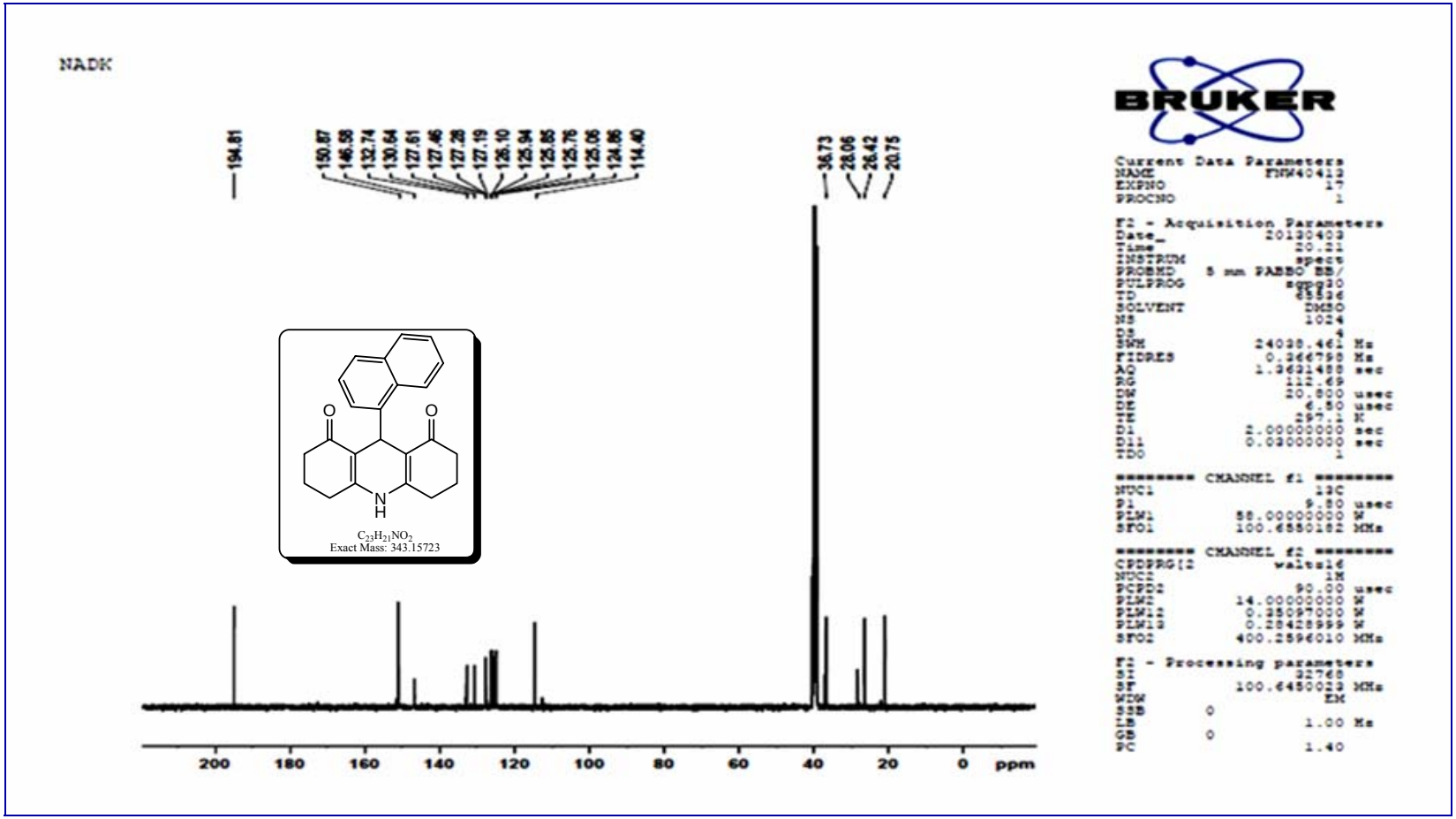
[1]H NMR Spectra of 3,4,6,7-tetrahydro-9-(2,4-dinitrophenyl)acridine-1,8(2H,5H,9H,10H)-dione (8g)



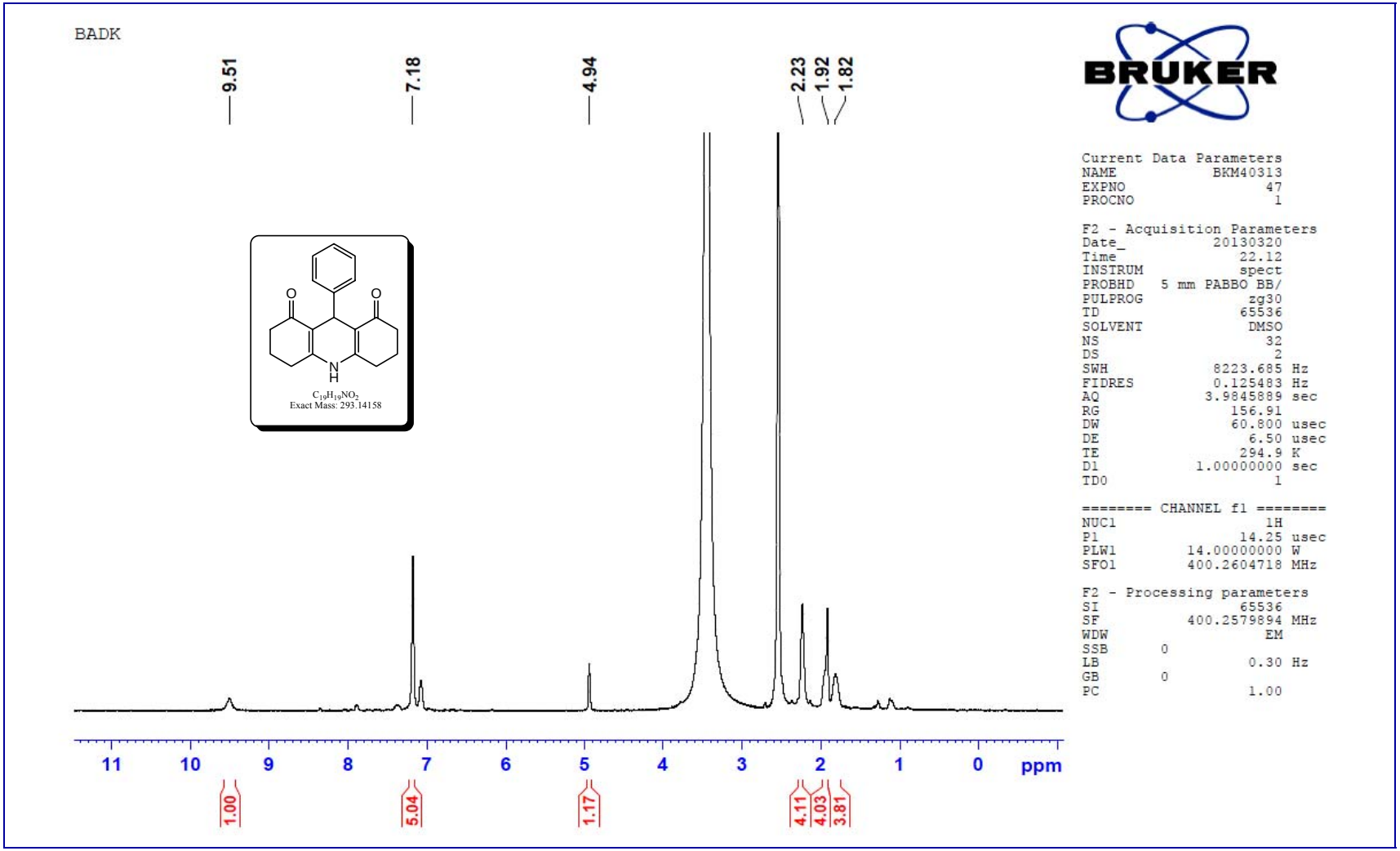
^{13}C NMR Spectra of 3,4,6,7-tetrahydro-9-(2,4-dinitrophenyl)acridine-1,8(2H,5H,9H,10H)-dione (8g)



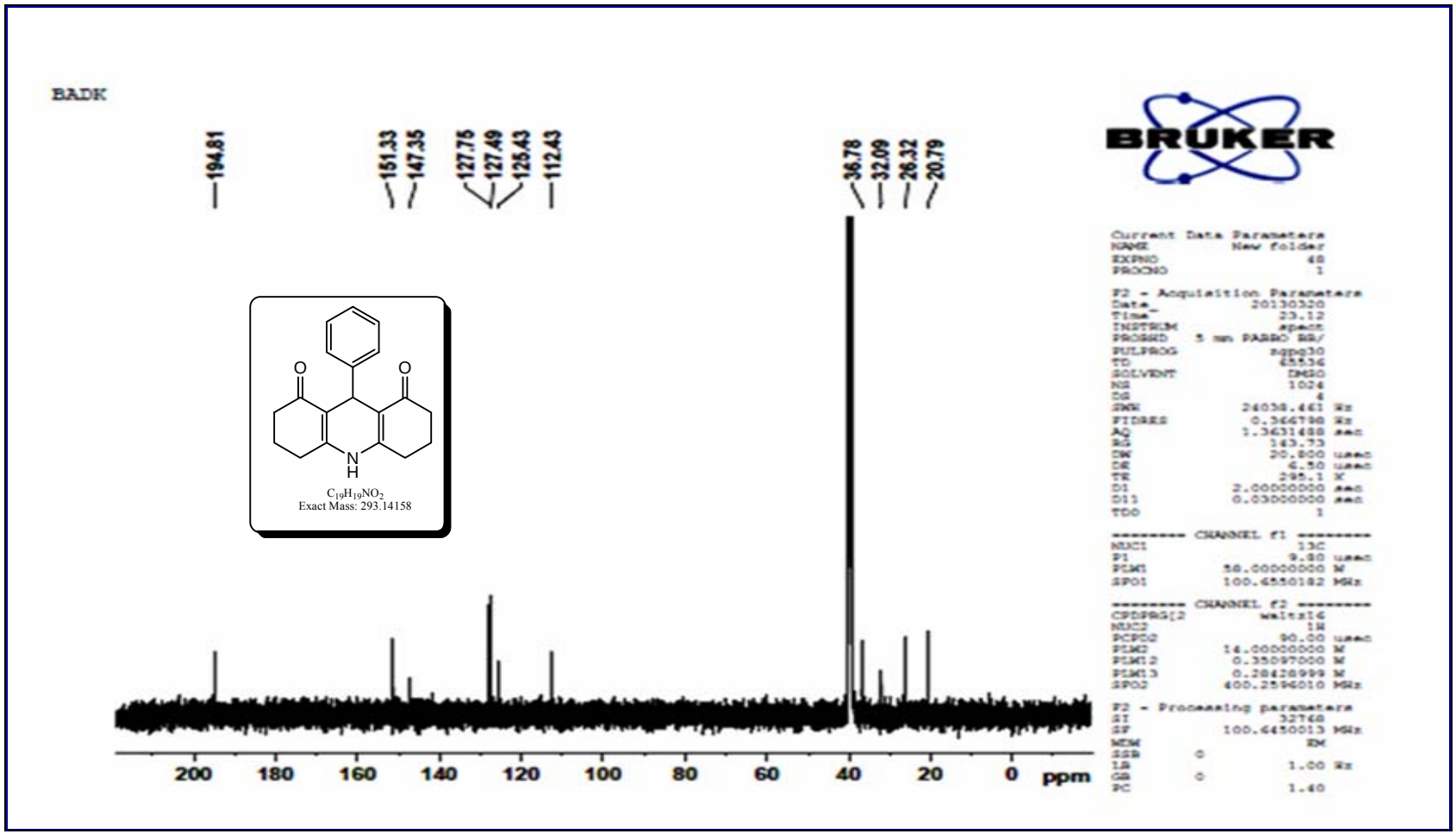
[1]H NMR Spectra of 3,4,6,7-tetrahydro-9-(naphthalen-1-yl)acridine-1,8(2H,5H,9H,10H)-dione (8h)



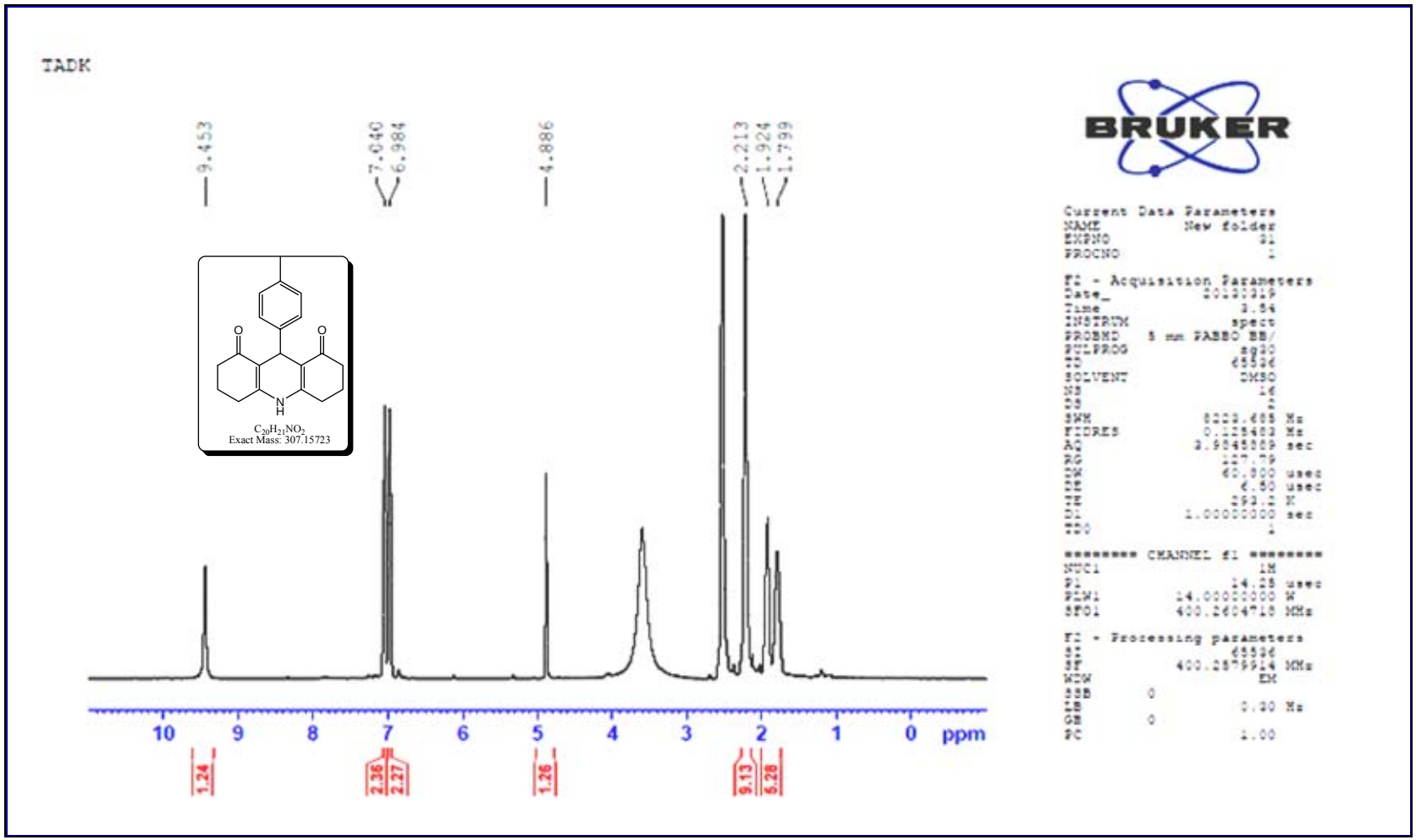
^{13}C NMR Spectra of 3,4,6,7-tetrahydro-9-(naphthalen-1-yl)acridine-1,8(2H,5H,9H,10H)-dione (8h)



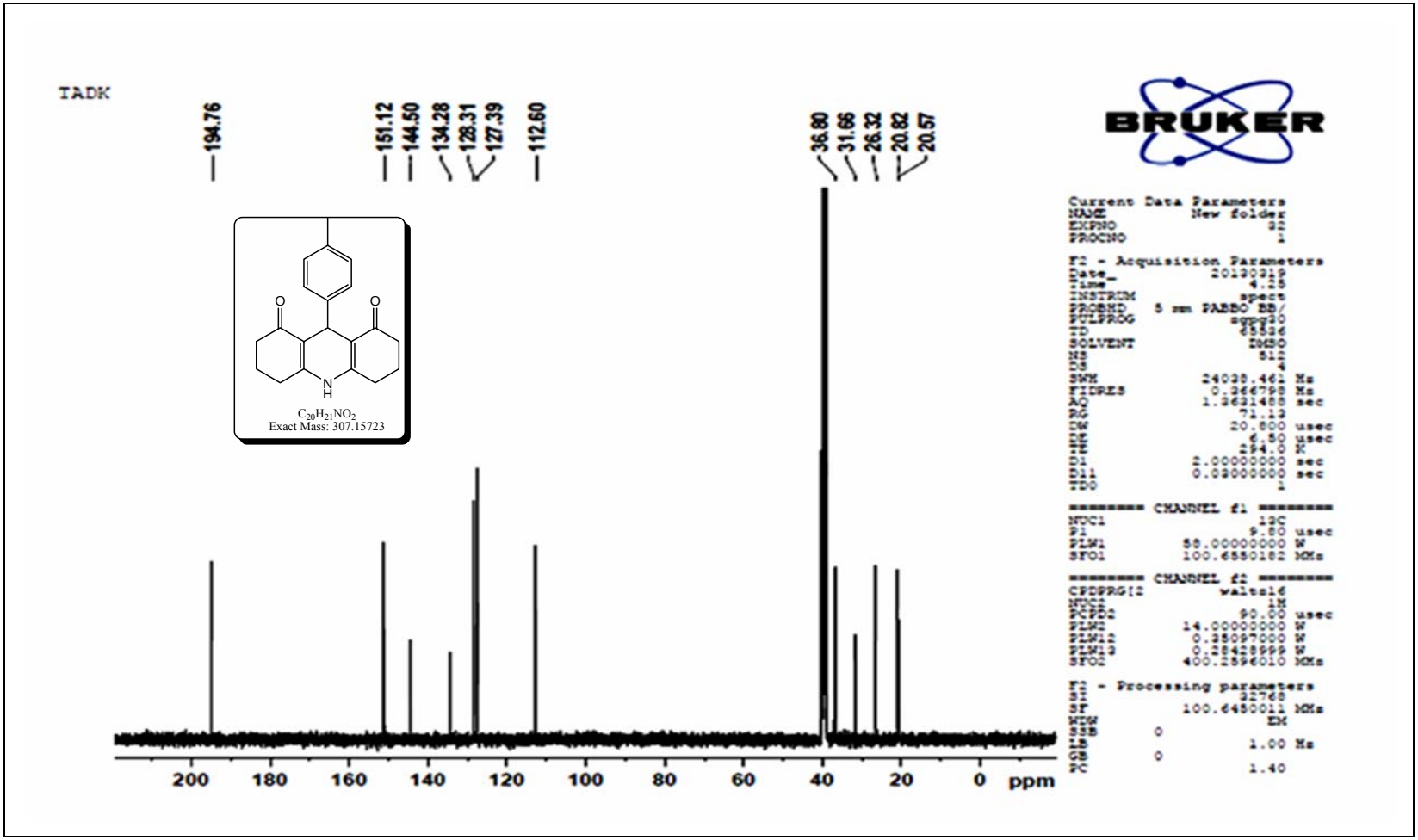
^{1}H NMR Spectra of 3,4,6,7-tetrahydro-9-phenylacridine-1,8(2H,5H,9H,10H)-dione (8i)



^{13}C NMR Spectra of 3,4,6,7-tetrahydro-9-phenylacridine-1,8(2H,5H,9H,10H)-dione (8i)



[1]H NMR of 3,4,6,7-tetrahydro-9-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (8j)



^{13}C NMR of 3,4,6,7-tetrahydro-9-p-tolylacridine-1,8(2H,5H,9H,10H)-dione (8j)