Electronic Supplementary Information (ESI) for:

Synergic Copper/TEMPO-Catalysed Benzylic C-H Imidation with *N*-Fluorobenzenesulfonimide at Room Temperature and Tandem Conversions with Alcohols or Arenes

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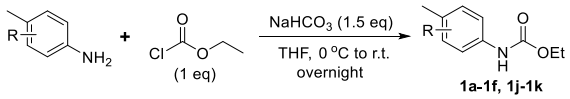
General Remarks

All commercially available compounds were purchased from Sigma-Aldrich, TCI, Acros, J&K Chemicals and Adamas-beta. CuCl (99.99%, trace metal basis, extra pure, CAS No. 7758-89-6) were purchased from Acros. TEMPO was purchased from TCI (98.0% purity, CAS No. 2564-83-2). *N*-Fluorobenzenesulfonimide (NFSI) (97.0% purity, CAS No. 133745-75-2), ethyl acetate (EtOAc) (99.8%, SafeDry, water < 50 ppm), 1,4-dioxane (99.7%, SafeDry, water < 50 ppm), acetonitrile (MeCN) (99.9%, SafeDry, water < 50 ppm), 1,2-dichloroethane (DCE) (99.5%, SafeDry, water < 50 ppm) and THF (99.8%, SafeDry, water < 50 ppm) was purchased from Adamas-beta. Unless otherwise noted, materials obtained from commercial suppliers were used without further purification. Carbamate substrates **2** were prepared through base-mediated condensation reactions between corresponding alcohols and isocyanates,[1] or between corresponding anilines and chloroformates,[2] according to literature reported methods.[1-2] Products were purified by flash chromatography on silica gel using petroleum ether, ethyl acetate and dichloromethane as the eluents. ^{1}H-NMR spectra were recorded on Bruker AVANCE III-400 spectrometers. Chemical shifts (in ppm) were referenced with TMS in $CDCl_3$ (0 ppm); s = singlet, d = doublet, t = triplet, q = quartet, p = pentad, se = sextet, h = heptet, o = octet. ^{13}C-NMR spectra were obtained by using the same NMR spectrometers and were calibrated with $CDCl_3$ (δ = 77.00 ppm). High resolution mass spectra were obtained from an Agilent 6520B Q-TOF mass spectrometer with electron spray ionization (ESI) as the ion source.

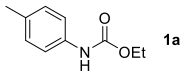
Preparation and ^{1}H-NMR data of Substrate 1a-1k

1) Preparation and ^{1}H-NMR data of 1a-1f and 1j-1k



Typical Procedure: To a solution of corresponding aniline (10 mmol) in THF (20 mL) was added sodium bicarbonate (15 mmol, 1.5 eq) at 0 °C. After stirring for 15 minutes, ethyl chloroformate (10 mmol, 1 eq) was added slowly at 0 °C, and the mixture was stirred at room temperature overnight. Then the reaction was quenched with saturated NH_4Cl (aq.), extracted with ethyl acetate, washed with water, and dried over Na_2SO_4. After removal of Na_2SO_4 by filtration, the organic phase was concentrated *in vacuo*, and purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding substrate **1a-1f** and **1j-1k**.

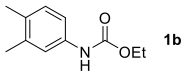
Ethyl *p*-tolylcarbamate (1a)



1a

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.25 (d, *J* = 8.5 Hz, 2H), 7.09 (d, *J* = 8.5 Hz, 2H), 6.64 (s, 1H), 4.21 (q, *J* = 7.1 Hz, 2H), 2.29 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm.

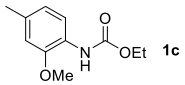
Ethyl (3,4-dimethylphenyl)carbamate (1b)



1b

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.15 (s, 1H), 7.11 (d, *J* = 8.3 Hz, 1H), 6.99 (d, *J* = 8.3 Hz, 1H), 6.94 (s, 1H), 4.19 (q, *J* = 7.1 Hz, 2H), 2.17 (s, 3H), 2.16 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H) ppm.

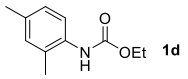
Ethyl (2-methoxy-4-methylphenyl)carbamate (1c)



1c

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.92 (d, *J* = 8.1 Hz, 1H), 7.10 (s, 1H), 6.74 (dd, *J* = 8.1 Hz, 1.9 Hz, 1H), 6.65 (d, *J* = 1.9 Hz, 1H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.81 (s, 3H), 2.30 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H) ppm.

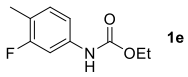
Ethyl (2,4-dimethylphenyl)carbamate (1d)



1d

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.56 (s, 1H), 6.98 (d, *J* = 7.9 Hz, 1H), 6.96 (s, 1H), 6.33 (s, 1H), 4.20 (q, *J* = 7.1 Hz, 2H), 2.27 (s, 3H), 2.20 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm.

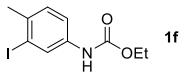
Ethyl (3-fluoro-4-methylphenyl)carbamate (1e)



1e

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.26-7.23 (m, 1H), 7.05 (t, *J* = 8.3 Hz, 1H), 6.93 (dd, *J* = 8.3 Hz, 2.2 Hz, 1H), 6.77 (s, 1H), 4.21 (q, *J* = 7.1 Hz, 2H), 2.20 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm.

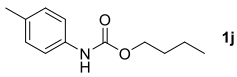
Ethyl (3-iodo-4-methylphenyl)carbamate (1f)



1f

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.85 (d, *J* = 2.4 Hz, 1H), 7.27 (dd, *J* = 8.2 Hz, 2.4 Hz, 1H), 7.12 (d, *J* = 8.2 Hz, 1H), 6.63 (s, 1H), 4.21 (q, *J* = 7.1 Hz, 2H), 2.36 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm.

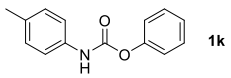
Butyl *p*-tolylcarbamate (1j)



1j

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.26 (d, *J* = 8.0 Hz, 2H), 7.07 (d, *J* = 8.0 Hz, 2H), 6.82 (s, 1H), 4.14 (t, *J* = 6.7 Hz, 2H), 2.28 (s, 3H), 1.63 (p, *J* = 7.1 Hz, 2H), 1.39 (se, *J* = 7.4 Hz, 2H), 0.93 (t, *J* = 7.4 Hz, 3H) ppm.

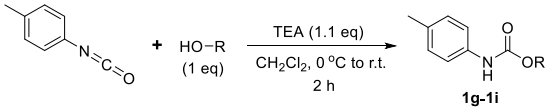
Phenyl *p*-tolylcarbamate (1k)



1k

^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.37 (t, *J* = 7.9 Hz, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.23 (d, *J* = 7.8 Hz, 1H), 7.18 (d, *J* = 7.8 Hz, 2H), 7.11 (d, *J* = 8.3 Hz, 2H), 6.92 (s, 1H), 2.31 (s, 3H) ppm.

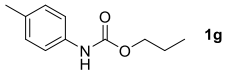
2) Preparation and ^{1}H-NMR data of 1g-1i



1g-1i

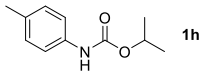
Typical Procedure: To a solution of 1-isocyanato-4-methylbenzene (5 mmol) and Et_3N (5.5 mmol, 1.1 eq) in CH_2Cl_2 (25 mL) was added corresponding alcohol (5 mmol, 1 eq) slowly at 0 °C, and the mixture was stirred at room temperature for 2 hours. Then the reaction was quenched with saturated NH_4Cl (aq.), extracted with ethyl acetate, washed with water, and dried over Na_2SO_4. After removal of Na_2SO_4 by filtration, the organic phase was concentrated *in vacuo*, and purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding substrate **1g**-**1i**.

Propyl *p*-tolylcarbamate (1g)



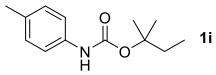
^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.46-7.45 (m, 2H), 7.15-7.07 (m, 2H), 6.77 (s, 1H), 4.11 (t, *J* = 6.7 Hz, 2H), 2.30 (s, 3H), 1.68 (se, *J* = 7.1 Hz, 2H), 0.96 (t, *J* = 7.4 Hz, 3H) ppm.

Isopropyl *p*-tolylcarbamate (1h)



^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.25 (d, *J* = 8.1 Hz, 2H), 7.07 (d, *J* = 8.1 Hz, 2H), 6.66 (s, 1H), 5.01 (h, *J* = 6.3 Hz, 1H), 2.28 (s, 3H), 1.27 (d, *J* = 6.3 Hz, 6H) ppm.

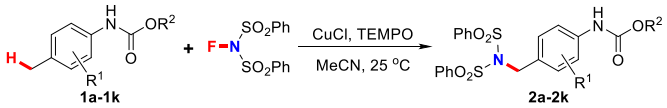
***Tert*-Pentyl *p*-tolylcarbamate (1i)**



^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.23 (d, *J* = 8.2 Hz, 2H), 7.08 (d, *J* = 8.2 Hz, 2H), 6.43 (s, 1H), 2.28 (s, 3H), 1.83 (q, *J* = 7.5 Hz, 2H), 1.48 (s, 6H), 0.92 (t, *J* = 7.5 Hz, 3H) ppm.

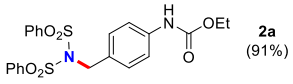
Experimental Procedure and Characterization Data

1) Synergic copper/TEMPO-catalysed benzylic C-H imidation of *p*-tolylcarbamates (Table 3)



Typical Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of *p*-tolylcarbamate (**1a**-**1k**, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding benzylic imidated products **2a**-**2k**.

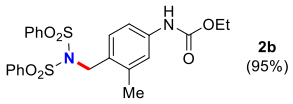
Ethyl (4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2a)



The reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (53.7 mg, **1a**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 129.6 mg of **2a** (91%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 148.0-148.6 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.80-7.78 (m, 4H), 7.57-7.53 (m, 2H), 7.43-7.39 (m, 4H), 7.30-7.24 (m, 4H), 6.87 (s, 1H), 4.88 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.30, 139.71, 137.77, 133.44, 129.85, 128.98, 128.63, 127.83, 118.19, 61.07, 51.80, 14.34 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{22}H_{22}N_2O_6S_2+Na]^+$ 497.0812, found 497.0816.

Ethyl (3-methyl-4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2b)

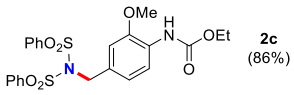


The reaction of 0.3 mmol of ethyl (3,4-dimethylphenyl)carbamate (57.9 mg, **1b**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 139.6 mg of **2b** (95%) after flash

chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

Light yellow solid, m.p. 148.2-148.5 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.81-7.79 (m, 4H), 7.58-7.55 (m, 2H), 7.45-7.41 (m, 4H), 7.13 (d, *J* = 8.4 Hz, 2H), 6.89 (dd, *J* = 8.4 Hz, 1.9 Hz, 1H), 6.62 (s, 1H), 4.97 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 2.26 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.46, 139.96, 137.56, 137.52, 133.54, 130.24, 128.73, 127.95, 126.92, 120.05, 116.07, 61.19, 49.80, 19.27, 14.48 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{23}H_{24}N_2O_6S_2+Na]^+$ 511.0968, found 511.0964.

Ethyl (2-methoxyl-4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2c)

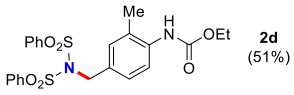


2c (86%)

The reaction of 0.3 mmol of ethyl (2-methoxy-4-methylphenyl)carbamate (62.7 mg, **1c**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 129.8 mg of **2c** (86%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

Light yellow solid, m.p. 96.9-97.7 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.99 (d, *J* = 8.2 Hz, 1H), 7.82-7.80 (m, 4H), 7.58-7.55 (m, 2H), 7.45-7.41 (m, 4H), 7.18 (s, 1H), 6.94 (dd, *J* = 8.2 Hz, 1.5 Hz, 1H), 6.80 (d, *J* = 1.5 Hz, 1H), 4.90 (s, 2H), 4.24 (q, *J* = 7.1 Hz, 2H), 3.61 (s, 3H), 1.33 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.24, 147.27, 139.83, 133.41, 128.60, 128.43, 127.88, 127.42, 121.91, 117.22, 110.14, 61.03, 55.32, 52.35, 15.39 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{23}H_{24}N_2O_7S_2+Na]^+$ 527.0917, found 527.0912.

Ethyl (2-methyl-4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2d)

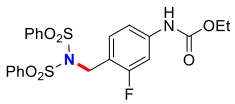


2d (51%)

The reaction of 0.3 mmol of ethyl (2,4-dimethylphenyl)carbamate (57.9 mg, **1d**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 74.9 mg of **2d** (51%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 112.4-113.0 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.81-7.79 (m, 4H), 7.71-7.70 (m, 1H), 7.59-7.56 (m, 2H), 7.46-7.42 (m, 4H), 7.19 (dd, *J* = 8.3 Hz, 1.6 Hz, 1H), 7.07 (s, 1H), 6.37 (s, 1H), 4.88 (s, 2H), 4.25 (q, *J* = 7.1 Hz, 2H), 2.10 (s, 3H), 1.34 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.68, 139.94, 135.80, 133.54, 130.93, 129.65, 128.74, 128.03, 127.77, 61.34, 52.09, 17.43, 14.52 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{23}H_{24}N_2O_7S_2+Na]^+$ 511.0968, found 511.0969.

Ethyl (3-fluoro-4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2e)

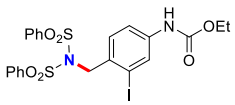


2e
(76%)

The reaction of 0.3 mmol of ethyl (3-fluoro-4-methylphenyl)carbamate (59.1 mg, **1e**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 111.6 mg of **2e** (76%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 83.6-84.5 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.87-7.85 (m, 4H), 7.61-7.57 (m, 2H), 7.48-7.44 (m, 4H), 7.33-7.30 (m, 1H), 7.17 (t, *J* = 8.0 Hz, 1H), 6.74-6.72 (m, 2H), 5.00 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 1.31 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 160.63 (d, *J* = 245.5 Hz), 153.21, 139.64, 139.43 (d, *J* = 11.2 Hz), 133.76, 130.62 (d, *J* = 4.5 Hz), 128.44 (d, *J* = 84.6 Hz), 127.58, 116.10 (d, *J* = 13.9 Hz), 113.69, 105.49 (d, *J* = 28.9 Hz), 61.49, 45.38 (d, *J* = 4.1 Hz), 14.42 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{22}H_{21}FN_2O_6S_2+Na]^+$ 515.0717, found 515.0716.

Ethyl (3-iodo-4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2f)

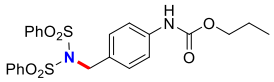


2f
(72%)

The reaction of 0.3 mmol of ethyl (3-iodo-4-methylphenyl)carbamate (91.5 mg, **1f**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 129.1 mg of **2f** (72%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 144.8-145.0 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.98 (s, 1H), 7.90-7.88 (m, 4H), 7.63-7.59 (m, 2H), 7.49-7.45 (m, 4H), 7.01 (d, *J* = 7.7 Hz, 1H), 6.93 (d, *J* = 8.1 Hz, 1H), 6.68 (s, 1H), 5.00 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.27, 139.35, 138.09, 133.79, 131.00, 128.81, 128.63, 128.51, 128.12, 118.08, 97.44, 61.33, 56.68, 14.34 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{22}H_{21}IN_2O_6S_2+Na]^+$ 622.9778, found 622.9777.

Propyl (4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2g)



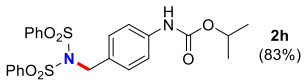
2g
(84%)

The reaction of 0.3 mmol of propyl *p*-tolylcarbamate (57.9 mg, **1g**) and NFSI (189 mg) with CuCl (1.5mg)

and TEMPO (4.7 mg) at 25 ºC in argon afforded 123.13 mg of **2g** (84%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 109.9-110.6 ºC. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.80-7.78 (m, 4H), 7.57-7.54 (m, 2H), 7.43-7.40 (m, 4H), 7.29-7.25 (m, 4H), 4.88 (s, 2H), 4.12 (t, *J* = 6.6 Hz, 2H), 1.69 (se, *J* = 7.1 Hz, 2H), 0.97 (t, *J* = 7.4 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.30, 139.53, 137.67, 133.30, 129.66, 128.77, 128.47, 127.65, 118.08, 66.52, 51.65, 21.87, 10.01 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{23}H_{24}N_2O_6S_2+Na]^+$ 511.0968, found 511.0970.

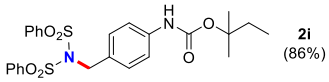
Isopropyl (4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2h)



The reaction of 0.3 mmol of isopropyl *p*-tolylcarbamate (57.9 mg, **1h**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 ºC in argon afforded 121.3 mg of **2h** (83%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 107.8-109.1 ºC. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.80-7.78 (m, 4H), 7.58-7.54 (m, 2H), 7.44-7.40 (m, 4H), 7.31-7.24 (m, 4H), 6.77 (s, 1H), 5.02 (h, *J* = 6.2 Hz, 1H), 4.88 (s, 2H), 1.30 (d, *J* = 6.2 Hz, 6H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.00, 139.80, 138.02, 133.52, 129.92, 128.93, 128.71, 127.92, 118.18, 68.69, 51.89, 21.98 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{23}H_{24}N_2O_6S_2+Na]^+$ 511.0968, found 511.0961.

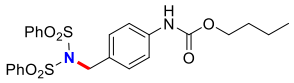
***Tert*-Pentyl (4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2i)**



The reaction of 0.3 mmol of *tert*-pentyl *p*-tolylcarbamate (66.3 mg, **1i**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 ºC in argon afforded 133.5 mg of **2i** (86%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 70.1-70.9 ºC. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.82-7.80 (m, 4H), 7.58-7.55 (m, 2H), 7.45-7.41 (m, 4H), 7.30-7.22 (m, 4H), 6.63 (s, 1H), 4.88 (s, 2H), 1.85 (q, *J* = 7.5 Hz, 2H), 1.50 (s, 6H), 0.94 (t, *J* = 7.5 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 152.48, 139.92, 138.36, 133.51, 129.92, 128.73, 127.96, 118.12, 83.03, 51.95, 33.54, 25.69, 8.22 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{25}H_{28}N_2O_6S_2+Na]^+$ 539.1281, found 539.1281.

Butyl (4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2j)

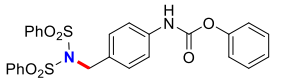


2j (70%)

The reaction of 0.3 mmol of butyl *p*-tolylcarbamate (62.1 mg, **1j**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 ºC in argon afforded 104.8 mg of **2j** (70%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 68.8-69.3 ºC. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.80-7.78 (m, 4H), 7.57-7.54 (m, 2H), 7.44-7.40 (m, 4H), 7.31-7.23 (m, 4H), 6.76 (s, 1H), 4.88 (s, 2H), 4.17 (t, *J* = 6.7 Hz, 2H), 1.65 (p, *J* = 7.1 Hz, 2H), 1.41 (se, *J* = 7.4 Hz, 2H), 0.95 (t, *J* = 7.4 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.55, 139.91, 137.96, 133.55, 129.97, 129.14, 128.75, 127.97, 118.29, 65.11, 51.94, 30.86, 18.99, 13.65 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{24}H_{26}N_2O_6S_2+Na]^+$ 525.1125, found 525.1124.

Phenyl (4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2k)

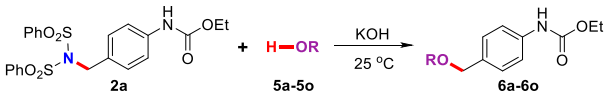


2k (50%)

The reaction of 0.3 mmol of phenyl *p*-tolylcarbamate (68.1 mg, **1k**) and NFSI (189 mg) with CuCl (1.5mg) and TEMPO (4.7 mg) at 25 ºC in argon afforded 77.8 mg of **2k** (50%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

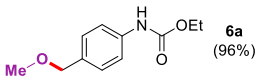
White solid, m.p. 132.5-133.1 ºC. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.81-7.79 (m, 4H), 7.58-7.54 (m, 2H), 7.44-7.38 (m, 6H), 7.34-7.31 (m, 4H), 7.29-7.18 (m, 4H), 4.89 (s, 2H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 150.39, 139.81, 137.33, 133.66, 130.04, 129.86, 129.41, 129.15, 128.81, 128.00, 127.42, 125.76, 121.58, 118.52, 51.89 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{26}H_{22}N_2O_6S_2+Na]^+$ 545.0812, found 545.0811.

2) Subsequent alkoxylation of benzylic imidated *p*-tolylcarbamate 2a with alcohols (Table 4, 6a-6o)



Typical Procedure: To a reaction tube charged with imidated *p*-tolylcarbamate **2a** (142.2 mg, 0.3 mmol) was added a suspension of KOH (67.2 mg, 1.2 mmol) in alcohols (**5a**-**5o**, 1 mL) under argon (1 atm). After stirring at 25ºC for 4 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding benzylic ethers **6a**-**6o**.

Ethyl (4-(methoxymethyl)phenyl)carbamate (6a)

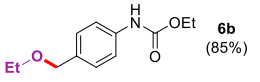


6a (96%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in methanol (**5a**, 1 mL) at 25 ºC in argon afforded 60.4 mg of **6a** (96%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.36 (d, *J* = 8.1 Hz, 2H), 7.27 (d, *J* = 8.4 Hz, 2H), 6.78 (s, 1H), 4.40 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.36 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.61, 137.47, 132.96, 128.66, 118.50, 74.20, 61.17, 57.84, 14.50 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{11}H_{15}NO_3+Na]^+$ 232.0944, found 232.0944.

Ethyl (4-(ethoxymethyl)phenyl)carbamate (6b)

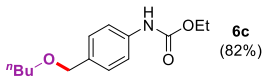


6b (85%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in ethanol (**5b**, 1 mL) at 25 ºC in argon afforded 56.7 mg of **6b** (85%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.2 Hz, 2H), 7.27 (d, *J* = 8.4 Hz, 2H), 6.79 (s, 1H), 4.45 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.52 (q, *J* = 7.0 Hz, 2H), 1.30 (t, *J* = 7.1 Hz, 3H), 1.23 (t, *J* = 7.0 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.61, 137.34, 133.38, 128.56, 118.52, 72.21, 65.47, 61.13, 15.15, 14.49 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{12}H_{17}NO_3+Na]^+$ 246.1101, found 246.1107.

Ethyl (4-(butoxymethyl)phenyl)carbamate (6c)

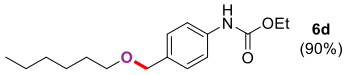


6c (82%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in butanol (**5c**, 1 mL) at 25 ºC in argon afforded 61.4 mg of **6c** (82%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.1 Hz, 2H), 7.26 (d, *J* = 8.4 Hz, 2H), 6.84 (s, 1H), 4.44 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 3.45 (t, *J* = 6.6 Hz, 2H), 1.62-1.55 (m. 2H), 1.43-1.33 (m, 2H), 1.30 (t, *J* = 7.1 Hz, 3H), 0.91 (t, *J* = 7.4 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.63, 137.31, 133.48, 128.47, 118.51, 72.33, 69.95, 61.10, 31.73, 19.29, 14.48, 13.85 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{21}NO_3+Na]^+$ 274.1414, found 274.1717.

Ethyl (4-((hexyloxy)methyl)phenyl)carbamate (6d)

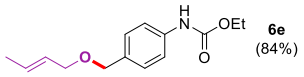


6d (90%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in hexanol (**5d**, 1 mL) at 25 ºC in argon afforded 75.1 mg of **6d** (90%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.0 Hz, 2H), 7.26 (d, *J* = 8.4 Hz, 2H), 6.79 (s, 1H), 4.44 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.44 (t, *J* = 6.7 Hz, 2H), 1.60 (p, *J* = 7.0 Hz, 2H), 1.36-1.26 (m. 9H), 0.88 (t, *J* = 6.8 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.62, 137.30, 133.50, 128.49, 118.49, 72.34, 70.29, 61.12, 31.63, 29.64, 25.80, 22.56, 14.49, 13.99 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{16}H_{25}NO_3+Na]^+$ 302.1727, found 302.1724.

Ethyl (*E*)-(4-((but-2-en-1-yloxy)methyl)phenyl)carbamate (6e)



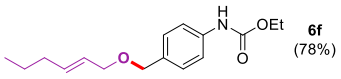
6e (84%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in (*E*)-but-2-en-1-ol (crotonyl alcohol, **5e**, 1 mL) at 25 ºC in argon afforded 62.5 mg of **6e** (84%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.1 Hz, 2H), 7.27 (d, *J* = 8.4 Hz, 2H), 6.81 (s,

1H), 5.75-5.68 (m, 1H), 5.64-5.57 (m, 1H), 4.44 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 3.93 (d, *J* = 6.2 Hz, 2H), 1.71 (dd, *J* = 6.2 Hz, 0.8 Hz, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.61, 137.35, 133.23, 129.68, 128.65, 127.43, 118.49, 71.38, 70.63, 61.11, 17.73, 14.48 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{19}NO_3+Na]^+$ 272.1257, found 272.1255.

Ethyl (*E*)-(4-((hex-2-en-1-yloxy)methyl)phenyl)carbamate (6f)

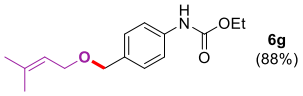


6f (78%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in (*E*)-hex-2-en-1-ol (**5f**, 1 mL) at 25 °C in argon afforded 64.6 mg of **6f** (78%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.1 Hz, 2H), 7.27 (d, *J* = 7.9 Hz, 2H), 6.75 (s, 1H), 5.74-5.67 (m, 1H), 5.61-5.54 (m, 1H), 4.44 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.95 (d, *J* = 6.1 Hz, 2H), 2.03 (q, *J* = 7.0 Hz, 2H), 1.41 (se, *J* = 7.4 Hz, 2H), 1.30 (t, *J* = 7.1 Hz, 3H), 0.90 (t, *J* = 7.4 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.57, 137.33, 134.86, 133.29, 128.70, 126.24, 118.49, 71.32, 70.72, 61.15, 34.34, 22.18, 14.51, 13.67 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{16}H_{23}NO_3+Na]^+$ 300.1570, found 300.1577.

Ethyl (4-(((3-methylbut-2-en-1-yl)oxy)methyl)phenyl)carbamate (6g)

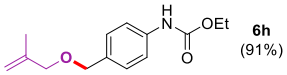


6g (88%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in 3-methylbut-2-en-1-ol (**5g**, 1 mL) at 25 °C in argon afforded 69.6 mg of **6g** (78%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.2 Hz, 2H), 7.27 (d, *J* = 8.0 Hz, 2H), 6.79 (s, 1H), 5.38 (tt, *J* = 6.9 Hz, 1.2 Hz, 1H), 4.44 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.97 (d, *J* = 6.9 Hz, 2H), 1.74 (s, 3H), 1.64 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.59, 137.34, 137.17, 133.36, 128.67, 120.96, 118.45, 71.50, 66.29, 61.11, 25.73, 17.98, 14.49 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{15}H_{21}NO_3+Na]^+$ 286.1414, found 286.1414.

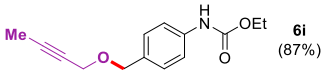
Ethyl (4-(((2-methylallyl)oxy)methyl)phenyl)carbamate (6h)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in 2-methylprop-2-en-1-ol (**5h**, 1 mL) at 25 °C in argon afforded 67.7 mg of **6h** (91%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.36 (d, *J* = 8.1 Hz, 2H), 7.27 (d, *J* = 8.6 Hz, 2H), 6.80 (s, 1H), 4.99 (d, *J* = 0.6 Hz, 1H), 4.92 (s, 1H), 4.44 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.91 (s, 2H), 1.76 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.61, 142.09, 137.37, 133.20, 128.57, 118.50, 112.29, 73.83, 71.29, 61.13, 19.48, 14.49 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{19}NO_3+Na]^+$ 272.1257, found 272.1258.

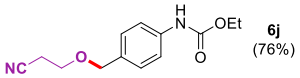
Ethyl (4-((but-2-yn-1-yloxy)methyl)phenyl)carbamate (6i)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in but-2-yn-1-ol (**5i**, 1 mL) at 25 °C in argon afforded 64.3 mg of **6i** (87%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.36 (d, *J* = 8.2 Hz, 2H), 7.28 (d, *J* = 8.3 Hz, 2H), 6.88 (s, 1H), 4.52 (s, 2H), 4.32 (q, *J* = 7.1 Hz, 2H), 4.10 (q, *J* = 2.3 Hz, 2H), 1.87 (t, *J* = 2.3 Hz, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.59, 137.58, 132.31, 128.92, 118.45, 82.59, 74.96, 70.87, 61.10, 57.38, 14.44, 3.53 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{17}NO_3+Na]^+$ 270.1101, found 270.1100.

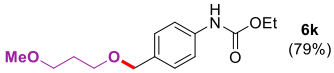
Ethyl (4-((2-cyanoethoxy)methyl)phenyl)carbamate (6j)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in 3-hydroxypropanenitrile (**5j**, 1 mL) at 25 °C in argon afforded 56.7 mg of **6j** (76%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.38 (d, *J* = 8.2 Hz, 2H), 7.28 (d, *J* = 7.4 Hz, 2H), 6.77 (s, 1H), 4.52 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.65 (t, *J* = 6.4 Hz, 2H), 2.61 (t, *J* = 6.4 Hz, 2H), 1.31 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.56, 137.81, 131.94, 128.68, 118.60, 117.79, 72.81, 64.29, 61.21, 18.85, 14.48 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{13}H_{16}N_2O_3+Na]^+$ 271.1053, found 271.1054.

Ethyl (4-((3-methoxypropoxy)methyl)phenyl)carbamate (6k)

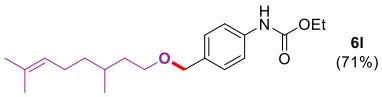


6k (79%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in 3-methoxypropan-1-ol (**5k**, 1 mL) at 25 °C in argon afforded 63.6 mg of **6k** (79%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.36 (d, *J* = 8.0 Hz, 2H), 7.25 (d, *J* = 8.4 Hz, 2H), 7.01 (s, 1H), 4.44 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 3.53 (t, *J* = 6.4 Hz, 2H), 3.48 (t, *J* = 6.4 Hz, 2H), 3.32 (s, 3H), 1.87 (p, *J* = 6.4 Hz, 2H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.65, 137.43, 133.16, 128.44, 118.47, 72.43, 69.63, 66.99, 61.02, 58.47, 29.85, 14.44 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{21}NO_4+Na]^+$ 290.1363, found 290.1362.

Ethyl (4-(((3,7-dimethyloct-6-en-1-yl)oxy)methyl)phenyl)carbamate (6l)

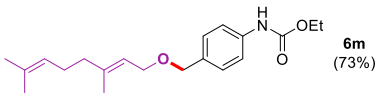


6l (71%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in 3,7-dimethyloct-6-en-1-ol (citronellol, **5l**, 1 mL) at 25 °C in argon afforded 71.3 mg of **6l** (71%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.2 Hz, 2H), 7.27 (d, *J* = 8.5 Hz, 2H), 6.72 (s, 1H), 5.11-5.07 (m, 1H), 4.44 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.51-3.43 (m, 2H), 2.03-1.91 (m, 2H), 1.70-1.55 (m, 8H), 1.45-1.34 (m, 2H), 1.30 (t, *J* = 7.1 Hz, 3H), 1.19-1.12 (m, 1H), 0.88 (d, *J* = 6.6 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.58, 137.28, 133.52, 131.10, 128.51, 124.77, 118.46, 72.41, 68.50, 61.15, 37.15, 36.63, 29.50, 25.68, 25.41, 19.49, 17.59, 14.51 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{20}H_{31}NO_3+Na]^+$ 356.2196, found 356.2194.

Ethyl (*E*)-(4-(((3,7-dimethylocta-2,6-dien-1-yl)oxy)methyl)phenyl)carbamate (6m)



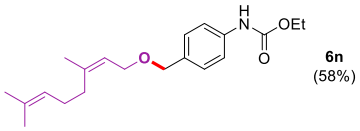
6m (73%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in

(*E*)-3,7-dimethylocta-2,6-dien-1-ol (geraniol, **5m**, 1 mL) at 25 ºC in argon afforded 72.3 mg of **6m** (73%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.1 Hz, 2H), 7.28 (d, *J* = 8.5 Hz, 2H), 6.73 (s, 1H), 5.38 (t, *J* = 6.6 Hz, 1H), 5.10 (t, *J* = 6.5 Hz, 1H), 4.45 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 4.00 (d, *J* = 6.8 Hz, 2H), 2.12-2.02 (m, 4H), 1.68 (s, 3H), 1.63 (s, 3H), 1.60 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.57, 140.40, 137.33, 133.45, 131.61, 128.73, 123.96, 120.73, 118.49, 71.42, 66.33, 61.16, 39.55, 26.31, 25.66, 17.64, 16.45, 14.51 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{20}H_{29}NO_3+Na]^+$ 354.2040, found 354.2042.

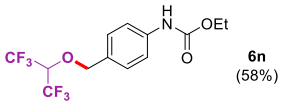
Ethyl (*Z*)-(4-(((3,7-dimethylocta-2,6-dien-1-yl)oxy)methyl)phenyl)carbamate (6n)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in (*Z*)-3,7-dimethylocta-2,6-dien-1-ol (nerol, **5n**, 1 mL) at 25 ºC in argon afforded 57.4 mg of **6n** (58%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.35 (d, *J* = 8.2 Hz, 2H), 7.27 (d, *J* = 8.4 Hz, 2H), 6.65 (s, 1H), 5.39 (t, *J* = 6.5 Hz, 1H), 5.07 (s, 1H), 4.44 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.98 (d, *J* = 6.8 Hz, 2H), 2.05-2.04 (m, 4H), 1.75 (s, 3H), 1.67 (s, 3H), 1.58 (s, 3H), 1.31 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.55, 140.60, 137.30, 133.45, 131.88, 128.69, 123.81, 121.74, 118.43, 71.61, 66.19, 61.16, 32.21, 26.65, 25.66, 23.46, 17.60 14.52 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{20}H_{29}NO_3+Na]^+$ 354.2040, found 354.2037.

Ethyl (*Z*)-(4-(((3,7-dimethylocta-2,6-dien-1-yl)oxy)methyl)phenyl)carbamate (6o)

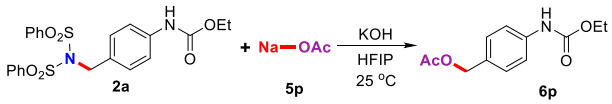


The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) with KOH (67.2 mg) in 1,1,1,3,3,3-hexafluoropropan-2-ol (HFIP, **5o**, 1 mL) at 40 ºC in argon afforded 94.5 mg of **6o** (91%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

White solid, m.p. 74.1-74.7 ºC. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.42 (d, *J* = 8.3 Hz, 2H), 7.29 (d, *J* = 8.5

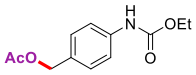
Hz, 2H), 6.78 (s, 1H), 4.77 (s, 2H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.10 (h, *J* = 6.0 Hz, 1H), 1.31 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.56, 138.81, 129.79, 129.24, 121.55 (q, *J* = 282.1 Hz), 118.64, 75.45, 73.90 (p, *J* = 32.2 Hz), 61.36, 14.43 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{13}H_{13}F_6NO_3+Na]^+$ 368.0692, found 368.0697.

3) Subsequent acyloxylation of benzylic imidated *p*-tolylcarbamate 2a with carboxylate (Table 4, 6p)



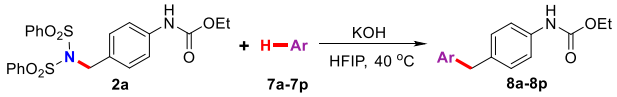
Typical Procedure: To a reaction tube charged with imidated *p*-tolylcarbamate **2a** (142.2 mg, 0.3 mmol) and KOH (33.6 mg, 0.6 mmol) was added a suspension of sodium acetate (NaOAc, **5p**, 49.2 mg, 0.6 mmol) in HFIP (2 mL) under argon (1 atm). After stirring at 40°C for 4 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 46.6 mg of benzyl acetate **6p** (66%).

4-((Ethoxycarbonyl)amino)benzyl acetate (6p)



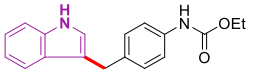
White solid, m.p. 104.8-105.2 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.39 (d, *J* = 8.2 Hz, 2H), 7.30 (d, *J* = 8.3 Hz, 2H), 6.77 (s, 1H), 5.05 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 2.08 (s, 3H), 1.31 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 170.95, 153.50, 138.07, 130.67, 129.35, 118.53, 65.95, 61.25, 21.01, 14.49 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{12}H_{15}NO_4+Na]^+$ 260.0893, found 260.0890.

4) Subsequent arylation of benzylic imidated *p*-tolylcarbamate 2a with arenes (Table 5)



Typical Procedure: To a reaction tube charged with imidated *p*-tolylcarbamate **2a** (142.2 mg, 0.3 mmol) and KOH (33.6 mg, 0.6 mmol) was added a solution of arenes (**7a-7p**, 0.6 mmol) in HFIP (2 mL) under argon (1 atm). After stirring at 40°C for 4 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding benzylated arenes **8a-8p**.

Ethyl (4-((1*H*-indol-3-yl)methyl)phenyl)carbamate (8a)

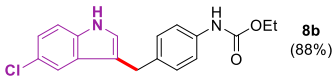


8a (86%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 1*H*-indole (**7a**, 70.2 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 75.5 mg of **8a** (86%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

White solid, m.p. 89.6-89.8 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.98 (s, 1H), 7.48 (d, *J* = 7.9 Hz, 1H), 7.31 (d, *J* = 8.1 Hz, 1H), 7.27-7.14 (m, 5H), 7.06 (t, *J* = 7.4 Hz, 1H), 6.84 (s, 1H), 6.57 (s, 1H), 4.20 (q, *J* = 7.1 Hz, 2H), 4.04 (s, 2H), 1.28 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.78, 136.39, 136.31, 135.70, 129.16, 127.30, 122.31, 121.92, 119.22, 119.03, 118.87, 115.66, 111.06, 102.21, 61.13, 30.87, 14.51 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{18}H_{18}N_2O_2+Na]^+$ 217.1261, found 217.2157.

Ethyl (4-((5-chloro-1*H*-indol-3-yl)methyl)phenyl)carbamate (8b)



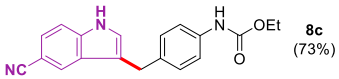
8b (88%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 5-chloro-1*H*-indole (**7b**, 90.6 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 86.8 mg of **8b** (88%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1 to 6:1, *v*/*v*) as the eluent.

White solid, m.p. 122.7-123.0 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 8.10 (s, 1H), 7.43 (d, *J* = 1.7 Hz, 1H), 7.25-7.07 (m, 6H), 6.84 (s, 1H), 6.60 (s, 1H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.97 (s, 2H), 1.28 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.76, 135.84, 134.73, 129.66, 129.10, 128.40, 124.96, 123.72, 122.24, 118.91, 118.49, 115.50, 112.08, 101.83, 61.17, 30.68, 14.52 ppm. **HRMS *m/z* (ESI)** calcd for

$[C_{18}H_{17}ClN_2O_2+Na]^+$ 351.0871, found 351.0869.

Ethyl (4-((5-cyano-1*H*-indol-3-yl)methyl)phenyl)carbamate (8c)

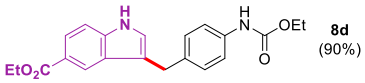


8c (73%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 1*H*-indole-5-carbonitrile (**7c**, 85.2 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 69.7 mg of **8c** (73%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 148.5-148.9 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 11.45 (s, 1H), 9.50 (s, 1H), 7.96 (s, 1H), 7.52 (d, *J* = 8.4 Hz, 1H), 7.42-7.36 (m, 4H), 7.22 (d, *J* = 8.4 Hz, 2H), 4.12 (q, *J* = 7.1 Hz, 2H), 4.02 (s, 2H), 1.25 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 153.56, 138.08, 137.06, 135.05, 128.69, 126.76, 125.68, 124.27, 123.68, 120.87, 118.27, 115.60, 112.69, 100.29, 60.01, 29.90, 14.53 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{19}H_{17}N_3O_2+Na]^+$ 342.1213, found 342.1216.

Ethyl 3-(4-((ethoxycarbonyl)amino)benzyl)-1*H*-indole-5-carboxylate (8d)

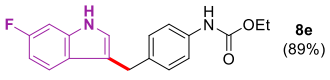


8d (90%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and ethyl 1*H*-indole-5-carboxylate (**7d**, 113.4 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 99.0 mg of **8d** (90%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 144.7-145.1 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 11.25 (s, 1H), 9.49 (s, 1H), 8.12 (s, 1H), 7.72 (dd, *J* = 8.6 Hz, 1.4 Hz, 1H), 7.43 (d, *J* = 8.6 Hz, 1H), 7.38 (d, *J* = 8.3 Hz, 2H), 7.25 (d, *J* = 1.8 Hz, 1H), 7.18 (d, *J* = 8.4 Hz, 2H), 4.28 (q, *J* = 7.1 Hz, 2H), 4.11 (q, *J* = 7.1 Hz, 2H), 4.03 (s, 2H), 1.31 (t, *J* = 7.1 Hz, 3H), 1.23 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 166.85, 153.63, 139.11, 137.11, 135.21, 128.67, 126.61, 125.03, 122.05, 121.25, 120.12, 118.25, 115.69, 111.38, 60.10, 60.07, 30.17, 14.59, 14.37 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{21}H_{22}N_2O_4+Na]^+$ 389.1472, found 389.1475.

Ethyl (4-((6-fluoro-1*H*-indol-3-yl)methyl)phenyl)carbamate (8e)



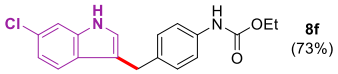
8e (89%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 6-fluoro-1*H*-indole (**7e**, 81.0 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 83.4 mg of **8e** (89%) after flash

chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

White solid, m.p. 210.5-211.0 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 8.01 (s, 1H), 7.35 (dd, *J* = 8.6 Hz, 5.4 Hz, 1H), 7.27 (d, *J* = 8.2 Hz, 2H), 7.17 (d, *J* = 8.4 Hz, 2H), 6.99 (dd, *J* = 9.7 Hz, 2.1 Hz, 1H), 6.83-6.79 (m, 2H), 6.56 (s, 1H), 4.20 (q, *J* = 7.1 Hz, 2H), 4.01 (s, 2H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 159.97 (d, *J* = 236.1 Hz), 153.77, 136.35 (d, *J* = 12.4 Hz), 135.93 (d, *J* = 19.7 Hz), 129.15, 123.93, 122.52 (d, *J* = 3.5 Hz), 119.78 (d, *J* = 10.2 Hz), 118.90, 115.83, 108.01 (d, *J* = 24.4 Hz), 102.33, 97.34 (d, *J* = 26.0 Hz), 61.18, 30.87, 14.53 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{18}H_{17}FN_2O_2+Na]^+$ 335.1166, found 335.1170.

Ethyl (4-((6-chloro-1*H*-indol-3-yl)methyl)phenyl)carbamate (8f)

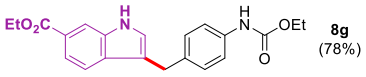


8f (73%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 6-chloro-1*H*-indole (**7f**, 90.6 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 72.1 mg of **8f** (73%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

White solid, m.p. 127.1-127.7 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 8.03 (s, 1H), 7.36-7.25 (m, 4H), 7.18-7.13 (m, 2H), 7.02-7.00 (m, 1H), 6.85 (s, 1H), 6.55 (s, 1H), 4.21 (q, *J* = 7.0 Hz, 2H), 4.01 (s, 2H), 1.29 (t, *J* = 7.0 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.75, 136.77, 135.85, 129.50, 129.13, 127.91, 125.94, 122.93, 120.01, 119.96, 118.88, 115.91, 110.99, 61.19, 30.78, 14.53 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{18}H_{17}ClN_2O_2+Na]^+$ 351.0871, found 351.0877.

Ethyl 3-(4-((ethoxycarbonyl)amino)benzyl)-1*H*-indole-6-carboxylate (8g)



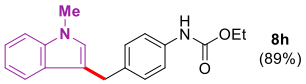
8g (78%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and ethyl 1*H*-indole-6-carboxylate (**7g**, 113.4 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 85.2 mg of **8g** (78%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 141.4-141.7 °C. **^{1}H NMR (DMSO-d_6, 400 MHz)**: δ = 11.24 (s, 1H), 9.47 (s, 1H), 8.03 (s, 1H), 7.57 (dd, *J* = 8.4 Hz, 1.3 Hz, 1H), 7.50 (d, *J* = 8.4 Hz, 1H), 7.38-7.34 (m, 3H), 7.18 (d, *J* = 8.4 Hz, 2H), 4.30 (q, *J* = 7.1 Hz, 2H), 4.10 (q, *J* = 7.1 Hz, 2H), 3.99 (s, 2H), 1.33 (t, *J* = 7.1 Hz, 3H), 1.22 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d_6, 100 MHz)**: δ = 166.84, 153.61, 137.05, 135.67, 135.31, 130.42, 128.69, 127.19, 122.26, 119.03, 118.40, 118.24, 114.88, 113.43, 60.24, 60.06, 30.21, 14.58, 14.36 ppm. **HRMS *m/z* (ESI)** calcd

for $[C_{21}H_{22}N_2O_4+Na]^+$ 389.1472, found 389.1476.

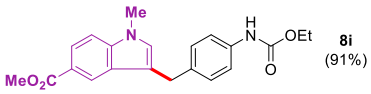
Ethyl (4-((1-methyl-1*H*-indol-3-yl)methyl)phenyl)carbamate (8h)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 1-methyl-1*H*-indole (**7h**, 78.6 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 82.5 mg of **8h** (89%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

White solid, m.p. 105.9-106.3 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.48 (d, *J* = 7.9 Hz, 1H), 7.27-7.18 (m, 6H), 7.07-7.03 (m, 1H), 6.70 (s, 1H), 6.56 (s, 1H), 4.19 (q, *J* = 7.1 Hz, 2H), 4.03 (s, 2H), 3.68 (s, 3H), 1.28 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.68, 137.12, 136.45, 135.74, 129.16, 127.71, 127.05, 121.52, 119.13, 118.71, 114.29, 109.09, 100.56, 61.09, 32.52, 30.81, 14.53 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{19}H_{20}N_2O_2+Na]^+$ 331.1417, found 331.1418.

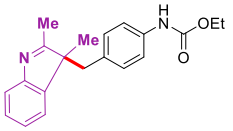
Methyl 3-(4-((ethoxycarbonyl)amino)benzyl)-1-methyl-1*H*-indole-5-carboxylate (8i)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and methyl 1-methyl-1*H*-indole-5-carboxylate (**7i**, 113.4 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 99.8 mg of **8i** (91%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1 to 6:1, *v*/*v*) as the eluent.

White solid, m.p. 130.6-130.8 °C. **^{1}H NMR (DMSO-d_6, 400 MHz)**: δ = 9.50 (s, 1H), 8.10 (t, *J* = 1.1 Hz, 1H), 7.73 (dd, *J* = 8.7 Hz, 1.6 Hz, 1H), 7.42 (d, *J* = 8.7 Hz, 1H), 7.35 (d, *J* = 8.2 Hz, 2H), 7.14-7.12 (m, 3H), 4.06 (q, *J* = 7.1 Hz, 2H), 3.96 (s, 2H), 3.78 (s, 3H), 3.71 (s, 3H), 1.19 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d_6, 100 MHz)**: δ = 167.24, 153.61, 139.24, 137.13, 134.99, 129.38, 128.62, 126.82, 122.09, 121.35, 119.88, 118.31, 115.26, 109.65, 60.04, 51.67, 32.44, 29.90, 14.54 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{21}H_{22}N_2O_4+Na]^+$ 389.1472, found 389.1472.

Ethyl (4-((2,3-dimethyl-3*H*-indol-3-yl)methyl)phenyl)carbamate (8j)

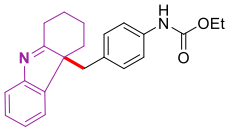


8j
(73%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 2,3-dimethyl-1*H*-indole (**7j**, 87.1 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 70.3 mg of **8j** (73%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (3:1 to 1:1, *v*/*v*) as the eluent.

White solid, m.p. 96.7-97.0 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 9.40 (s, 1H), 7.35 (d, *J* = 7.2 Hz, 1H), 7.24-7.16 (m, 3H), 7.11 (d, *J* = 8.4 Hz, 2H), 6.63 (d, *J* = 8.4 Hz, 2H), 4.07 (q, *J* = 7.1 Hz, 2H), 3.16 (d, *J* = 13.6 Hz, 1H), 2.95 (d, *J* = 13.6 Hz, 1H), 2.27 (s, 3H), 1.31 (s, 3H), 1.20 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 185.94, 154.30, 153.44, 143.49, 137.41, 130.42, 129.24, 127.39, 124.42, 122.65, 119.08, 117.18, 60.04, 58.58, 41.04, 22.08, 16.00, 14.54 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{20}H_{22}N_2O_2+Na]^+$ 345.1574, found 345.1572.

Ethyl (4-((1,2,3,4-tetrahydro-4a*H*-carbazol-4a-yl)methyl)phenyl)carbamate (8k)

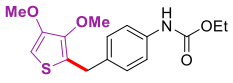


8k
(74%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 2,3,4,9-tetrahydro-1*H*-carbazole (**7k**, 102.6 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 77.4 mg of **8k** (74%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (3:1 to 1:1, *v*/*v*) as the eluent.

Light-yellow solid, m.p. 219.4-219.7 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 9.39 (s, 1H), 7.38 (dt, *J* = 7.2 Hz, 0.8 Hz, 1H), 7.28 (dt, *J* = 7.7 Hz, 1.8 Hz, 1H), 7.23-7.13 (m, 2H), 7.04 (d, *J* = 8.4 Hz, 2H), 6.59 (d, *J* = 8.6 Hz, 2H), 4.05 (q, *J* = 7.1 Hz, 2H), 3.22 (d, *J* = 13.6 Hz, 1H), 3.11 (d, *J* = 13.6 Hz, 1H), 2.84-2.79 (m, 1H), 2.71-2.67 (m, 1H), 2.44-2.40 (m, 1H), 2.17-1.99 (m, 2H), 1.66-1.63 (m, 1H), 1.31-1.27 (m, 1H), 1.19 (t, *J* = 7.1 Hz, 3H), 1.04-0.98 (m, 1H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 187.91, 154.78, 153.40, 144.65, 137.24, 130.31, 129.19, 127.25, 124.10, 122.54, 119.34, 117.14, 59.98, 58.73, 37.77, 29.98, 28.96, 28.31, 20.72, 14.51 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{22}H_{24}N_2O_2+Na]^+$ 371.1730, found 371.1733.

Ethyl (4-((3,4-dimethoxythiophen-2-yl)methyl)phenyl)carbamate (8l)

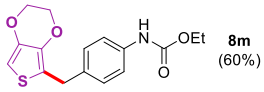


8l
(62%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 3,4-dimethoxythiophene (**7l**, 86.4 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 60.0 mg of **8l** (62%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

White solid, m.p. 101.6-101.9 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 9.51 (s, 1H), 7.34 (d, *J* = 8.3 Hz, 2H), 7.07 (d, *J* = 8.5 Hz, 2H), 6.30 (s, 1H), 4.07 (q, *J* = 7.1 Hz, 2H), 3.83 (s, 2H), 3.70 (s, 3H), 3.64 (s, 3H), 1.19 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 153.54, 150.11, 143.00, 137.52, 133.76, 128.64, 125.66, 118.28, 93.90, 60.19, 60.04, 56.97, 31.13, 14.51 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{16}H_{19}NO_4S+Na]^+$ 344.0927, found 344.0928.

Ethyl (4-((2,3-dihydrothieno[3,4-*b*][1,4]dioxin-5-yl)methyl)phenyl)carbamate (8m)

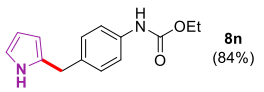


8m (60%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 2,3-dihydrothieno[3,4-*b*][1,4] dioxine (**7m**, 85.2 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 57.7 mg of **8m** (60%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1 to 6:1, *v*/*v*) as the eluent.

White solid, m.p. 81.3-81.9 °C. **^{1}H NMR (CDCl$_3$, 400 MHz)**: δ = 7.29 (d, *J* = 8.0 Hz, 2H), 7.17 (d, *J* = 8.3 Hz, 2H), 6.58 (s, 1H), 6.13 (s, 1H), 4.23-4.16 (m, 6H), 3.91 (s, 2H), 1.29 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (CDCl$_3$, 100 MHz)**: δ = 141.47, 137.80, 136.20, 134.97, 129.05, 118.78, 116.72, 96.26, 64.66, 64.60, 61.15, 31.24, 14.53 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{16}H_{17}NO_4S+Na]^+$ 342.0771, found 342.0771.

Ethyl (4-((1*H*-pyrrol-2-yl)methyl)phenyl)carbamate (8n)



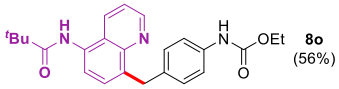
8n (84%)

The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 1*H*-pyrrole (**7n**, 40.2 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 61.8 mg of **8n** (84%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent.

Light-yellow solid, m.p. 50.8-51.4 °C. **^{1}H NMR (CDCl$_3$, 400 MHz)**: δ = 7.86 (s, 1H), 7.30 (d, *J* = 8.0 Hz, 2H), 7.13 (d, *J* = 8.4 Hz, 2H), 6.65 (d, *J* = 1.5 Hz, 1H), 6.59 (s, 1H), 6.13 (q, *J* = 2.8 Hz, 1H), 5.97 (s, 1H), 4.21 (q, *J* = 7.1 Hz, 2H), 3.92 (s, 2H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (CDCl$_3$, 100 MHz)**: δ = 153.70,

136.26, 134.51, 130.69, 129.23, 119.04, 116.93, 108.28, 106.31, 61.20, 33.35, 15.52 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{16}N_2O_2+Na]^+$ 267.1104, found 267.1108.

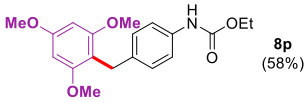
Ethyl (4-((5-pivalamidoquinolin-8-yl)methyl)phenyl)carbamate (8o)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and *N*-(quinolin-5-yl)pivalamide (**7o**, 136.8 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 68.4 mg of **8o** (56%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1 to 6:1, *v*/*v*) as the eluent.

White solid, m.p. 173.2-174.0 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 10.29 (s, 1H), 8.77 (d, *J* = 4.0 Hz, 1H), 8.73 (d, *J* = 7.9 Hz, 1H), 8.23 (d, *J* = 8.4 Hz, 1H), 7.38-7.35 (m, 2H), 7.26 (d, *J* = 7.8 Hz, 2H), 7.06 (d, *J* = 8.3 Hz, 2H), 6.63 (s, 1H), 4.31 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 1.42 (s, 9H), 1.28 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 177.17, 153.67, 147.68, 139.29, 136.18, 135.28, 133.60, 133.15, 130.29, 128.88, 128.39, 126.70, 121.24, 118.86, 115.77, 61.07, 40.26, 37.61, 27.68, 14.48 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{24}H_{27}N_3O_3+Na]^+$ 406.2125, found 406.2130.

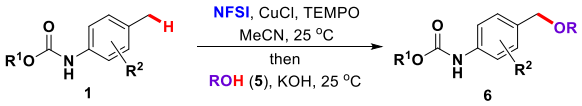
Ethyl (4-(2,4,6-trimethoxybenzyl)phenyl)carbamate (8p)



The reaction of 0.3 mmol of imidated *p*-tolylcarbamate **2a** (142.2 mg) and 1,3,5-trimethoxybenzene (**7p**, 100.8 mg) with KOH (33.6 mg) in HFIP (2 mL) at 40 °C in argon afforded 60.3 mg of **8p** (58%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

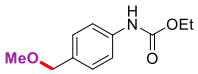
White solid, m.p. 350.6-351.0 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.20-7.14 (m, 4H), 6.51 (s, 1H), 6.13 (s, 2H), 4.18 (q, *J* = 7.1 Hz, 2H), 3.87 (s, 2H), 3.79 (s, 3H), 3.77 (s, 6H), 1.27 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 159.52, 158.68, 153.71, 137.39, 135.14, 128.83, 118.52, 110.17, 90.50, 60.93, 55.60, 55.23, 27.53, 14.49 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{19}H_{23}NO_5+Na]^+$ 368.1468, found 368.1467.

5) Tandem imidation-alkoxylation from *p*-tolylcarbamates 1 without isolation of 2 (Table 6, 6a-6t)



Typical Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of *p*-tolylcarbamate (**1**, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the reaction was quenched with Na_2CO_3 (2M, aq., 2 mL) and extracted with EtOAc (4 mL). The organic layer was concentrated *in vacuo*, dissolved in alcohols (**5**, 1 mL), and added to a reaction tude charged with KOH (67.2 mg, 1.2 mmol) under argon (1 atm). After stirring at 25°C for another 4 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding benzylic ethers **6**.

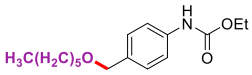
Ethyl (4-(methoxymethyl)phenyl)carbamate (6a)



6a
83% (87%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with methanol (**5a**, 1 mL) afforded 51.8 mg of **6a** (83%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 87% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 96% yield of **6a** in Table 4.

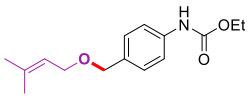
Ethyl (4-((hexyloxy)methyl)phenyl)carbamate (6d)



6d
76% (82%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with hexanol (**5d**, 1 mL) afforded 63.5 mg of **6d** (76%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 82% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 90% yield of **6d** in Table 4.

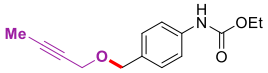
Ethyl (4-(((3-methylbut-2-en-1-yl)oxy)methyl)phenyl)carbamate (6g)



6g
75% (80%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 3-methylbut-2-en-1-ol (**5g**, 1 mL) afforded 59.4 mg of **6g** (75%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 80% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 88% yield of **6g** in Table 4.

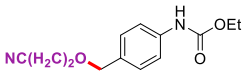
Ethyl (4-((but-2-yn-1-yloxy)methyl)phenyl)carbamate (6i)



6i
68% (79%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with but-2-yn-1-ol (**5i**, 1 mL) afforded 50.7 mg of **6i** (68%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 79% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 87% yield of **6i** in Table 4.

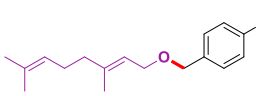
Ethyl (4-((2-cyanoethoxy)methyl)phenyl)carbamate (6j)



6j
57% (69%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 3-hydroxypropanenitrile (**5j**, 1 mL) afforded 42.7 mg of **6j** (57%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 69% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 76% yield of **6j** in Table 4.

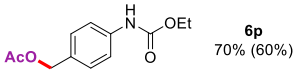
Ethyl (*E*)-(4-(((3,7-dimethylocta-2,6-dien-1-yl)oxy)methyl)phenyl)carbamate (6m)



6m
61% (66%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with (*E*)-3,7-dimethylocta-2,6-dien-1-ol (geraniol, **5m**, 1 mL) afforded 60.9 mg of **6m** (61%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 66% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 73% yield of **6m** in Table 4.

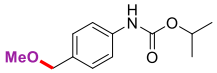
4-((Ethoxycarbonyl)amino)benzyl acetate (6p)



6p
70% (60%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with sodium acetate (**5p**, 49.2 mg, 0.6 mmol) and KOH (33.6 mg, 0.6 mmol) afforded 49.6 mg of **6p** (70%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 60% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 66% yield of **6m** in Table 4.

Isopropyl (4-(methoxymethyl)phenyl)carbamate (6q)

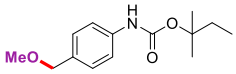


6q
(71%)

The tandem reaction of 0.3 mmol of isopropyl *p*-tolylcarbamate (57.9 mg, **1h**) as the starting material with methanol (**5a**, 1 mL) afforded 47.7 mg of **6q** (71%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.36 (d, *J* = 8.2 Hz, 2H), 7.26 (d, *J* = 8.5 Hz, 2H), 6.68 (s, 1H), 5.02 (h, *J* = 6.3 Hz, 1H), 4.40 (s, 2H), 3.36 (s, 3H), 1.29 (d, *J* = 6.3 Hz, 6H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.18, 137.59, 132.85, 128.66, 118.42, 74.22, 68.68, 57.83, 22.05 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{12}H_{17}NO_3+Na]^+$ 246.1101, found 246.1099.

***Tert*-Pentyl (4-(methoxymethyl)phenyl)carbamate (6r)**

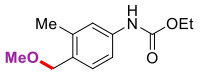


6r
(85%)

The tandem reaction of 0.3 mmol of *tert*-pentyl *p*-tolylcarbamate (66.3 mg, **1i**) as the starting material with methanol (**5a**, 1 mL) afforded 64.3 mg of **6r** (85%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.34 (d, *J* = 8.2 Hz, 2H), 7.25 (d, *J* = 8.3 Hz, 2H), 6.58 (s, 1H), 4.40 (s, 2H), 3.35 (s, 3H), 1.84 (q, *J* = 7.5 Hz, 2H), 1.48 (s, 6H), 0.93 (t, *J* = 7.5 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 152.66, 137.87, 132.60, 128.62, 118.34, 82.92, 74.24, 57.80, 33.57, 25.76, 8.27 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{14}H_{21}NO_3+Na]^+$ 274.1414, found 274.1416.

Ethyl (4-(methoxymethyl)-3-methylphenyl)carbamate (6s)

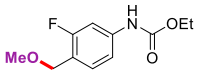


6s
(66%)

The tandem reaction of 0.3 mmol of ethyl (3,4-dimethylphenyl)carbamate (57.9 mg, **1b**) as the starting material with methanol (**5a**, 1 mL) afforded 44.4 mg of **6s** (66%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.23-7.21 (m, 2H), 7.26 (dd, *J* = 8.3 Hz, 2.0 Hz, 1H), 6.66 (s, 1H), 4.40 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 3.37 (s, 3H), 2.31 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 153.57, 137.88, 137.51, 131.05, 129.61, 120.28, 115.68, 72.59, 61.1, 57.91, 18.84, 14.52 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{12}H_{17}NO_3+Na]^+$ 246.1101, found 246.1101.

Ethyl (3-fluoro-4-(methoxymethyl)phenyl)carbamate (6t)

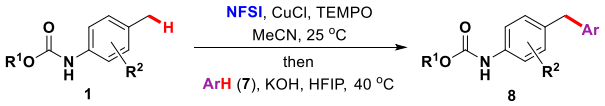


6t
(42%)

The tandem reaction of 0.3 mmol of ethyl (3-fluoro-4-methylphenyl)carbamate (59.1 mg, **1e**) as the starting material with methanol (**5a**, 1 mL) afforded 28.9 mg of **6t** (42%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

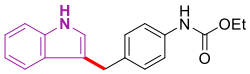
Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 9.89 (s, 1H), 7.38 (dd, *J* = 10.6 Hz, 2.1 Hz, 1H), 7.30 (t, *J* = 8.4 Hz, 1H), 7.20 (dd, *J* = 8.4 Hz, 2.1 Hz, 1H), 4.36 (s, 2H), 4.13 (q, *J* = 7.1 Hz, 2H), 3.25 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 160.44 (d, *J* = 241.9 Hz), 153.41, 140.72 (d, *J* = 11.2 Hz), 131.03 (d, *J* = 6.0 Hz), 118.24 (d, *J* = 15.3 Hz), 113.55, 104.58 (d, *J* = 26.4 Hz), 67.08 (d, *J* = 2.6 Hz), 60.43, 57.35, 14.45 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{11}H_{14}FNO_3+Na]^+$ 228.1031, found 228.1031.

6) Tandem imidation-arylation from *p*-tolylcarbamates 1 without isolation of 2 (Table 6, 8a-8s)



Typical Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of *p*-tolylcarbamate (**1**, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the reaction was quenched with Na_2CO_3 (2M, aq., 2 mL) and extracted with EtOAc (4 mL). The organic layer was concentrated *in vacuo*, dissolved in HFIP (2 mL), and added to a reaction tude charged with KOH (34.6 mg, 0.6 mmol) and arene (**7**, 0.9 mmol) at 25 °C under argon (1 atm). After stirring at 40°C for another 4 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding benzylated arene **8**.

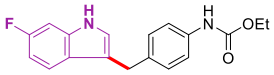
Ethyl (4-((1*H*-indol-3-yl)methyl)phenyl)carbamate (8a)



8a
69% (78%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 1*H*-indole (**7a**, 105.3 mg) afforded 61.1 mg of **8a** (69%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent. For comparison, the 78% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 86% yield of **8a** in Table 5.

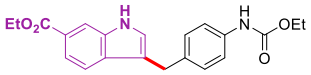
Ethyl (4-((6-fluoro-1*H*-indol-3-yl)methyl)phenyl)carbamate (8e)



8e
65% (81%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 6-fluoro-1*H*-indole (**7e**, 121.5 mg) afforded 61.2 mg of **8e** (65%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent. For comparison, the 81% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 89% yield of **8e** in Table 5.

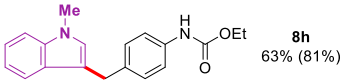
Ethyl (4-((6-fluoro-1*H*-indol-3-yl)methyl)phenyl)carbamate (8g)



8g
73% (71%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with ethyl 1*H*-indole-6-carboxylate (**7g**, 170.1 mg) afforded 80.4 mg of **8g** (73%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent. For comparison, the 71% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 78% yield of **8g** in Table 5.

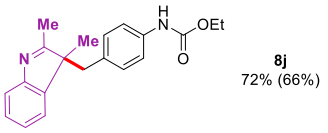
Ethyl (4-((1-methyl-1*H*-indol-3-yl)methyl)phenyl)carbamate (8h)



8h
63% (81%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 1-methyl-1*H*-indole (**7h**, 117.9 mg) afforded 58.6 mg of **8h** (63%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent. For comparison, the 81% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 89% yield of **8h** in Table 5.

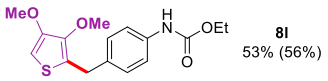
Ethyl (4-((2,3-dimethyl-3*H*-indol-3-yl)methyl)phenyl)carbamate (8j)



8j
72% (66%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 2,3-dimethyl-1*H*-indole (**7j**, 130.6 mg) afforded 69.8 mg of **8j** (72%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (3:1 to 1:1, *v*/*v*) as the eluent. For comparison, the 66% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 73% yield of **8j** in Table 5.

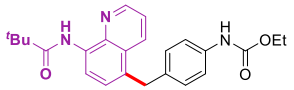
Ethyl (4-((3,4-dimethoxythiophen-2-yl)methyl)phenyl)carbamate (8l)



8l
53% (56%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 3,4-dimethoxythiophene (**7l**, 129.6 mg) afforded 51.4 mg of **8l** (53%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1, *v*/*v*) as the eluent. For comparison, the 56% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 62% yield of **8l** in Table 5.

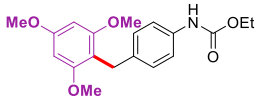
Ethyl (4-((8-pivalamidoquinolin-5-yl)methyl)phenyl)carbamate (8o)



8o
52% (51%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with *N*-(quinolin-5-yl)pivalamide (**7o**, 205.2 mg) afforded 63.5 mg of **8o** (52%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (8:1 to 6:1, *v*/*v*) as the eluent. For comparison, the 51% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 56% yield of **8o** in Table 5.

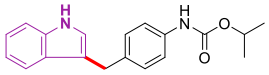
Ethyl (4-(2,4,6-trimethoxybenzyl)phenyl)carbamate (8p)



8p
51% (53%)

The tandem reaction of 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg) as the starting material with 1,3,5-trimethoxybenzene (**7p**, 151.2 mg) afforded 53.1 mg of **8p** (51%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent. For comparison, the 53% yield in parenthesis is calculated by multiplying the 91% yield of **2a** in Table 3 with the 58% yield of **8p** in Table 5.

Isopropyl (4-((1*H*-indol-3-yl)methyl)phenyl)carbamate (8q)

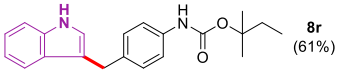


8q
(74%)

The tandem reaction of 0.3 mmol of isopropyl *p*-tolylcarbamate (**1h**, 57.9 mg) as the starting material with 1*H*-indole (**7a**, 105.3 mg) afforded 68.7 mg of **8q** (74%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

White solid, m.p. 129.1-130.0 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ =10.78 (s, 1H), 9.39 (s, 1H), 7.36-7.28 (m, 4H), 7.14-7.07 (m, 3H), 7.00 (td, *J* = 7.6 Hz, 1.2 Hz, 1H), 6.87 (t, *J* = 7.5 Hz, 1H), 4.82 (h, *J* = 6.2 Hz, 1H), 3.92 (s, 2H), 1.19 (d, *J* = 6.2 Hz, 6H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 153.18, 136.97, 136.42, 135.56, 128.62, 126.95, 122.97, 120.90, 118.57, 118.21, 114.13, 111.36, 67.23, 30.47, 22.00 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{19}H_{20}N_2O_2+Na]^+$ 331.1417, found 331.1425.

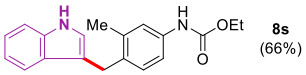
***Tert*-Pentyl (4-((1*H*-indol-3-yl)methyl)phenyl)carbamate (8r)**



The tandem reaction of 0.3 mmol of *tert*-pentyl *p*-tolylcarbamate (66.3 mg, **1i**) as the starting material with 1*H*-indole (**7a**, 105.3 mg) afforded 61.5 mg of **8r** (61%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

Colourless oil. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ =10.78 (s, 1H), 9.17 (s, 1H), 7.35 (dd, *J* = 8.0 Hz, 1.0 Hz, 1H), 7.30-7.28 (m, 3H), 7.11 (d, *J* = 8.6 Hz, 2H), 7.07 (d, *J* = 2.4 Hz, 1H), 7.00 (td, *J* = 8.2 Hz, 1.1 Hz, 1H), 6.87 (td, *J* = 8.0 Hz, 1.0 Hz, 1H), 3.91 (s, 2H), 1.74 (q, *J* = 7.5 Hz, 2H), 1.37 (s, 6H), 0.84 (t, *J* = 7.5 Hz, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 152.77, 137.21, 136.43, 135.29, 128.55, 126.95, 122.96, 120.89, 118.58, 118.19, 114.17, 111.36, 80.99, 32.97, 30.47, 25.71, 8.18 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{21}H_{24}N_2O_2+Na]^+$ 357.1730, found 359.1727.

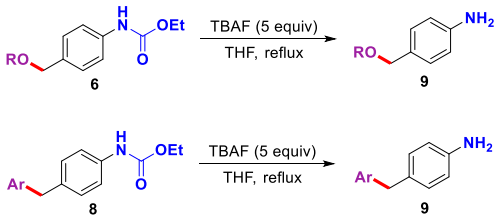
Ethyl (4-((1*H*-indol-3-yl)methyl)-3-methylphenyl)carbamate (8s)



The tandem reaction of 0.3 mmol of ethyl (3,4-dimethylphenyl)carbamate (57.9 mg, **1b**) as the starting material with 1*H*-indole (**7a**, 105.3 mg) afforded 61.6 mg of **8s** (66%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (10:1 to 8:1, *v*/*v*) as the eluent.

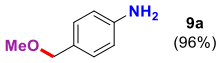
Colourless oil. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ =10.77 (s, 1H), 9.40 (s, 1H), 7.38 (dd, *J* = 7.9 Hz, 1.0 Hz, 1H), 7.30 (d, *J* = 8.1 Hz, 1H), 7.22-7.14 (m, 2H), 7.03-6.99 (m, 2H), 6.91-6.87 (m, 2H), 4.06 (q, *J* = 7.1 Hz, 2H), 3.90 (s, 2H), 2.20 (s, 3H), 1.19 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 153.59, 137.00, 136.41, 136.12, 133.48, 129.33, 127.09, 123.13, 120.91, 119.91, 118.55, 118.22, 115.75, 113.13, 111.40, 59.97, 28.23, 19.45, 14.57 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{19}H_{20}N_2O_2+Na]^+$ 331.1417, found 331.1419.

7) Applications to the preparation of key intermediates for the synthesis of bioactive molecules (Scheme 2)



Typical Procedure for deprotection: To a reaction tube charged with benzyl ether **6** or benzylated arene **8** (0.3 mmol) was added a solution of Bu_4NF (1.5 mL of 1.0 M solution in THF, 1.5mmol) under argon (1 atm). After stirring under reflux for 12 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding aniline **9**.

4-(Methoxymethyl)aniline (9a)

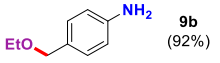


9a
(96%)

The deprotection of 0.3 mmol of ethyl (4-(methoxymethyl)phenyl)carbamate (62.7 mg, **6a**) afforded 39.6 mg of **9a** (96%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1, *v*/*v*) as the eluent.

White solid, m.p. 166.8-167.4 ºC. **^{1}H NMR (DMSO-d_6, 400 MHz)**: δ = 6.92 (d, *J* = 8.4 Hz, 2H), 6.48 (d, *J* = 8.4 Hz, 2H), 5.01 (s, 2H), 4.14 (s, 2H), 3.15 (s, 3H) ppm. **^{13}C NMR (DMSO-d_6, 100 MHz)**: δ = 148.22, 129.26, 124.96, 113.48, 73.94, 56.72 ppm. **HRMS *m/z* (ESI)** calcd for $[C_8H_{11}NO+H]^+$ 138.0913, found 138.0910.

4-(Ethoxymethyl)aniline (9b)

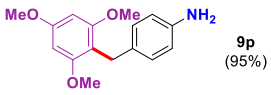


9b
(92%)

The deprotection of 0.3 mmol of ethyl (4-(ethoxymethyl)phenyl)carbamate (66.9 mg, **6b**) afforded 41.9 mg of **9b** (92%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1, *v*/*v*) as the eluent.

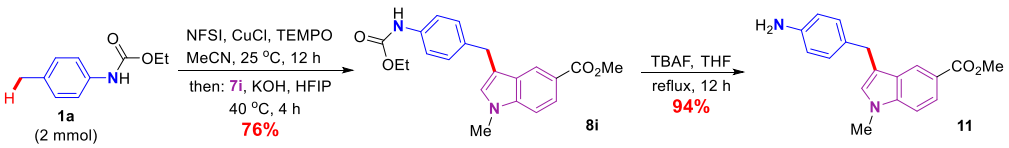
Colourless oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.12 (d, *J* = 8.3 Hz, 2H), 6.63 (d, *J* = 8.4 Hz, 2H), 4.37 (s, 2H), 3.58 (brs, 2H), 3.49 (q, *J* = 7.0 Hz, 2H), 1.21 (t, *J* = 7.0 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 145.89, 129.32, 128.27, 114.85, 72.52, 65.08, 15.15 ppm. **HRMS *m/z* (ESI)** calcd for $[C_9H_{13}NO+H]^+$ 152.1070, found 152.1067.

4-(2,4,6-Trimethoxybenzyl)aniline (9p)



The deprotection of 0.3 mmol of ethyl (4-(2,4,6-trimethoxybenzyl)phenyl)carbamate (103.5 mg, **8p**) afforded 78.1 mg of **9p** (95%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (3:1, *v*/*v*) as the eluent.

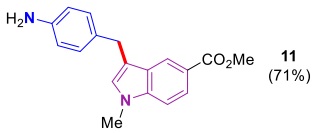
Light-yellow solid, m.p. 110.0-110.7 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.04 (d, *J* = 8.4 Hz, 2H), 6.55 (d, *J* = 8.3 Hz, 2H), 6.14 (s, 2H), 3.82 (s, 2H), 3.79 (s, 3H), 3.77 (s, 6H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 159.35, 158.70, 143.67, 132.42, 129.09, 115.03, 110.86, 90.55, 55.64, 55.63, 55.25, 27.27 ppm. **HRMS *m/z* (ESI)** calcd for $[C_9H_{13}NO+H]^+$ 152.1070, found 152.1067.



Typical Procedure: To a reaction tube charged with CuCl (9.9 mg, 0.1 mmol) and NFSI (1.26 g, 4 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 358.2 mg, 2 mmol) and TEMPO (31.3 mg, 0.2 mmol) in anhydrous acetonitrile (10 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the reaction was quenched with Na_2CO_3 (2M, aq., 2 mL) and extracted with EtOAc (4 mL). The organic layer was concentrated *in vacuo*, dissolved in HFIP (12 mL), and added to a reaction tude charged with KOH (224.4 mg, 4 mmol) and methyl 1-methyl-1*H*-indole-5-carboxylate (**7i**, 756.3 mg, 4 mmol) at 25 °C under argon (1 atm). After stirring at 40°C for another 4 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 556.4 mg of methyl 3-(4-((ethoxycarbonyl)amino)benzyl)-1-methyl-1*H*-indole-5-carboxylate (**8i**, 76%).

Subsequently, to a reaction tube charged with the above **8i** (556.4 mg, 1.52 mmol) was added a solution of Bu_4NF (10 mL of 1.0 M solution in THF, 10 mmol) under argon (1 atm). After stirring under reflux for 12 hours, the mixture was concentrated *in vacuo*, followed by purification via flash chromatography on silica gel using petroleum ether and ethyl acetate as the effluent to afford 420.6 mg of methyl 3-(4-aminobenzyl)-1-methyl-1*H*-indole-5-carboxylate (**11**, 94%).

Methyl 3-(4-aminobenzyl)-1-methyl-1*H*-indole-5-carboxylate (11)



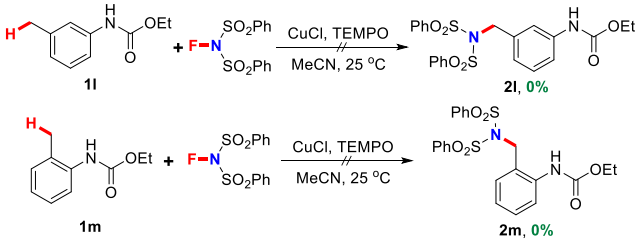
11
(71%)

Synthesis of key intermediate **11** from 0.3 mmol of ethyl *p*-tolylcarbamate (**1a**, 358.2 mg, 2 mmol) afforded 420.6 mg of **11** (71% total yield from **1a**) after flash chromatography on silica gel using petroleum ether and ethyl acetate (3:1, *v*/*v*) as the eluent. For comparison, the literature reported total yield of the identical intermediate from the same amount of starting material is 53%.

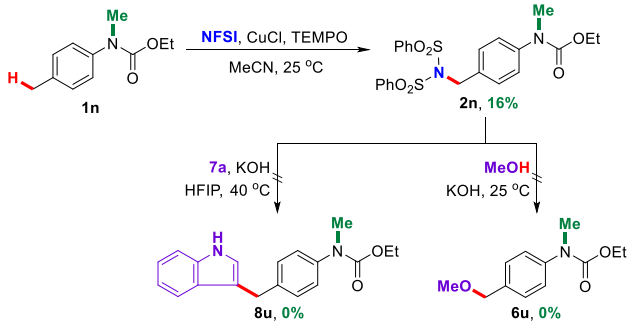
White solid, m.p. 149.4-150.0 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 8.08 (d, *J* = 1.6 Hz, 1H), 7.71 (dd, *J* = 8.6 Hz, 1.6 Hz, 1H), 7.42 (d, *J* = 8.6 Hz, 1H), 7.13 (s, 1H), 6.87 (d, *J* = 8.4 Hz, 2H), 6.44 (d, *J* = 8.4 Hz, 2H), 4.80 (s, 2H), 3.85 (s, 2H), 3.78 (s, 3H), 3.73 (s, 3H) ppm. **^{13}C NMR (DMSO-d$_6$, 100 MHz)**: δ = 167.23, 146.54, 139.20, 129.17, 128.75, 127.95, 126.87, 121.95, 121.40, 119.69, 116.05, 113.94, 109.59, 51.65, 32.43, 29.74 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{18}H_{18}N_2O_2+H]^+$ 317.1261, found 317.1261.

Control Experiments

1) To demonstrate the crucial role of the carbamate directing group (Scheme 3)



Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of TEMPO (4.7 mg, 0.03 mmol) and ethyl *m*-tolylcarbamate (**1l**, 53.7 mg, 0.3 mmol) or ethyl *o*-tolylcarbamate (**1m**, 53.7 mg, 0.3 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, no corresponding benzylic imidated product **2l** or **2m** could be observed on GC-MS.



Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of ethyl methyl(*p*-tolyl)carbamate (**1n**, 57.9 mg, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 23.6 mg of **2n** (16%).

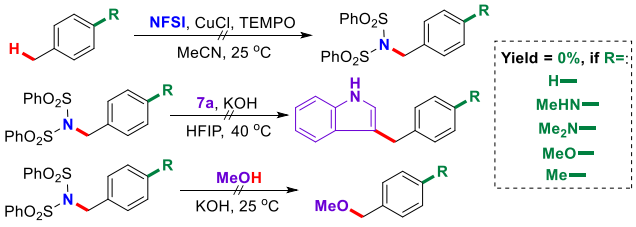
To a reaction tube charged with imidated *p*-tolylcarbamate **2n** (146.4 mg, 0.3 mmol) was added a suspension of KOH (67.2 mg, 1.2 mmol) in methanol (**5a**, 1 mL) under argon (1 atm). After stirring at 25°C for 4 hours, no corresponding benzyl ether **6u** could be observed on GC-MS.

To a reaction tube charged with imidated *p*-tolylcarbamate **2n** (146.4 mg, 0.3 mmol) and KOH (33.6 mg, 0.6 mmol) was added a solution of 1*H*-indole (**7a**, 70.2 mg, 0.6 mmol) in HFIP (2 mL) under argon (1 atm). After stirring at 40°C for 4 hours, no corresponding benzylated indole **8u** could be observed on GC-MS.

Ethyl methyl(4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2n)

The reaction of 0.3 mmol of ethyl methyl(*p*-tolyl)carbamate (**1n**, 57.9 mg) and NFSI (189 mg) with CuCl (1.5 mg) and TEMPO (4.7 mg) at 25 °C in argon afforded 23.6 mg of **2n** (16%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

White solid, m.p. 137.0-137.9 °C. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.77-7.75 (m, 4H), 7.55-7.51 (m, 2H), 7.41-7.37 (m, 4H), 7.31 (d, *J* = 8.5 Hz, 2H), 7.08 (d, *J* = 8.4 Hz, 2H), 4.89 (s, 2H), 4.16 (q, *J* = 7.1 Hz, 2H), 3.25 (s, 1H), 1.23 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 155.33, 143.16, 139.77, 133.52, 129.55, 129.35, 128.69, 127.89, 125.26, 61.63, 51.84, 37.41, 14.50 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{23}H_{24}N_2O_6S_2+Na]^+$ 511.0968, found 511.0964.

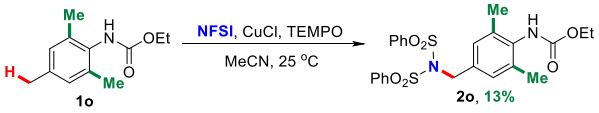


Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of TEMPO (4.7 mg, 0.03 mmol) and toluene, *N*,4-dimethylaniline, *N*,*N*,4-trimethylaniline, 1-methoxy-4-methylbenzene or *p*-xylene (0.3 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, no corresponding benzylic imidated product could be observed on GC-MS.

To a reaction tube charged with *N*-benzyl-*N*-(phenylsulfonyl)benzenesulfonamide, *N*-(4-methylbenzyl)-*N*-(phenylsulfonyl)benzenesulfonamide or *N*-(4-methoxybenzyl)-*N*-(phenylsulfonyl)benzenesulfonamide (0.3 mmol) was added a suspension of KOH (67.2 mg, 1.2 mmol) in methanol (**5a**, 1 mL) under argon (1 atm). After stirring at 25°C for 4 hours, no corresponding benzyl ether could be observed on GC-MS.

To a reaction tube charged with *N*-benzyl-*N*-(phenylsulfonyl)benzenesulfonamide, *N*-(4-methylbenzyl)-*N*-(phenylsulfonyl)benzenesulfonamide or *N*-(4-methoxybenzyl)-*N*-(phenylsulfonyl)benzenesulfonamide (0.3 mmol) and KOH (33.6 mg, 0.6 mmol) was added a solution of 1*H*-indole (**7a**, 70.2 mg, 0.6 mmol) in HFIP (2 mL) under argon (1 atm). After stirring at 40°C for 4 hours, no corresponding benzylated indole

could be observed on GC-MS.

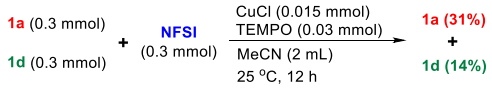


Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of ethyl mesitylcarbamate (**1o**, 62.1 mg, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 19.3 mg of **2o** (13%).

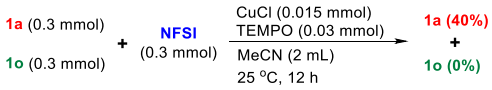
Ethyl (2,6-dimethyl-4-((*N*-(phenylsulfonyl)phenylsulfonamido)methyl)phenyl)carbamate (2o)

The reaction of 0.3 mmol of ethyl methyl(*p*-tolyl)carbamate (**1o**, 62.1 mg) and NFSI (189 mg) with CuCl (1.5 mg) and TEMPO (7.0 mg) at 25 °C in argon afforded 19.3 mg of **2o** (13%) after flash chromatography on silica gel using petroleum ether and ethyl acetate (6:1 to 3:1, *v*/*v*) as the eluent.

Light-yellow oil. **^{1}H NMR ($CDCl_3$, 400 MHz)**: δ = 7.80-7.78 (m, 4H), 7.60-7.56 (m, 2H), 7.48-7.44 (m, 4H), 6.98 (s, 2H), 5.96 (s, 1H), 4.87 (s, 2H), 4.22 (q, *J* = 7.1 Hz, 2H), 2.14 (s, 6H), 1.25 (t, *J* = 7.1 Hz, 3H) ppm. **^{13}C NMR ($CDCl_3$, 100 MHz)**: δ = 154.26, 139.84, 135.88, 133.57, 132.83, 128.74, 128.58, 128.03, 60.30, 52.13, 18.11, 14.59 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{24}H_{26}N_2O_6S_2+Na]^+$ 525.1125, found 525.1129.



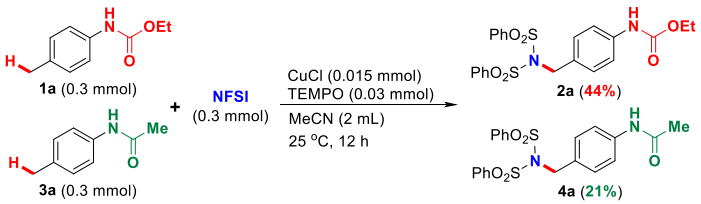
Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (94.6 mg, 0.3 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), ethyl (2,4-dimethylphenyl)carbamate (**1d**, 57.9 mg, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 44.3 mg of **2a** (31%) and 20.7 mg of **2d** (14%).



Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (94.6 mg,

0.3 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), ethyl mesitylcarbamate (**1o**, 62.1 mg, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25ºC for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 57.2 mg of **2a** (40%), whereas no **2o** could be observed on GC-MS.

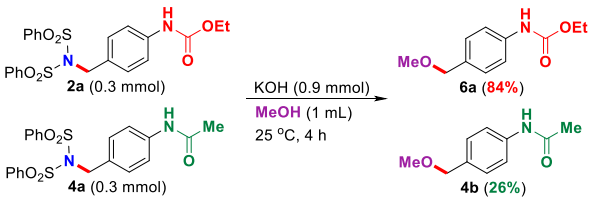
2) To indicate some key differences compared to the previous palladium-catalysed benzylic C-H imidation with NFSI (Scheme 4)



Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (94.6 mg, 0.3 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), *N*-(p-tolyl)acetamide (**3a**, 44.7 mg, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 62.9 mg of **2a** (44%) and 27.6 mg of **4a** (21%).

***N*-(4-((*N*-(Phenylsulfonyl)phenylsulfonamido)methyl)phenyl)acetamide (4a)**

White solid, m.p. 164.5-165.0 °C. **^{1}H NMR (DMSO-d$_6$, 400 MHz)**: δ = 9.99 (s, 1H), 7.80-7.71 (m, 6H), 7.59-7.52 (m, 6H), 7.25 (d, *J* = 8.5 Hz, 2H), 4.97 (s, 2H), 2.08 (s, 3H) ppm. **^{13}C NMR (CDCl$_3$, 100 MHz)**: δ = 168.73, 139.69, 137.92, 133.71, 130.06, 129.75, 128.83, 127.94, 119.61, 51.95, 24.44 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{21}H_{20}N_2O_5S_2+H]^+$ 445.0886, found 445.0884.

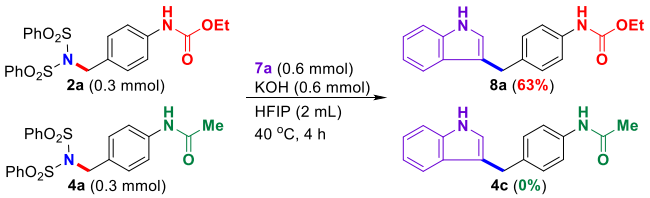


Experimental Procedure: To a reaction tube charged with the imidated *p*-tolylcarbamate **2a** (142.2 mg, 0.3 mmol) and the imidated *p*-tolylacetamide **4a** (133.2 mg, 0.3 mmol) was added a suspension of KOH (50.5 mg, 0.9 mmol) in methanol (**5a**, 1 mL) under argon (1 atm). After stirring at 25°C for 4 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 52.9 mg of **6a** (84%) and 13.8 mg of **4b** (26%).

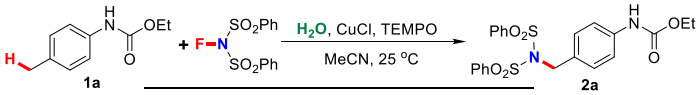
***N*-(4-(Methoxymethyl)phenyl)acetamide (4b)**

White solid, m.p. 98.0-98.5 °C. **^{1}H NMR (CDCl$_3$, 400 MHz)**: δ = 7.48 (d, *J* = 8.3 Hz, 2H), 7.36 (s, 1H), 7.28 (d, *J* = 8.3 Hz, 2H), 4.41 (s, 2H), 3.37 (s, 3H), 2.17 (s, 3H) ppm. **^{13}C NMR (CDCl$_3$, 100 MHz)**: δ = 168.31,

137.34, 134.05, 128.53, 119.75, 74.21, 57.96, 24.58 ppm. **HRMS *m/z* (ESI)** calcd for $[C_{10}H_{13}NO_2+Na]^+$ 202.0839, found 202.0837.



Experimental Procedure: To a reaction tube charged with the imidated *p*-tolylcarbamate **2a** (142.2 mg, 0.3 mmol), the imidated *p*-tolylacetamide **4a** (133.2 mg, 0.3 mmol) and KOH (33.6 mg, 0.6 mmol) was added a solution of 1*H*-indole (**7a**, 70.2 mg, 0.6 mmol) in HFIP (2 mL) under argon (1 atm). After stirring at 40°C for 4 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford 55.7 mg of **8a** (63%), whereas no **4c** could be observed on GC-MS.



Loading of H_2O	0	1	2	4	10 (equiv)
Yield of 2a	91	51	39	26	0 (%)

Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), H_2O (6 μL, 0.3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding 72.8 mg of the benzylic imidated *p*-tolylcarbamate **2a** (51%).

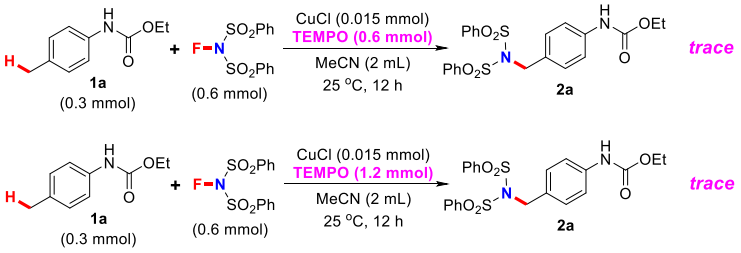
To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), H_2O (11 μL, 0.6 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding 55.2 mg of the benzylic imidated *p*-tolylcarbamate **2a** (39%).

To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), H_2O (22 μL, 1.2 mmol) and TEMPO (4.7 mg,

0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, the mixture was concentrated *in vacuo* to give dark residue, which was purified by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent to afford corresponding 37.3 mg of the benzylic imidated *p*-tolylcarbamate **2a** (26%).

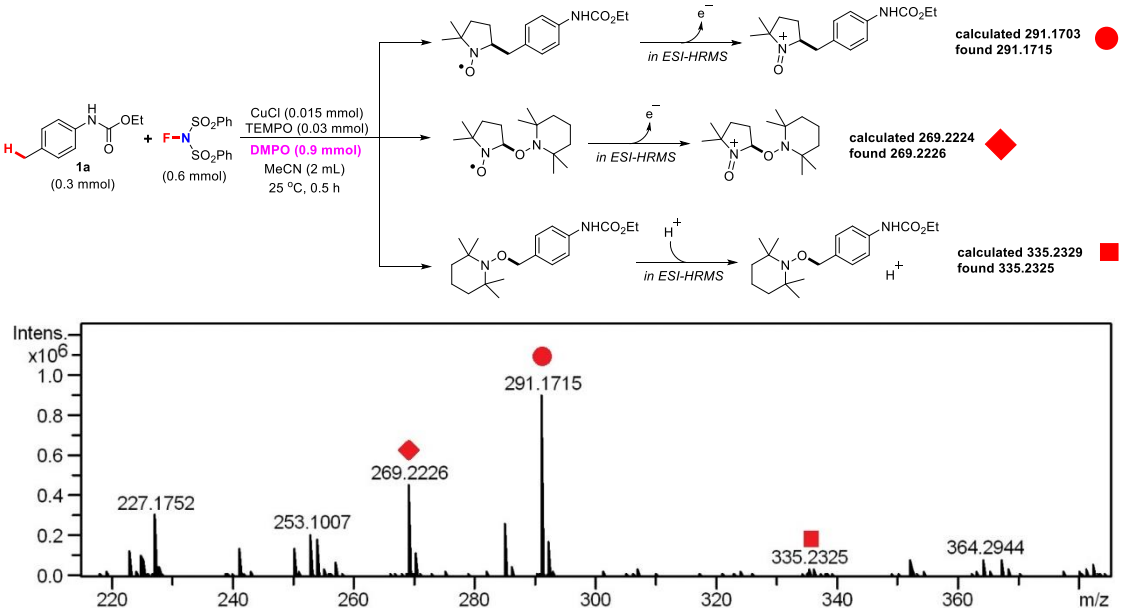
To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol), H_2O (54 μL, 3 mmol) and TEMPO (4.7 mg, 0.03 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, no benzylic imidated *p*-tolylcarbamate **2a** could be observed on GC-MS.

3) To support the radical pathway proposed in Scheme 5



Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of TEMPO (93.8 mg, 0.6 mmol) and ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, only trace amount of benzylic imidated product **2a** could be observed on TLC.

To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of TEMPO (187.5 mg, 1.2 mmol) and ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol) in anhydrous acetonitrile (2 mL) under argon (1 atm). After stirring at 25°C for 12 hours, only trace amount of benzylic imidated product **2a** could be observed on TLC.

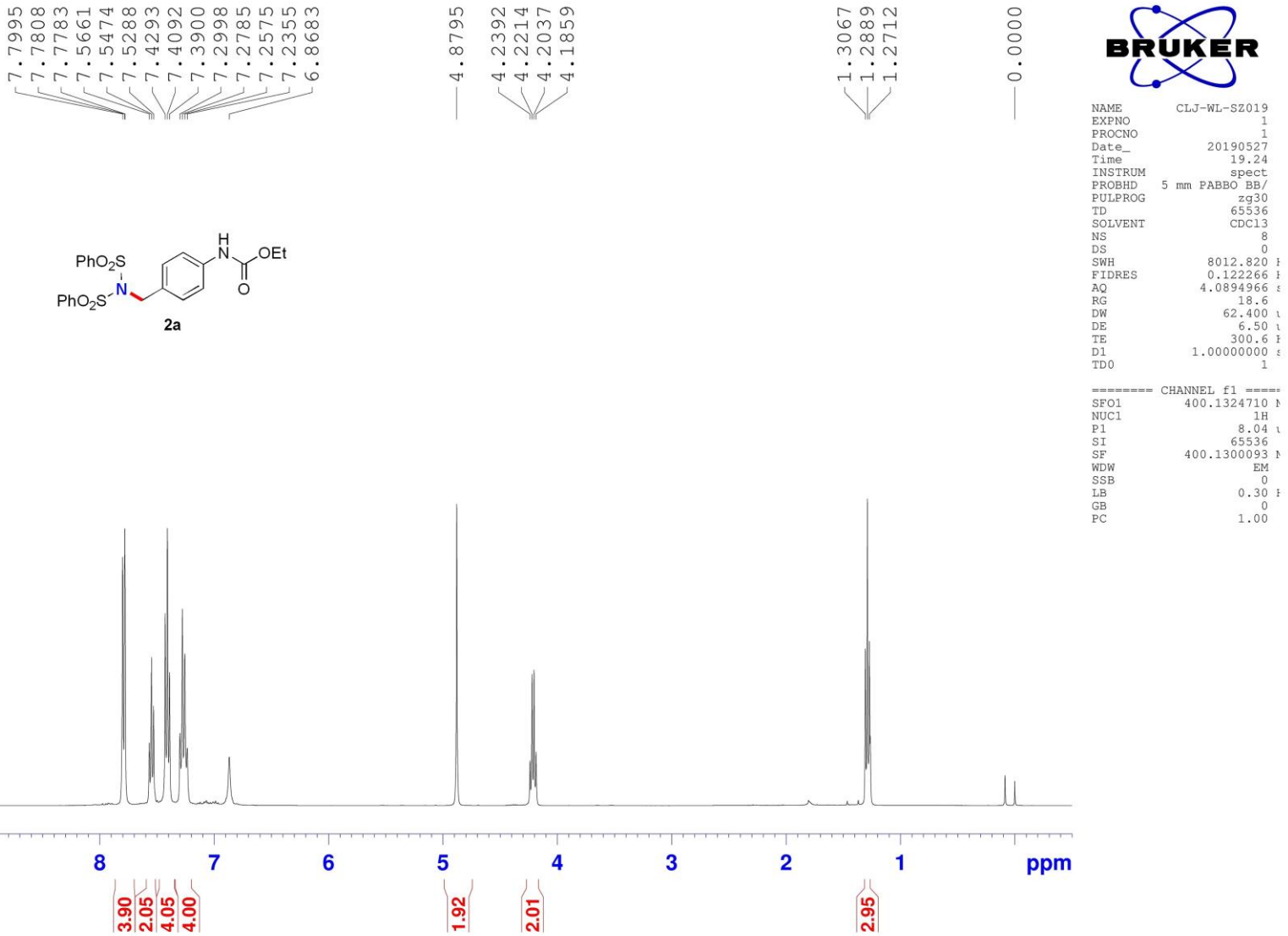


Experimental Procedure: To a reaction tube charged with CuCl (1.5 mg, 0.015 mmol) and NFSI (189 mg, 0.6 mmol) was added a solution of TEMPO (4.7 mg, 0.03 mmol) and ethyl *p*-tolylcarbamate (**1a**, 53.7 mg, 0.3 mmol) in anhydrous acetonitrile (1 mL) under argon (1 atm). Then a solution of DMPO (101.8 mg, 0.9 mmol) in anhydrous acetonitrile (1 mL) was added immediately. After stirring at 25°C for 30 minutes, the reaction mixture was investigated by ESI-HRMS.

The DMPO adduct of the benzylic radical: calcd for $[C_{16}H_{23}N_2O_3]^+$ 291.1703, found 291.1715.

The DMPO adduct of TEMPO: calcd for $[C_{15}H_{29}N_2O_2]^+$ 269.2224, found 269.2226.

The TEMPO adduct of the benzylic radical: calcd for $[C_{19}H_{30}N_2O_3+H]^+$ 335.2329, found 335.2325.



BRUKER

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TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820 H
FIDRES	0.122266 H
AQ	4.0894966 s
RG	18.6
DW	62.400 u
DE	6.50 u
TE	300.6 K
D1	1.00000000 s
TD0	1

======== CHANNEL f1 =====

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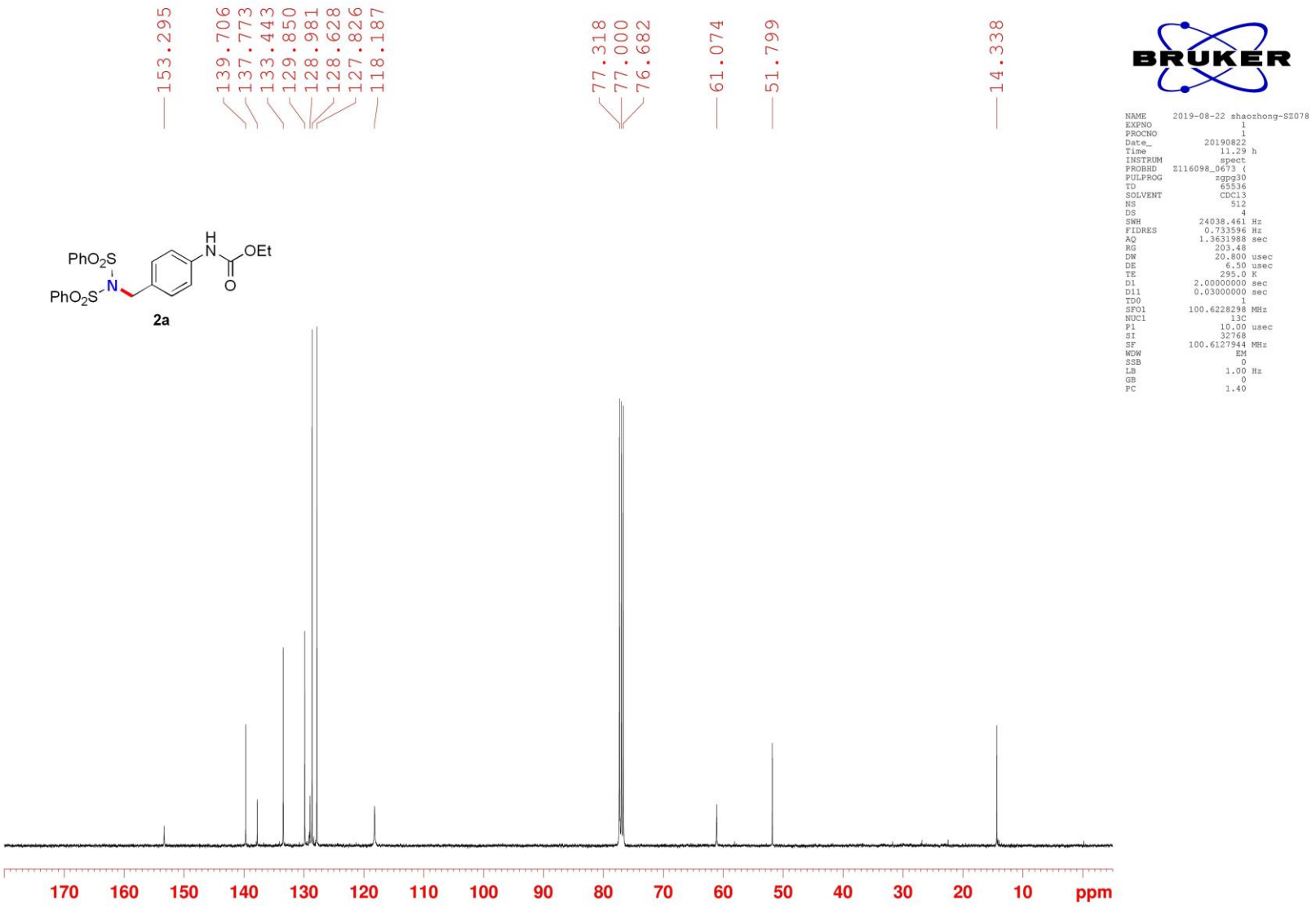
NUC1	1H
P1	8.04 u
SI	65536
SF	400.1300093 M
WDW	EM
SSB	0
LB	0.30 H
GB	0
PC	1.00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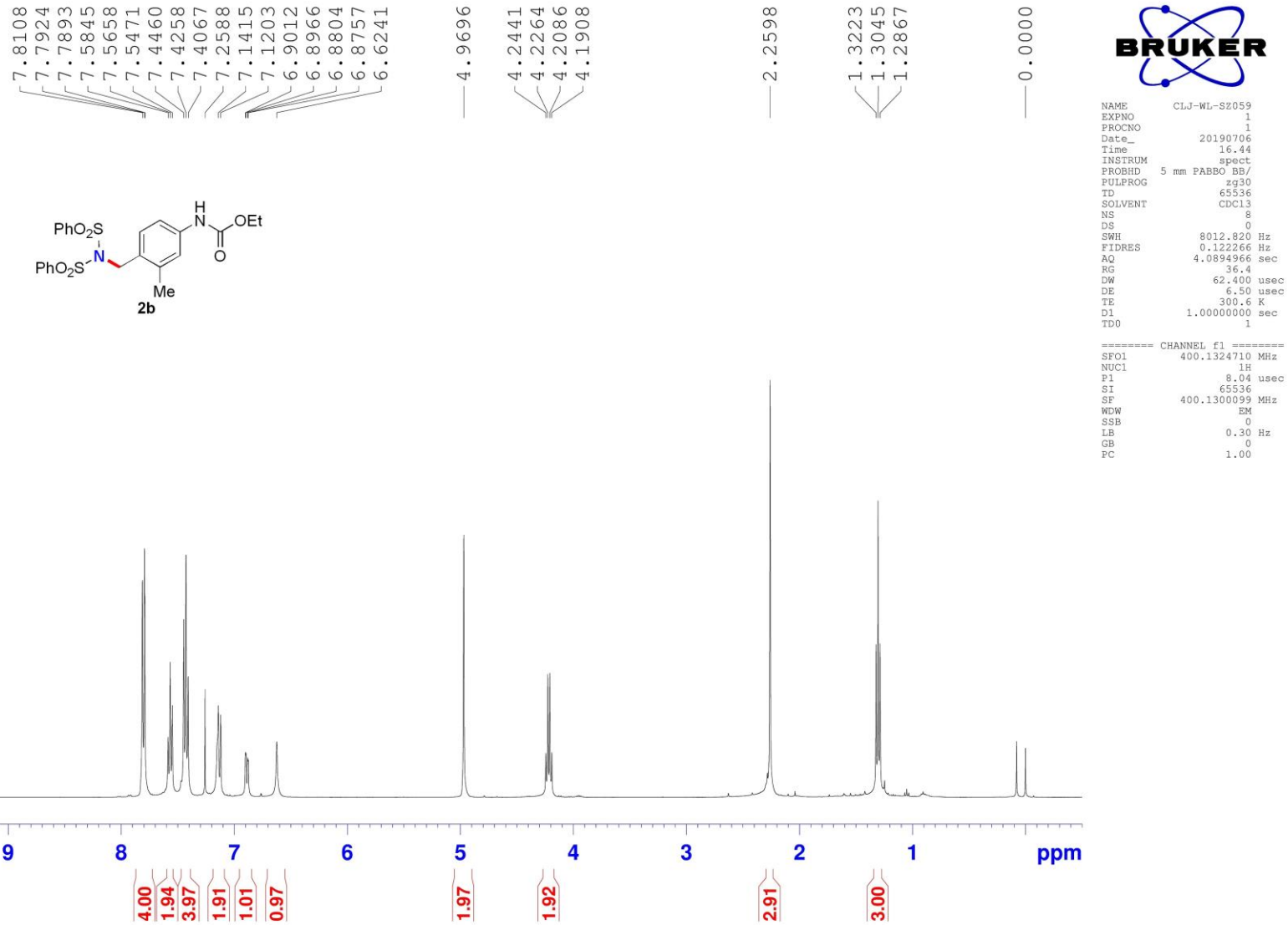
133.443
129.850
128.981
128.628
127.826
118.187
77.318
77.000
76.682
61.074
51.799
14.338
BRUKER
NAME 2019-08-22 shaozhong-SZ078
EXPNO 1
PROCNO 1
Date_ 20190822
Time 11.29 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127944 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
PhO2S
PhO2S
N
H
N
OEt
O
2a
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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7.4460
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7.4067
7.2588
7.1415
7.1203
6.9012
6.8966
6.8804
6.8757
6.6241
4.9696
4.2441
4.2264
4.2086
4.1908
2.2598
1.3223
1.3045
1.2867
0.0000
PhO2S
N
PhO2S
H
N
OEt
O
Me
2b
BRUKER
NAME CLJ-WL-SZ059
EXPNO 1
PROCNO 1
Date_ 20190706
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INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 36.4
DW 62.400 usec
DE 6.50 usec
TE 300.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
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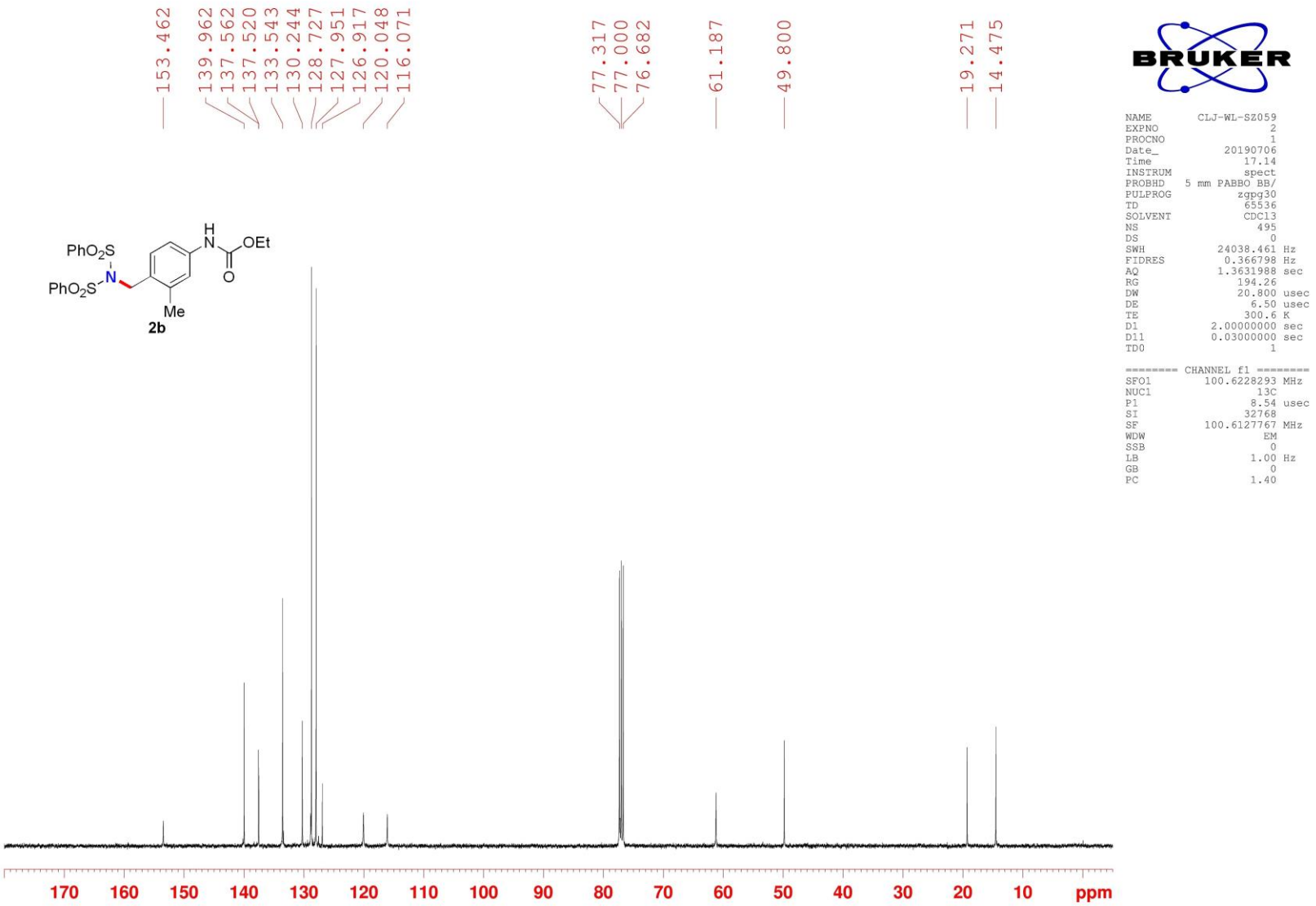
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
ppm
4.00
1.94
3.97
1.91
1.01
0.97
1.97
1.92
2.91
3.00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133.543
130.244
128.727
127.951
126.917
120.048
116.071
77.317
77.000
76.682
61.187
49.800
19.271
14.475
PhO2S
N
PhO2S
H
N
OEt
O
Me
2b
BRUKER
NAME CLJ-WL-SZ059
EXPNO 2
PROCNO 1
Date_ 20190706
Time 17.14
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 495
DS 0
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 194.26
DW 20.800 usec
DE 6.50 usec
TE 300.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
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NUC1 13C
P1 8.54 usec
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WDW EM
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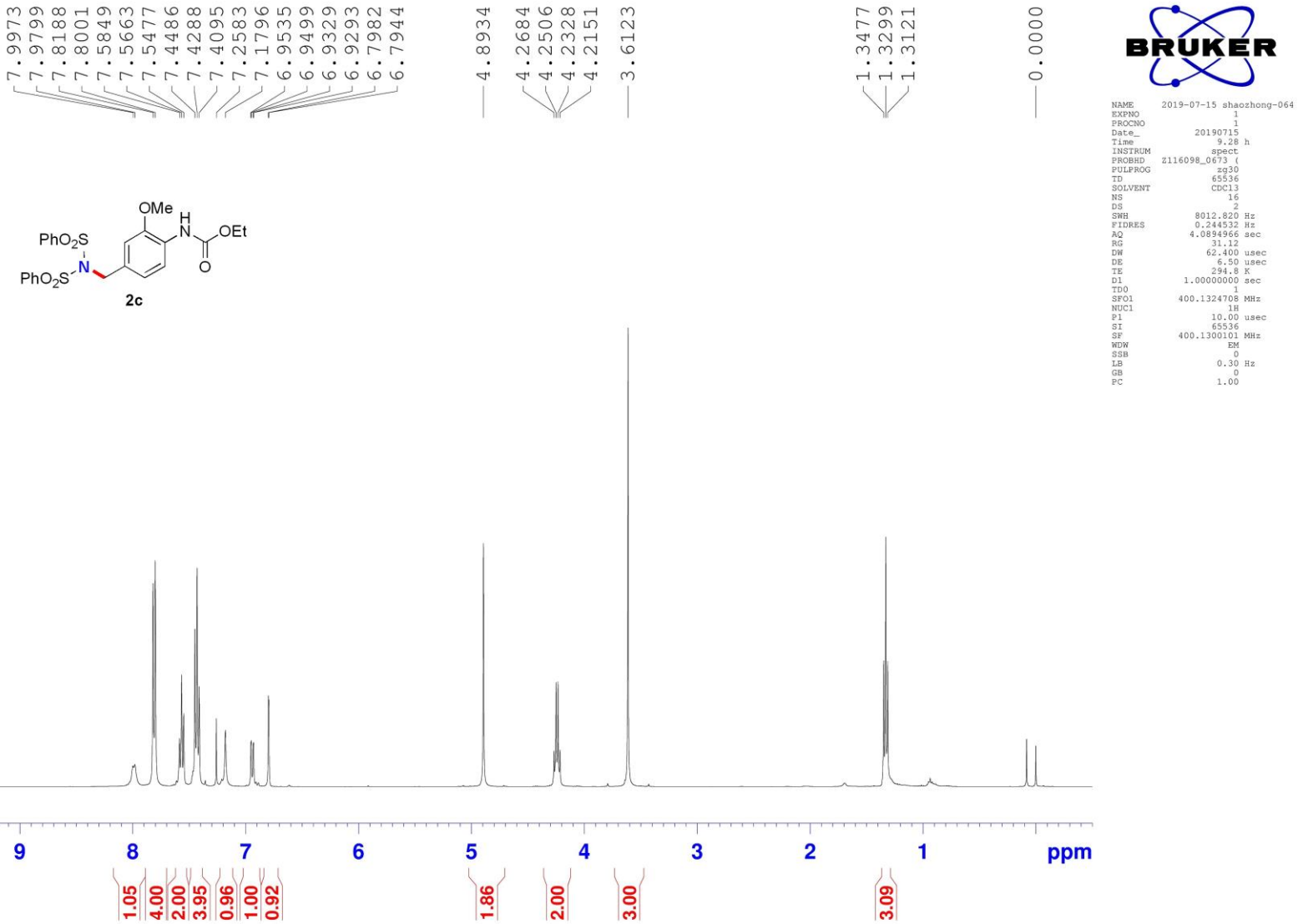
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7.9799
7.8188
7.8001
7.5849
7.5663
7.5477
7.4486
7.4288
7.4095
7.2583
7.1796
6.9535
6.9499
6.9329
6.9293
6.7982
6.7944
4.8934
4.2684
4.2506
4.2328
4.2151
3.6123
1.3477
1.3299
1.3121
0.0000
OMe
H
N
OEt
O
PhO2S
N
PhO2S
2c
BRUKER
NAME 2019-07-15 shaozhong-064
EXPNO 1
PROCNO 1
Date_ 20190715
Time 9.28 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 294.8 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300101 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
ppm
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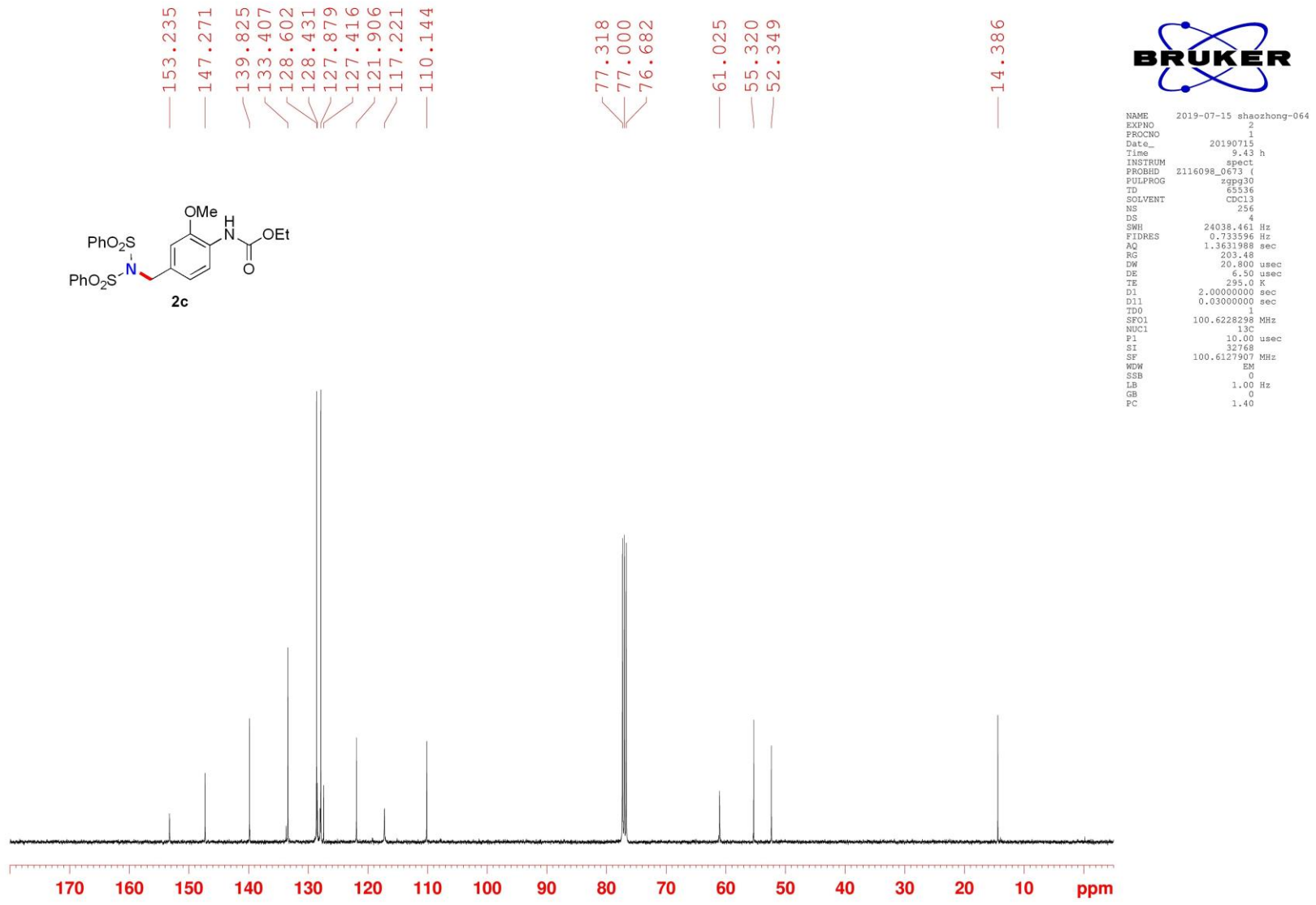
4.00
2.00
3.95
0.96
1.00
0.92
1.86
2.00
3.00
3.09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133.407
128.602
128.431
127.879
127.416
121.906
117.221
110.144
77.318
77.000
76.682
61.025
55.320
52.349
14.386
OMe
H
N
OEt
O
PhO2S
N
PhO2S
2c
NAME 2019-07-15 shaozhong-064
EXPNO 2
PROCNO 1
Date_ 20190715
Time 9.43 h
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PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
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WDW EM
SSB 0
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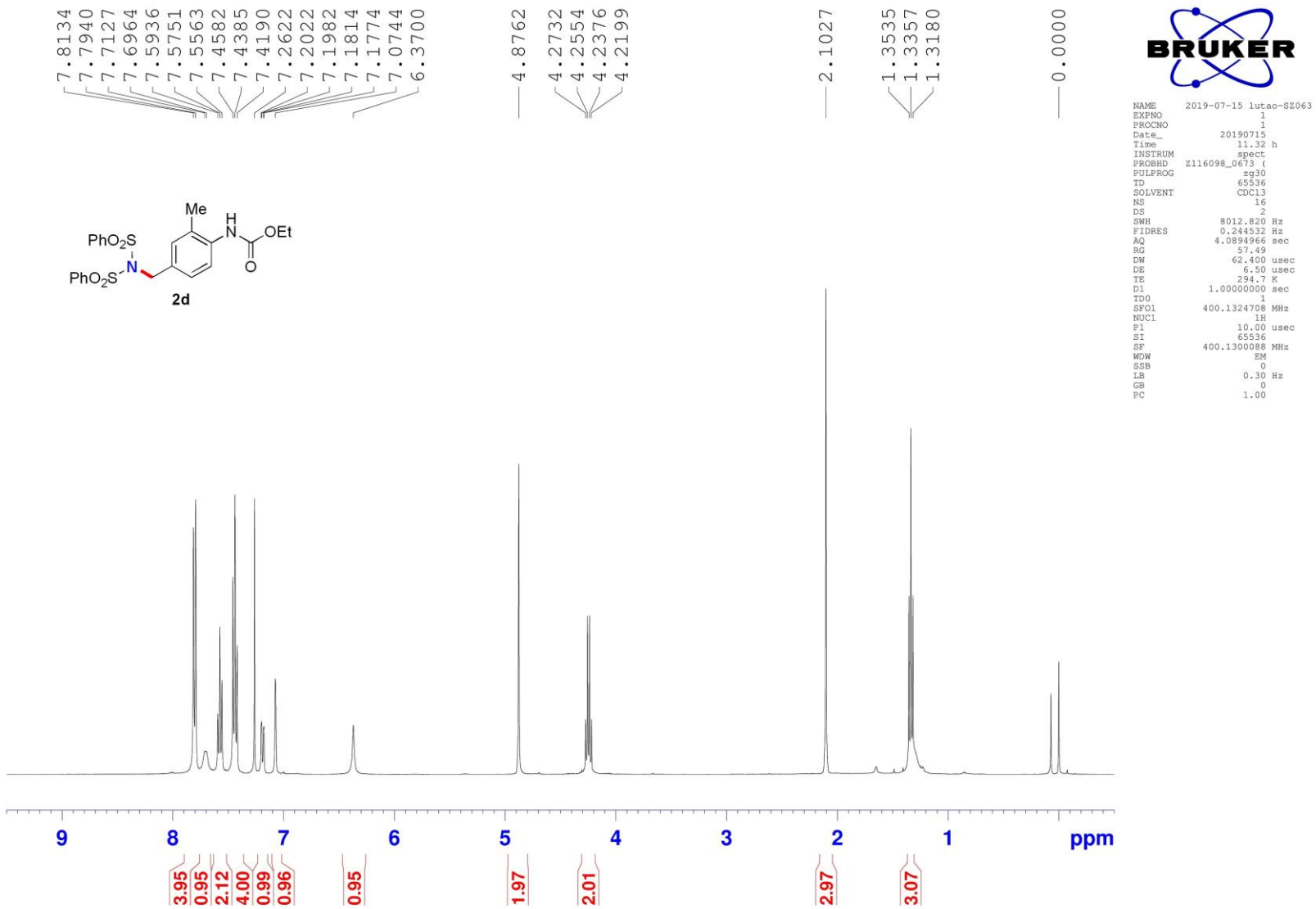
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7.5563
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7.4385
7.4190
7.2622
7.2022
7.1982
7.1814
7.1774
7.0744
6.3700
4.8762
4.2732
4.2554
4.2376
4.2199
2.1027
1.3535
1.3357
1.3180
0.0000
Me
H
N
OEt
O
PhO2S
N
PhO2S
2d
BRUKER
NAME 2019-07-15 lutao-SZ063
EXPNO 1
PROCNO 1
Date_ 20190715
Time 11.32 h
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PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 57.49
DW 62.400 usec
DE 6.50 usec
TE 294.7 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
ppm
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0.95
2.12
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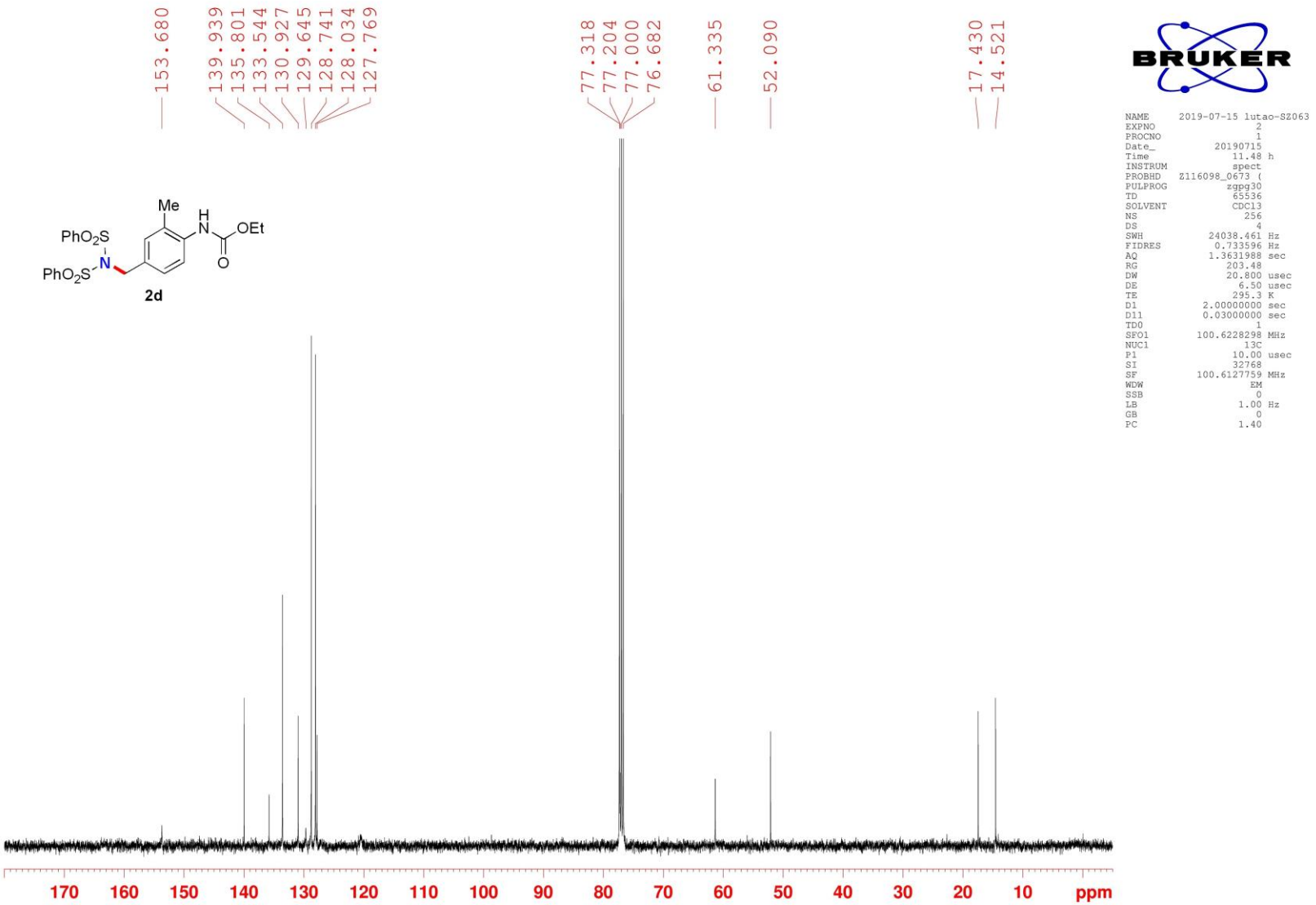
0.99
0.96
0.95
1.97
2.01
2.97
3.07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127.769
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77.204
77.000
76.682
61.335
52.090
17.430
14.521
Me
H
N
OEt
O
PhO2S
N
PhO2S
2d
BRUKER
NAME 2019-07-15 lutao-SZ063
EXPNO 2
PROCNO 1
Date_ 20190715
Time 11.48 h
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PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
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WDW EM
SSB 0
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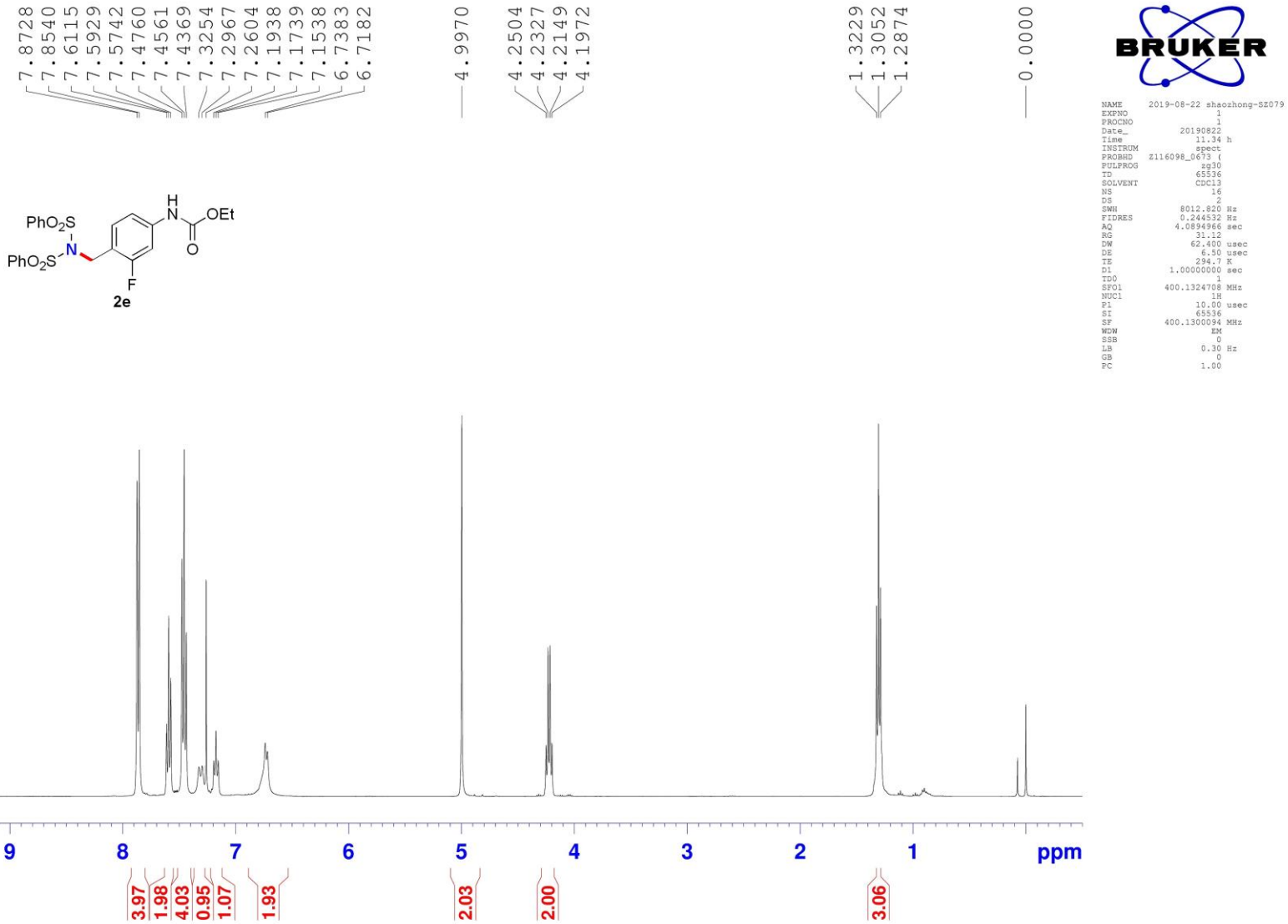
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7.1938
7.1739
7.1538
6.7383
6.7182
4.9970
4.2504
4.2327
4.2149
4.1972
1.3229
1.3052
1.2874
0.0000
BRUKER
NAME 2019-08-22 shaozhong-SZ079
EXPNO 1
PROCNO 1
Date_ 20190822
Time 11.34 h
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PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 294.7 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
PhO2S
N
PhO2S
H
N
OEt
O
F
2e
9
8
7
6
5
4
3
2
1
ppm
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1.07
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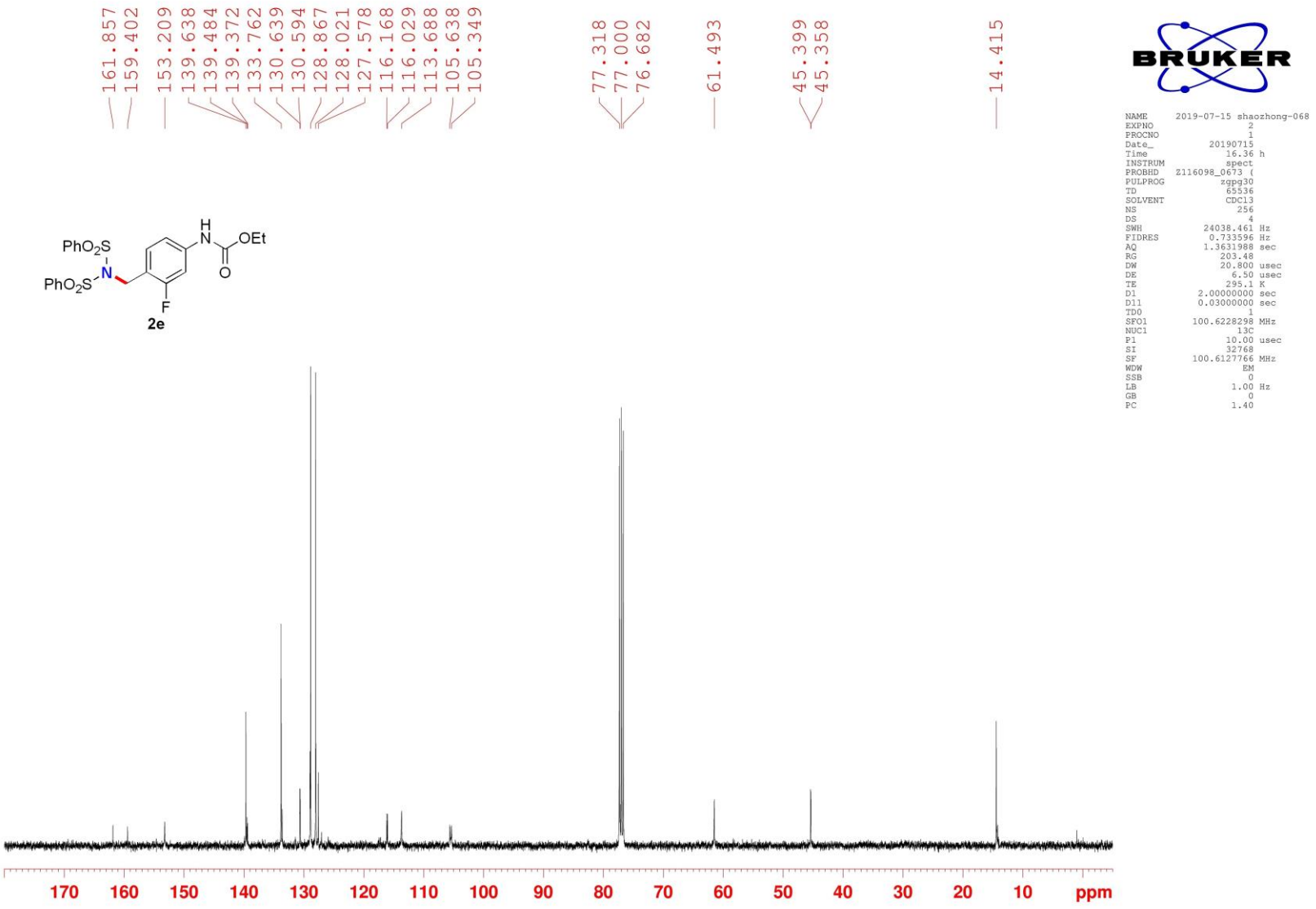
2.00
3.06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116.168
116.029
113.688
105.638
105.349
77.318
77.000
76.682
61.493
45.399
45.358
14.415
BRUKER
NAME 2019-07-15 shaozhong-068
EXPNO 2
PROCNO 1
Date_ 20190715
Time 16.36 h
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PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127766 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
PhO2S
N
PhO2S
H
N
OEt
O
F
2e
170
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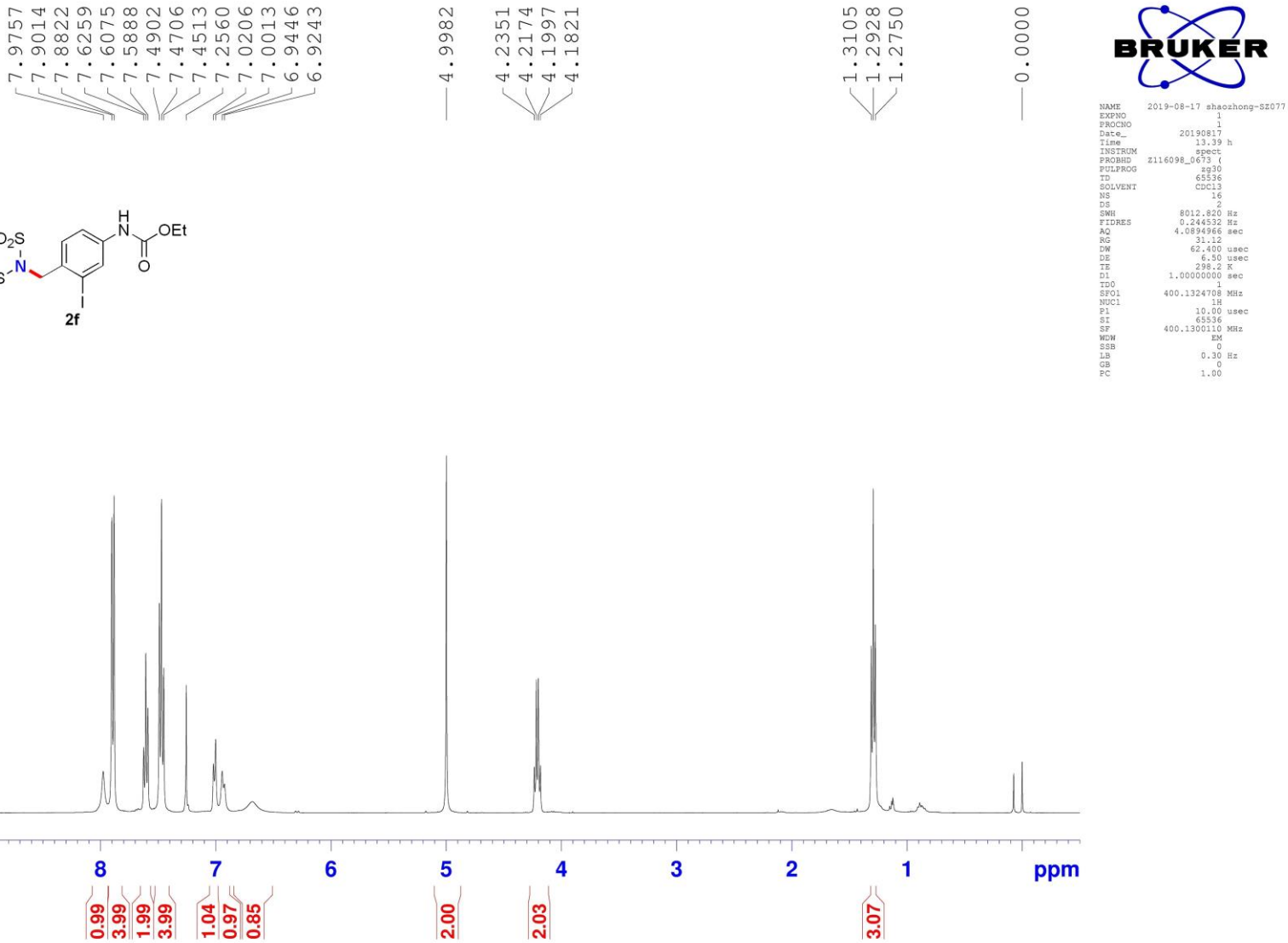
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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7.4513
7.2560
7.0206
7.0013
6.9446
6.9243
4.9982
4.2351
4.2174
4.1997
4.1821
1.3105
1.2928
1.2750
0.0000
BRUKER
NAME 2019-08-17 shaozhong-SZ077
EXPNO 1
PROCNO 1
Date_ 20190817
Time 13.39 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300110 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
PhO2S
PhO2S
N
H
N
OEt
O
I
2f
9
8
7
6
5
4
3
2
1
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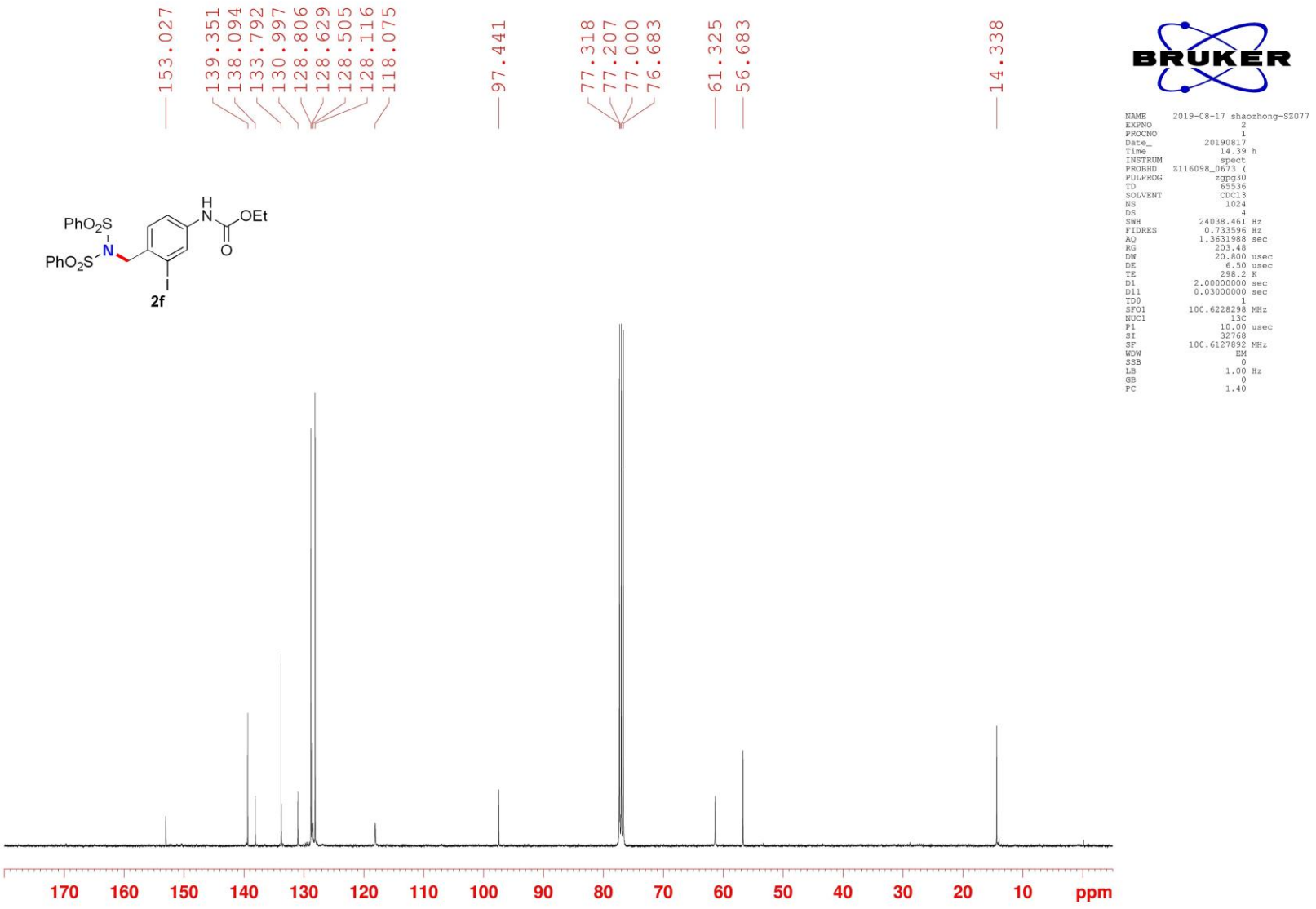
2.03
3.07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77.000
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56.683
14.338
BRUKER
NAME 2019-08-17 shaozhong-SZ077
EXPNO 2
PROCNO 1
Date_ 20190817
Time 14.39 h
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PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
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FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127892 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
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N
OEt
O
I
2f
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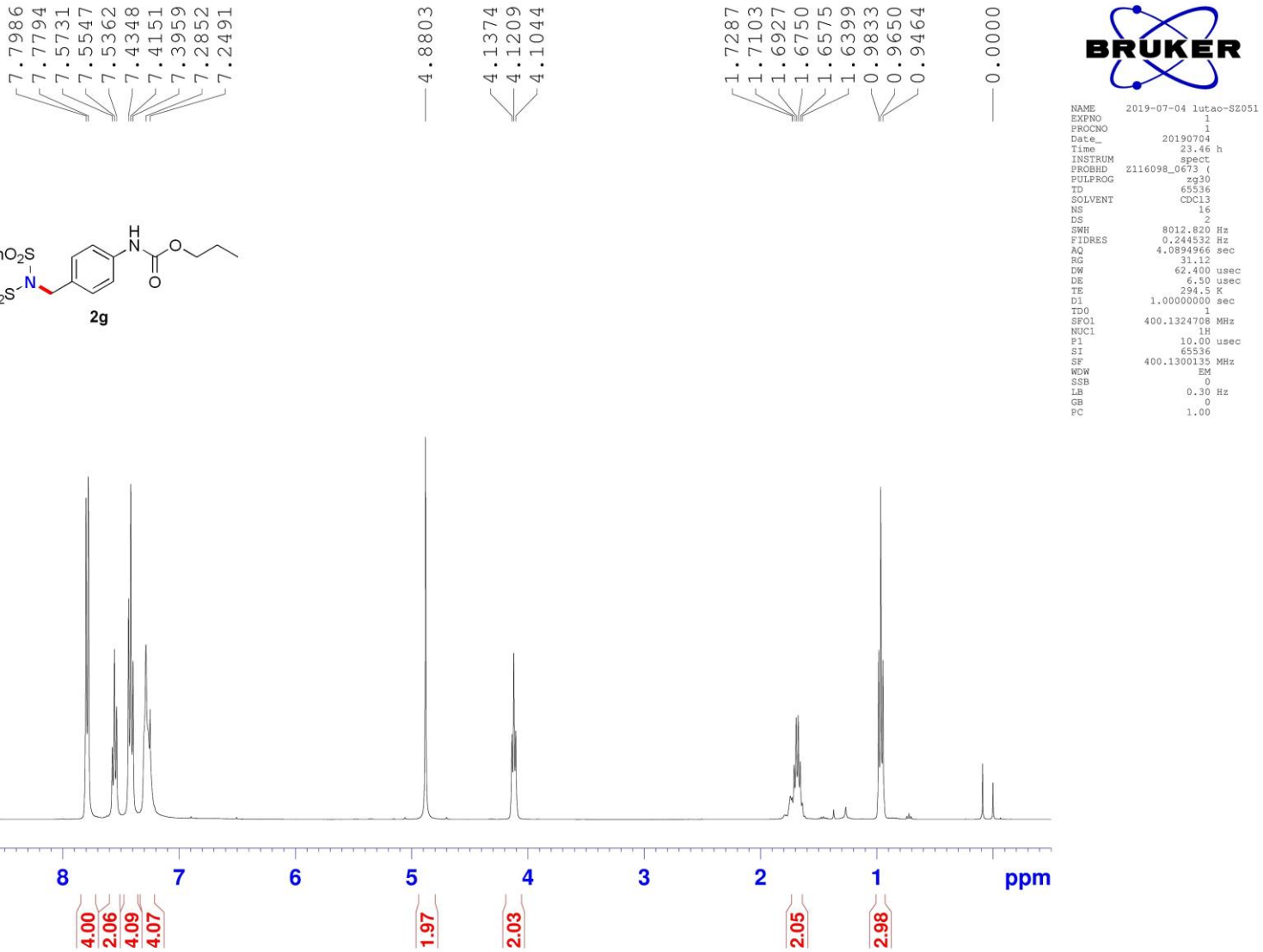
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7.2852
7.2491
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4.1044
1.7287
1.7103
1.6927
1.6750
1.6575
1.6399
0.9833
0.9650
0.9464
0.0000
PhO2S
N
PhO2S
H
N
O
O
2g
BRUKER
NAME 2019-07-04 lutao-SZ051
EXPNO 1
PROCNO 1
Date_ 20190704
Time 23.46 h
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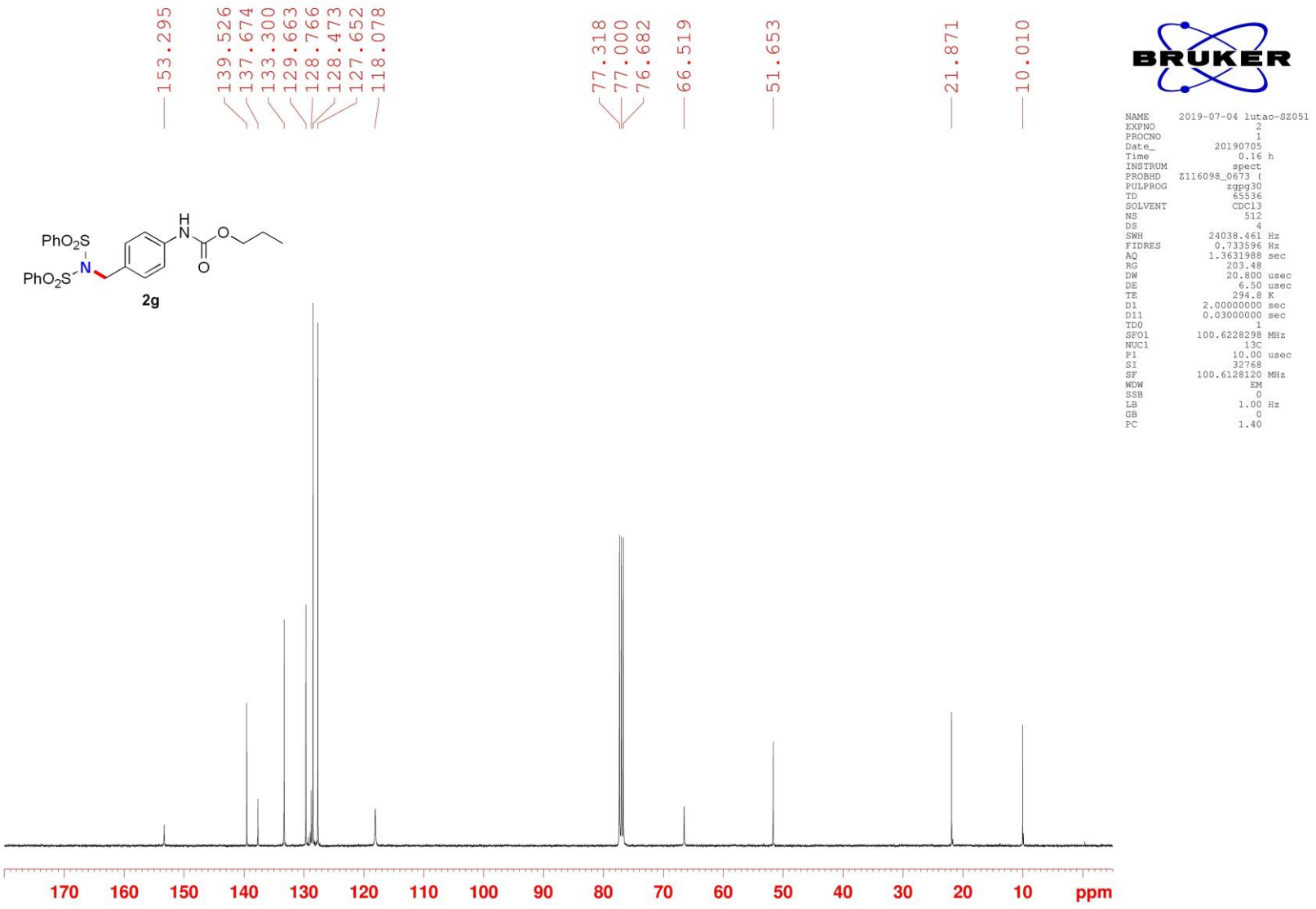
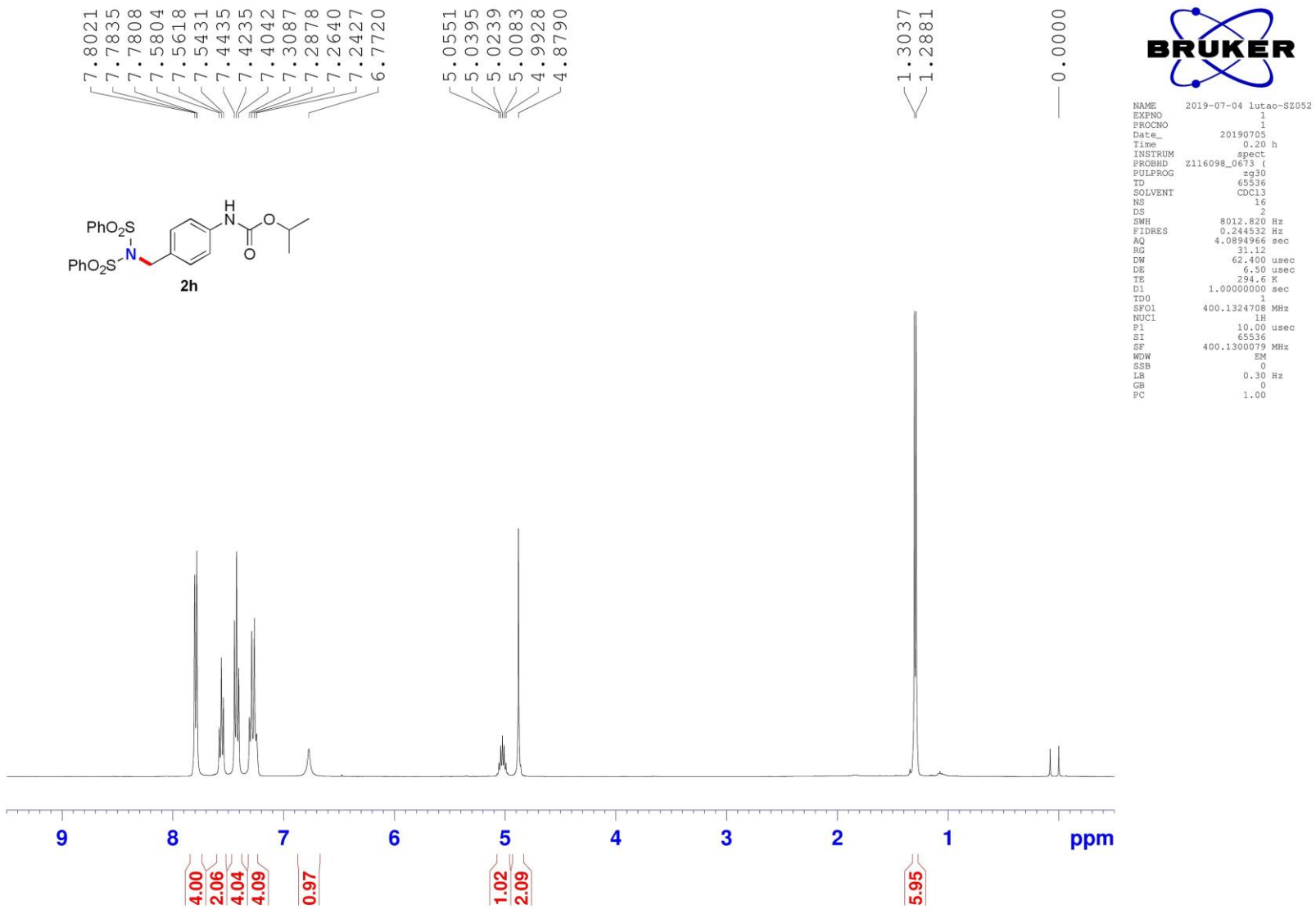
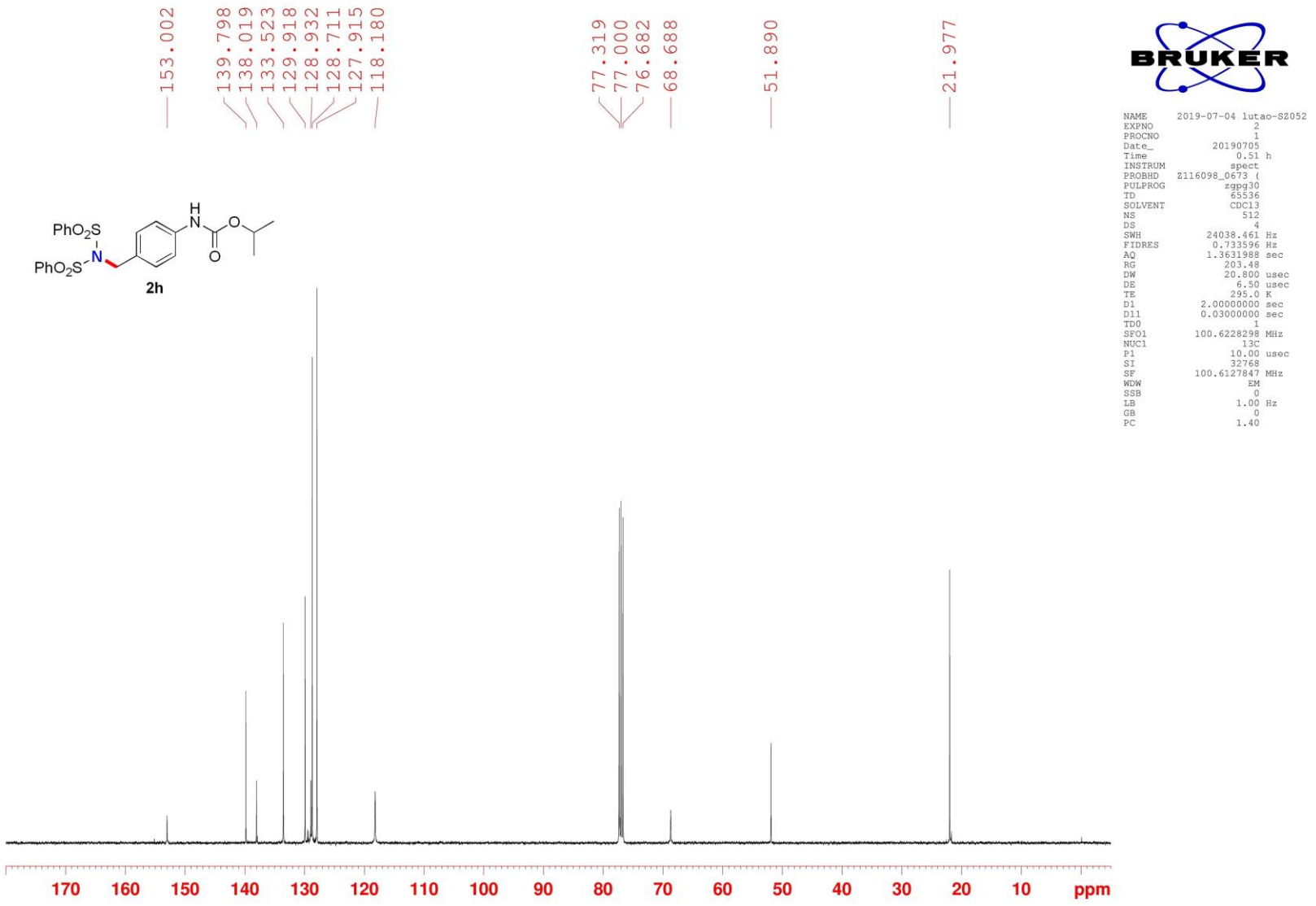
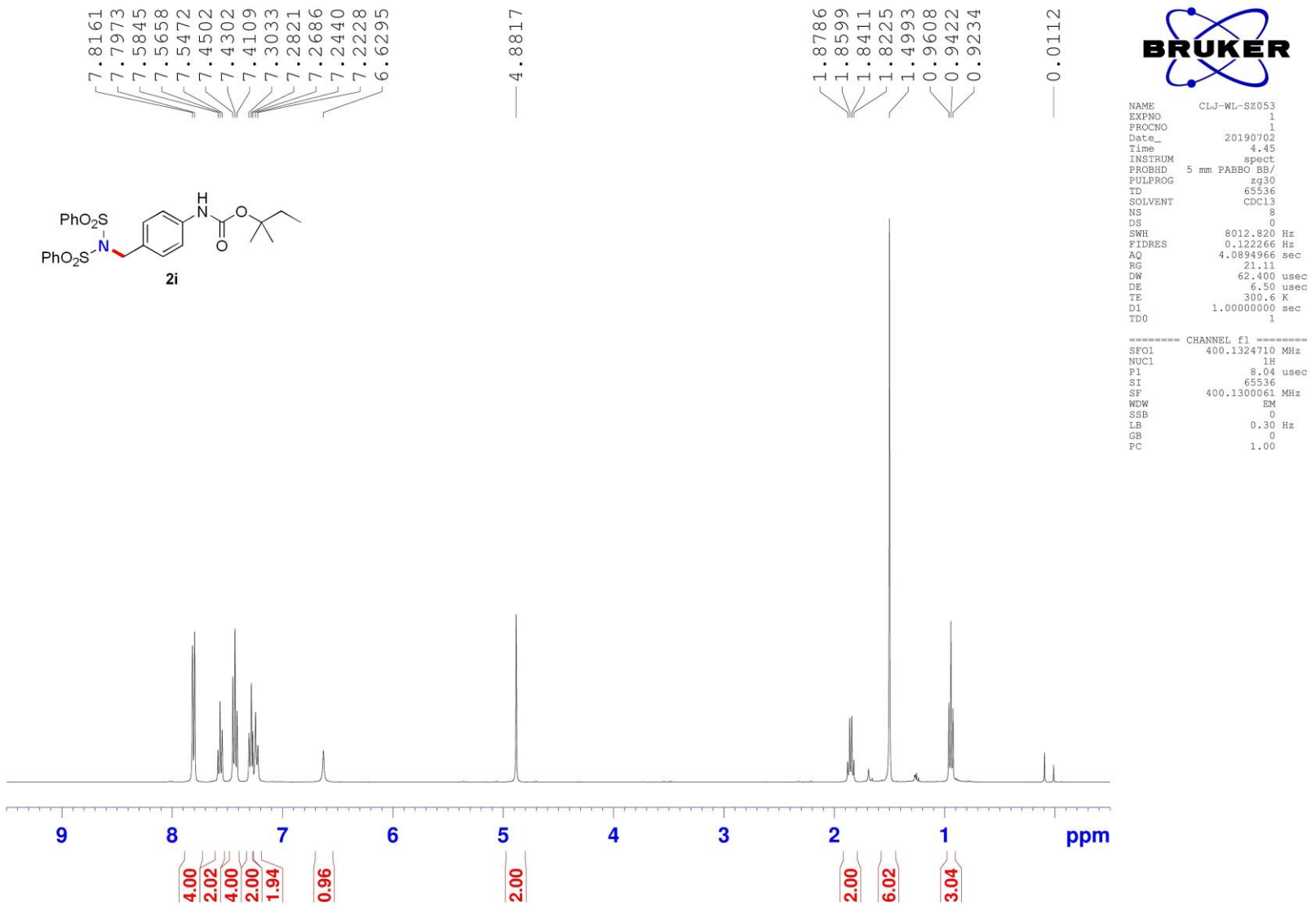
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300135 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
ppm
4.00
2.06
4.09
4.07
1.97
2.03
2.05
2.98


153.295
139.526
137.674
133.300
129.663
128.766
128.473
127.652
118.078
77.318
77.000
76.682
66.519
51.653
21.871
10.010
BRUKER
NAME 2019-07-04 lutao-SZ051
EXPNO 2
PROCNO 1
Date_ 20190705
Time 0.16 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 294.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6128120 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
PhO2S
PhO2S
N
H
N
O
O
2g
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

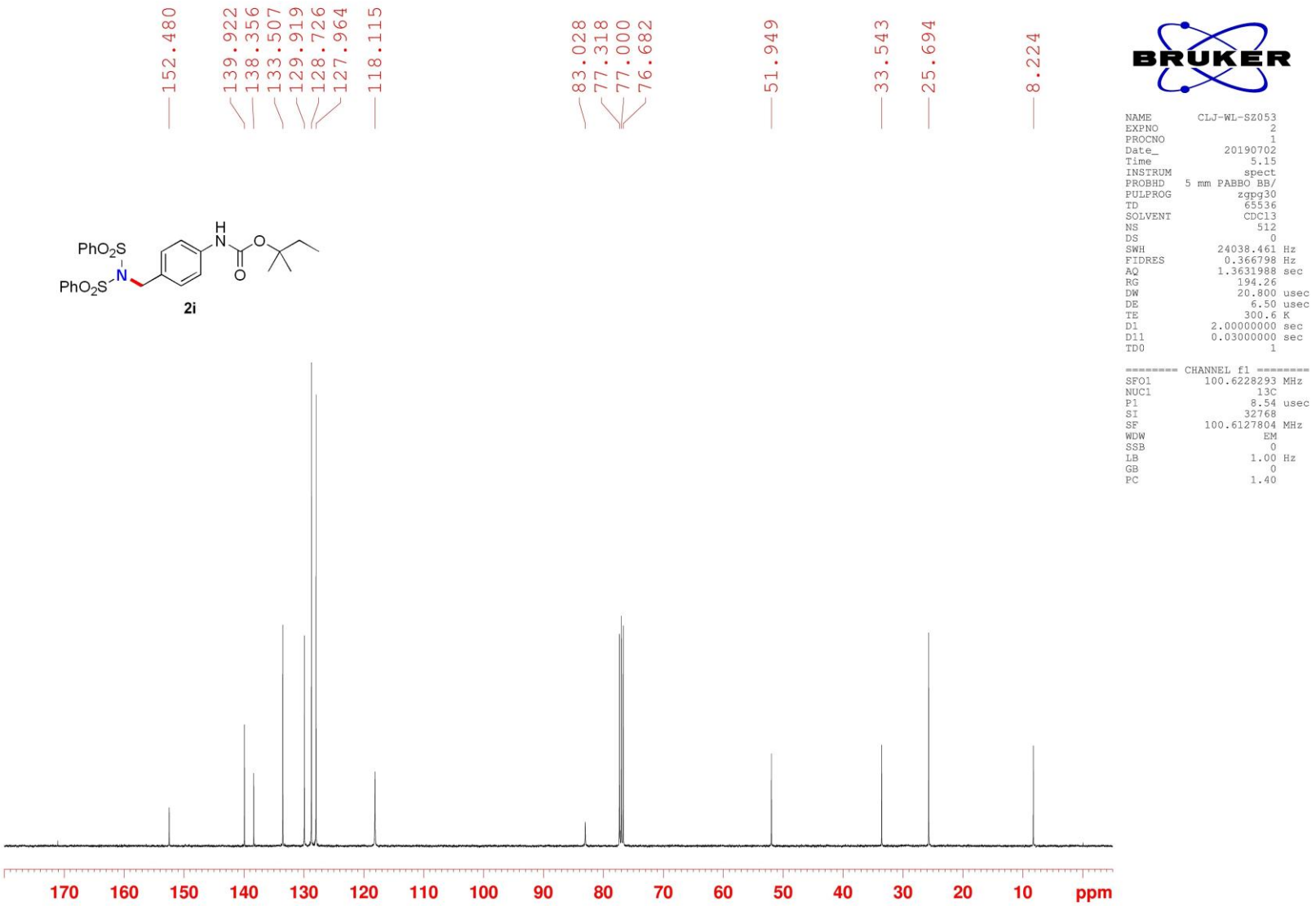

7.8021
7.7835
7.7808
7.5804
7.5618
7.5431
7.4435
7.4235
7.4042
7.3087
7.2878
7.2640
7.2427
6.7720
5.0551
5.0395
5.0239
5.0083
4.9928
4.8790
1.3037
1.2881
0.0000
BRUKER
NAME 2019-07-04 lutao-SZ052
EXPNO 1
PROCNO 1
Date_ 20190705
Time 0.20 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 294.6 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300079 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
PhO2S
N
PhO2S
H
N
O
O
2h
9
8
7
6
5
4
3
2
1
ppm
4.00
2.06
4.04
4.09
0.97
1.02
2.09
5.95

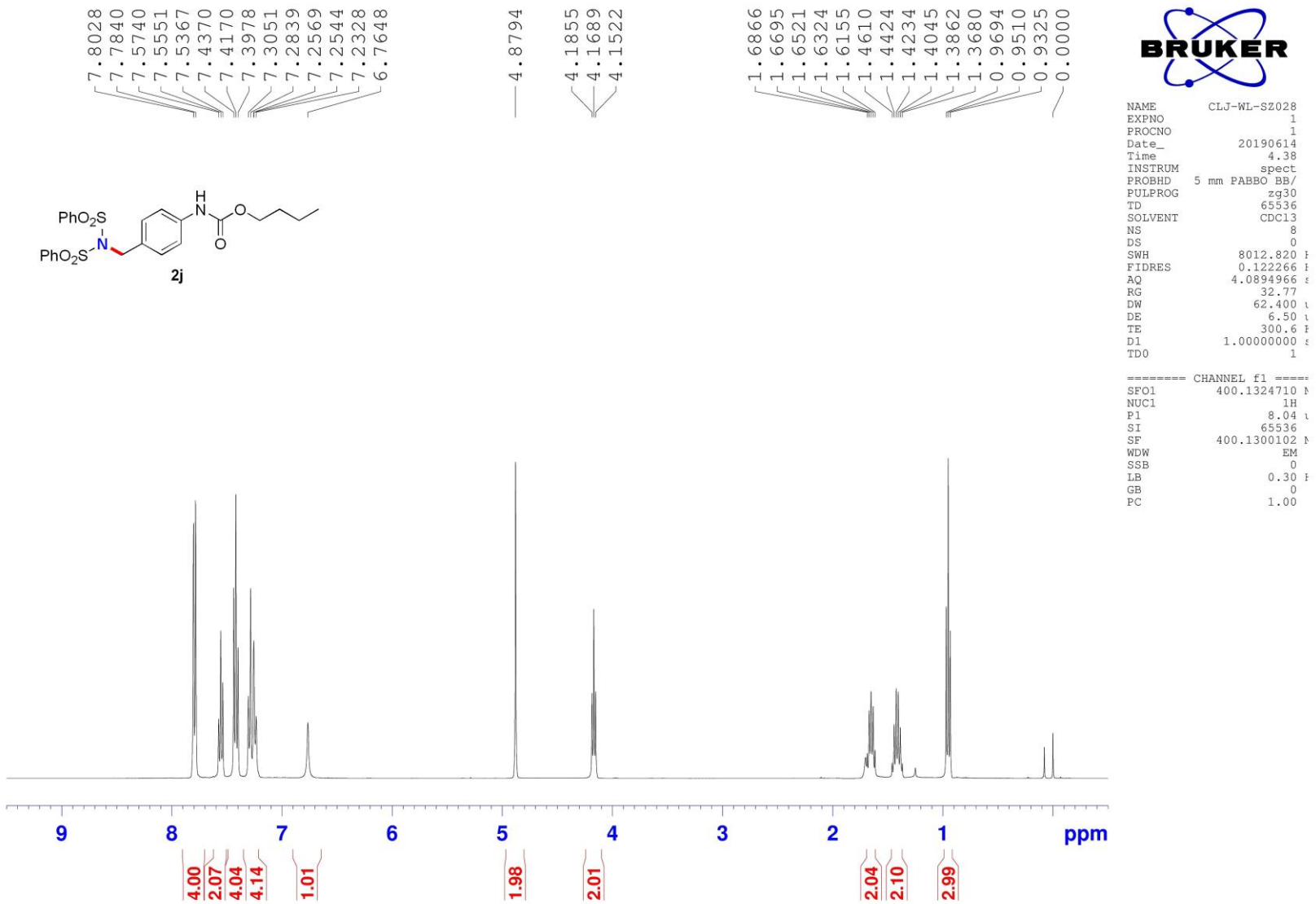

153.002
139.798
138.019
133.523
129.918
128.932
128.711
127.915
118.180
77.319
77.000
76.682
68.688
51.890
21.977
BRUKER
NAME 2019-07-04 lutao-SZ052
EXPNO 2
PROCNO 1
Date_ 20190705
Time 0.51 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127847 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
PhO2S
N
PhO2S
H
N
O
O
2h
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm



BRUKER

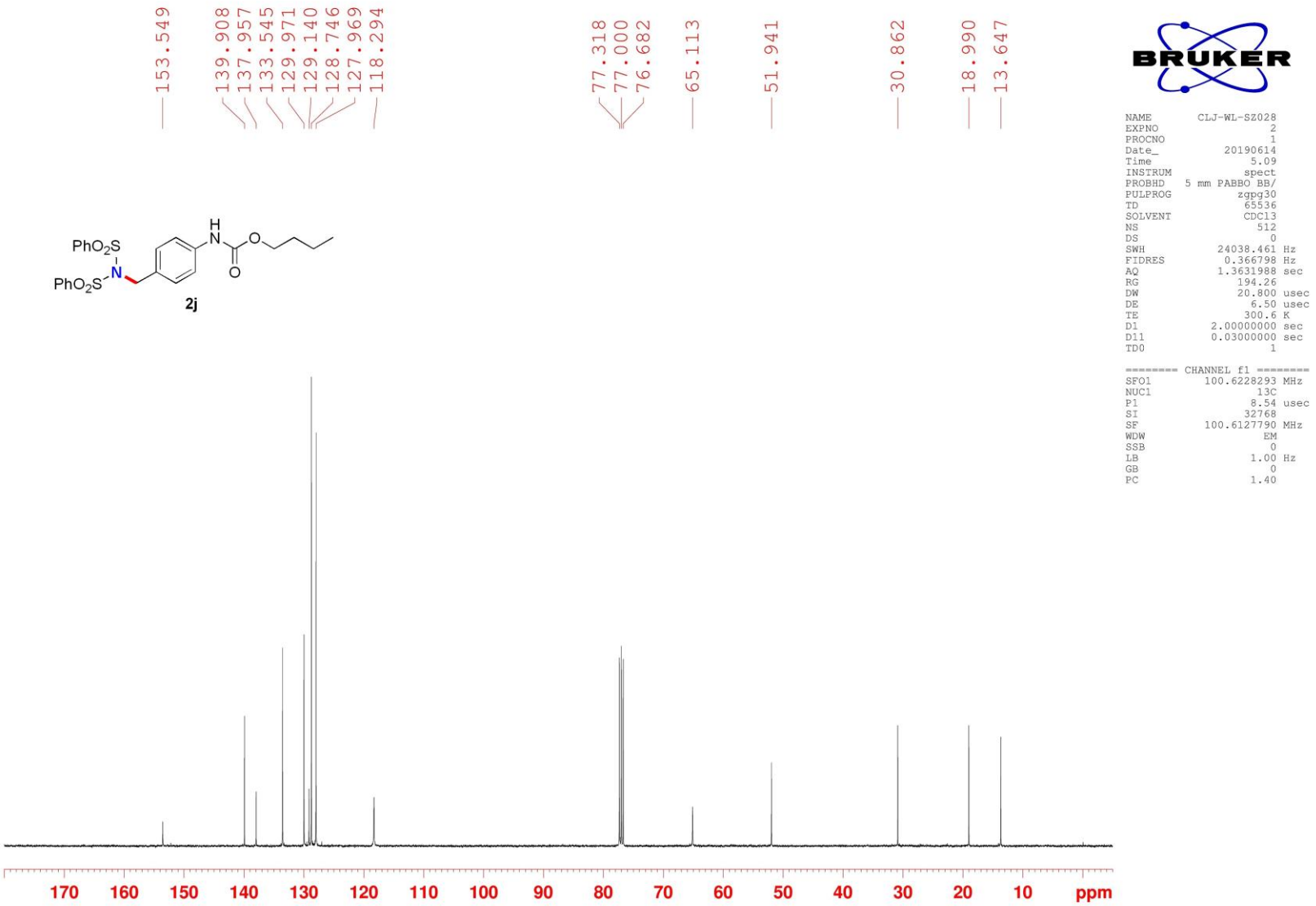
NAME	CLJ-WL-SZ053
EXPNO	1
PROCNO	1
Date_	20190702
Time	4.45
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	21.11
DW	62.400 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300061 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

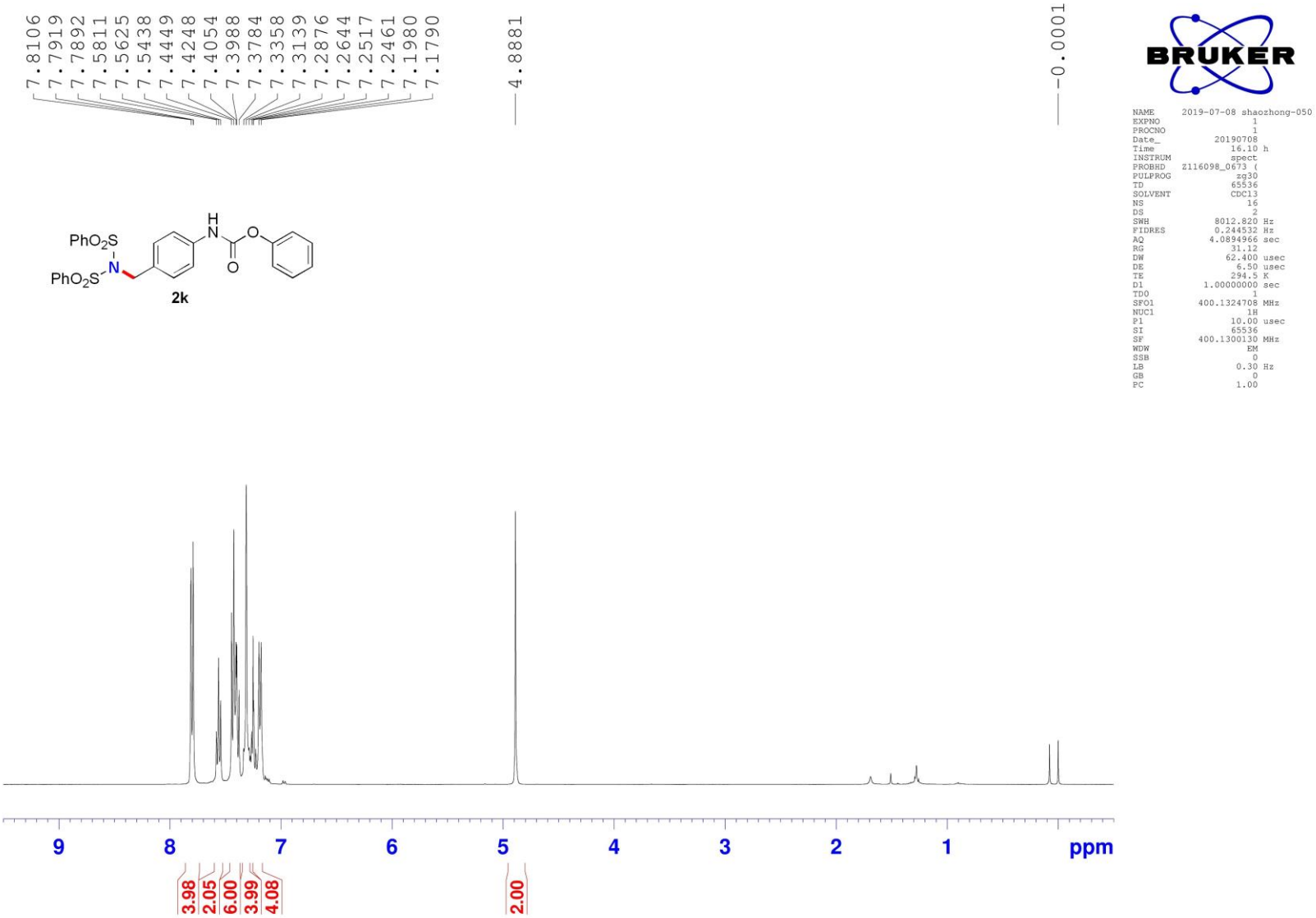

152.480
139.922
138.356
133.507
129.919
128.726
127.964
118.115
83.028
77.318
77.000
76.682
51.949
33.543
25.694
8.224
PhO2S
PhO2S
N
H
N
O
O
2i
BRUKER
NAME CLJ-WL-SZ053
EXPNO 2
PROCNO 1
Date_ 20190702
Time 5.15
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 0
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 194.26
DW 20.800 usec
DE 6.50 usec
TE 300.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228293 MHz
NUC1 13C
P1 8.54 usec
SI 32768
SF 100.6127804 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

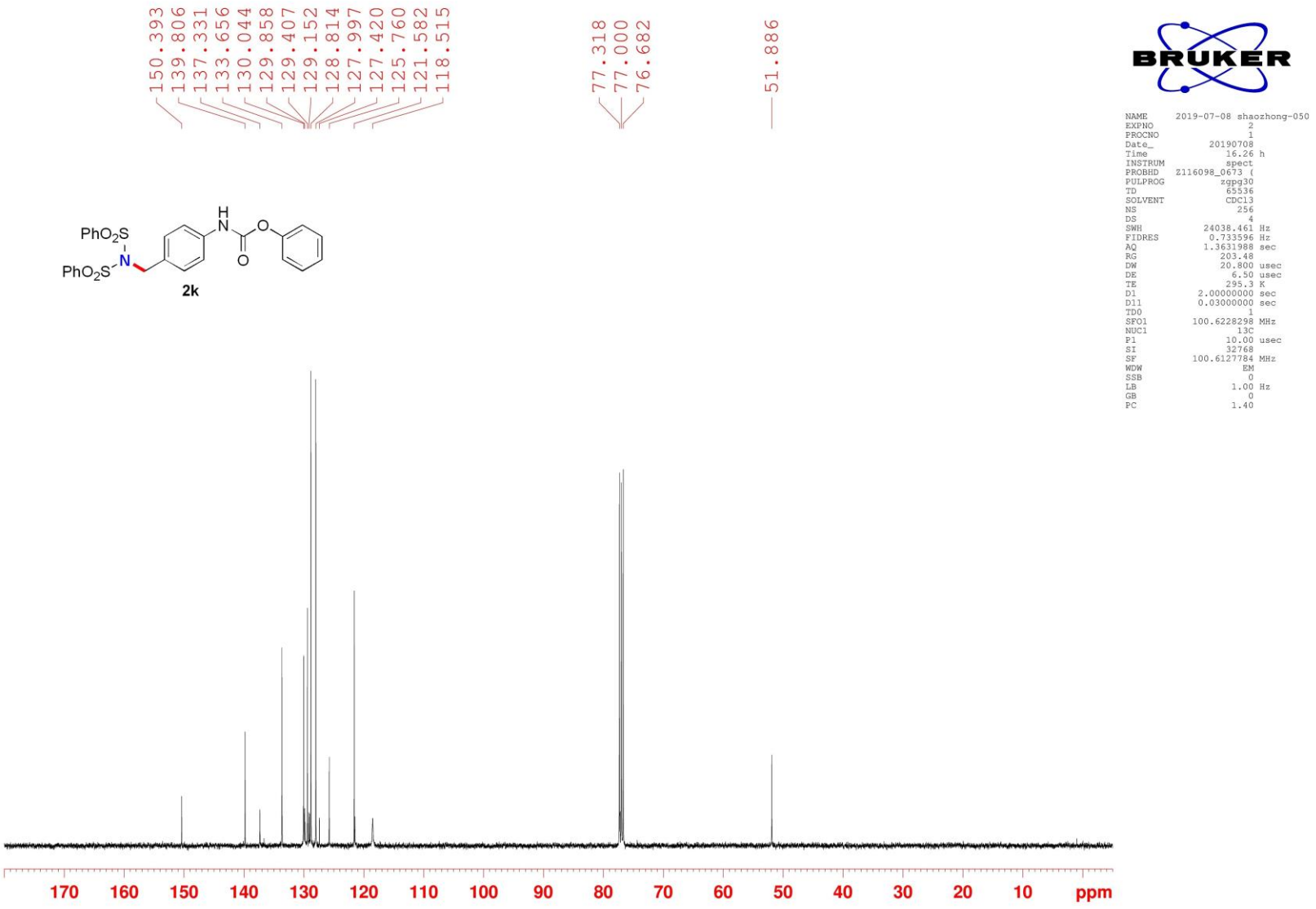


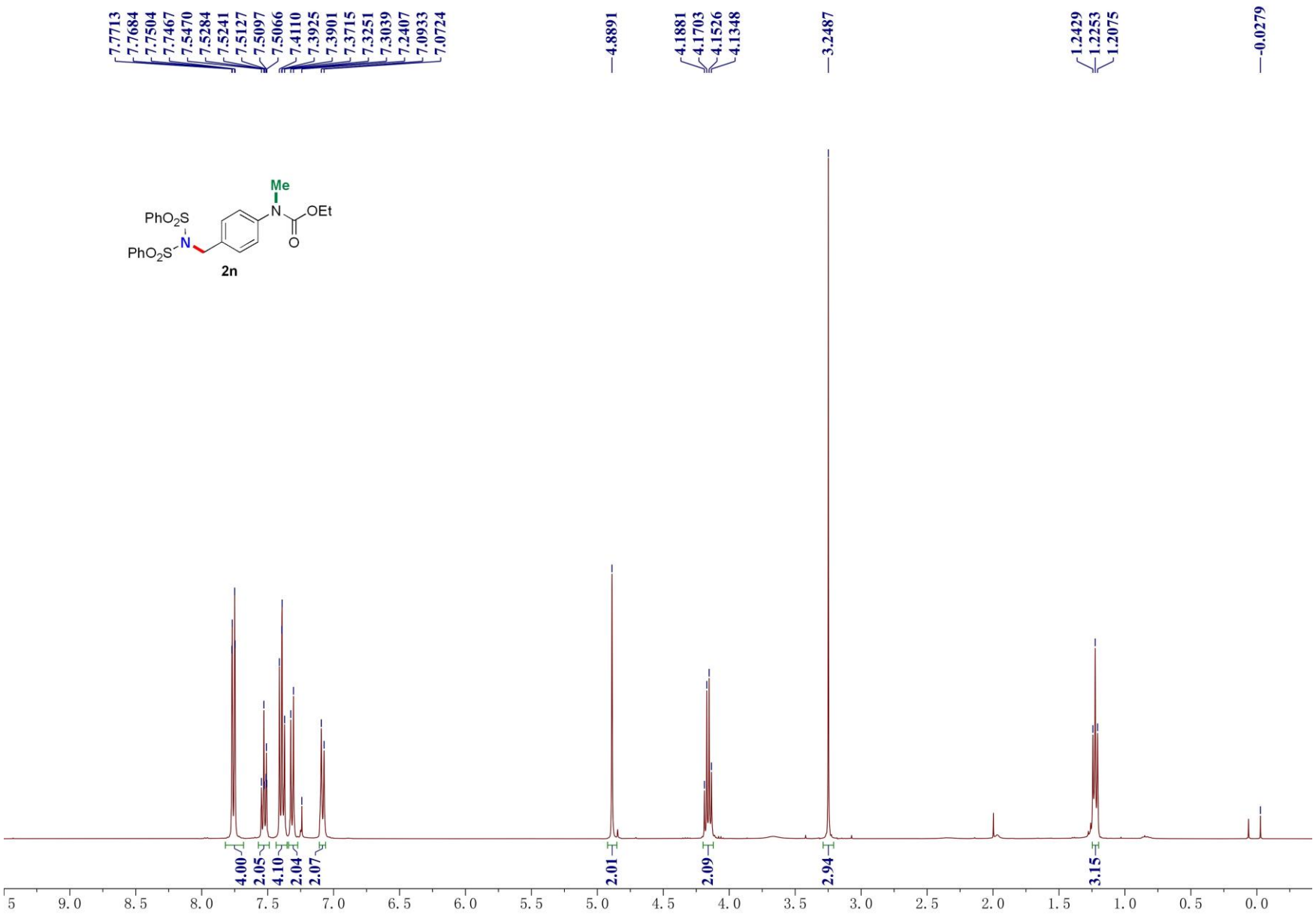
BRUKER

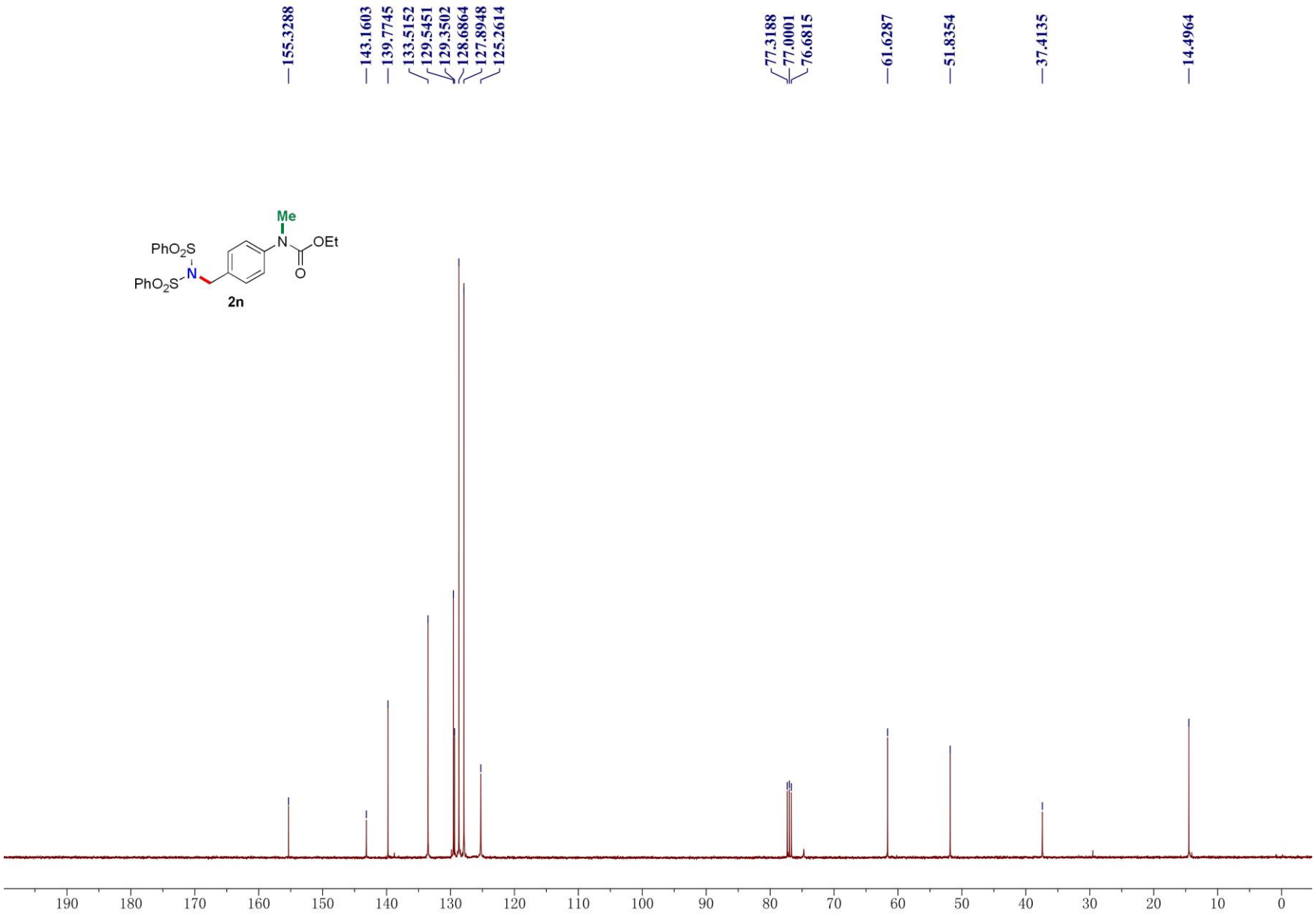
NAME	CLJ-WL-SZ028
EXPNO	1
PROCNO	1
Date_	20190614
Time	4.38
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820
FIDRES	0.122266
AQ	4.0894966
RG	32.77
DW	62.400
DE	6.50
TE	300.6
D1	1.00000000
TD0	1
======== CHANNEL f1 =====	
SFO1	400.1324710
NUC1	1H
P1	8.04
SI	65536
SF	400.1300102
WDW	EM
SSB	0
LB	0.30
GB	0
PC	1.00

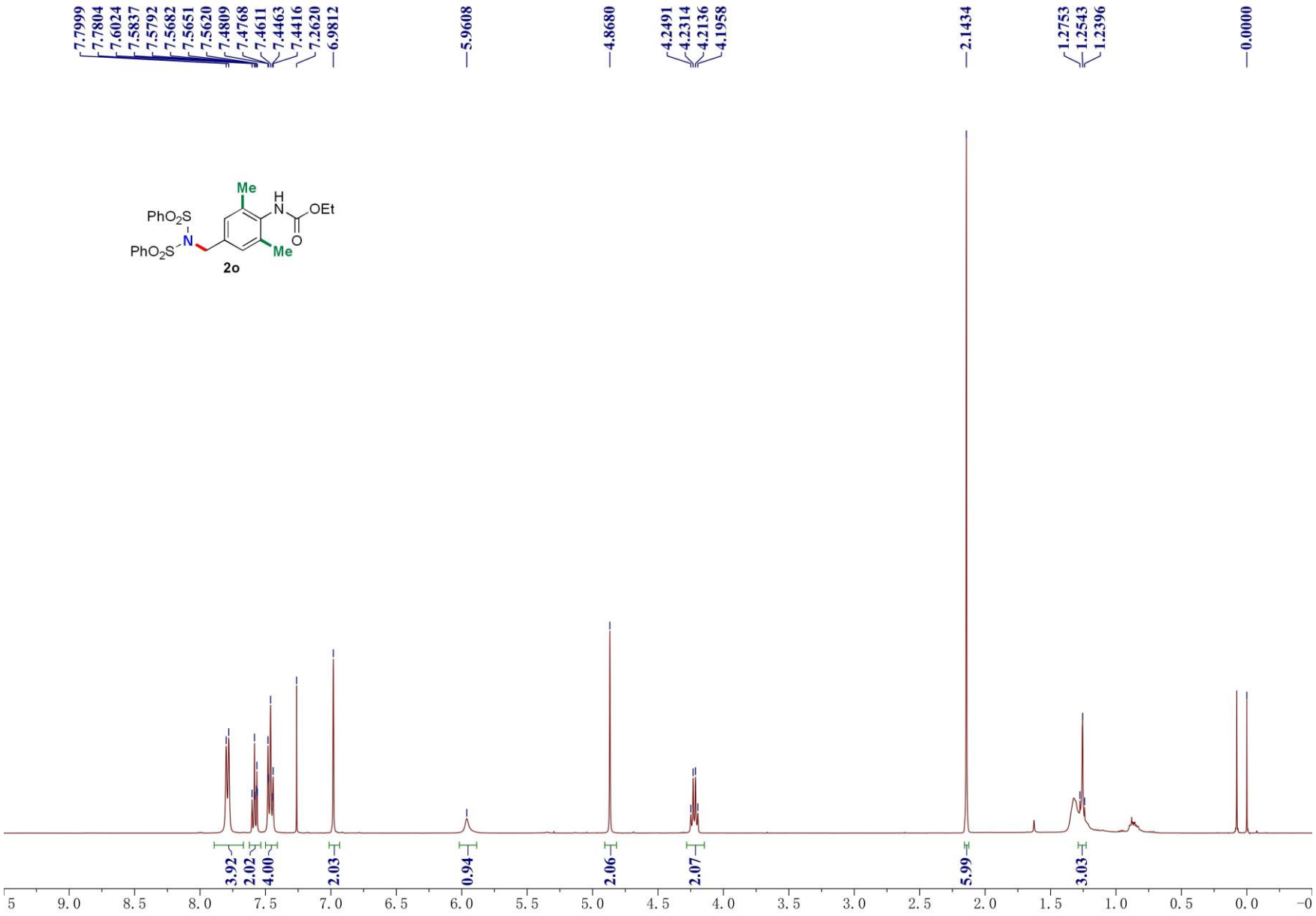

153.549
139.908
137.957
133.545
129.971
129.140
128.746
127.969
118.294
77.318
77.000
76.682
65.113
51.941
30.862
18.990
13.647
PhO2S
N
PhO2S
H
N
O
O
2j
BRUKER
NAME CLJ-WL-SZ028
EXPNO 2
PROCNO 1
Date_ 20190614
Time 5.09
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 0
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 194.26
DW 20.800 usec
DE 6.50 usec
TE 300.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6228293 MHz
NUC1 13C
P1 8.54 usec
SI 32768
SF 100.6127790 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

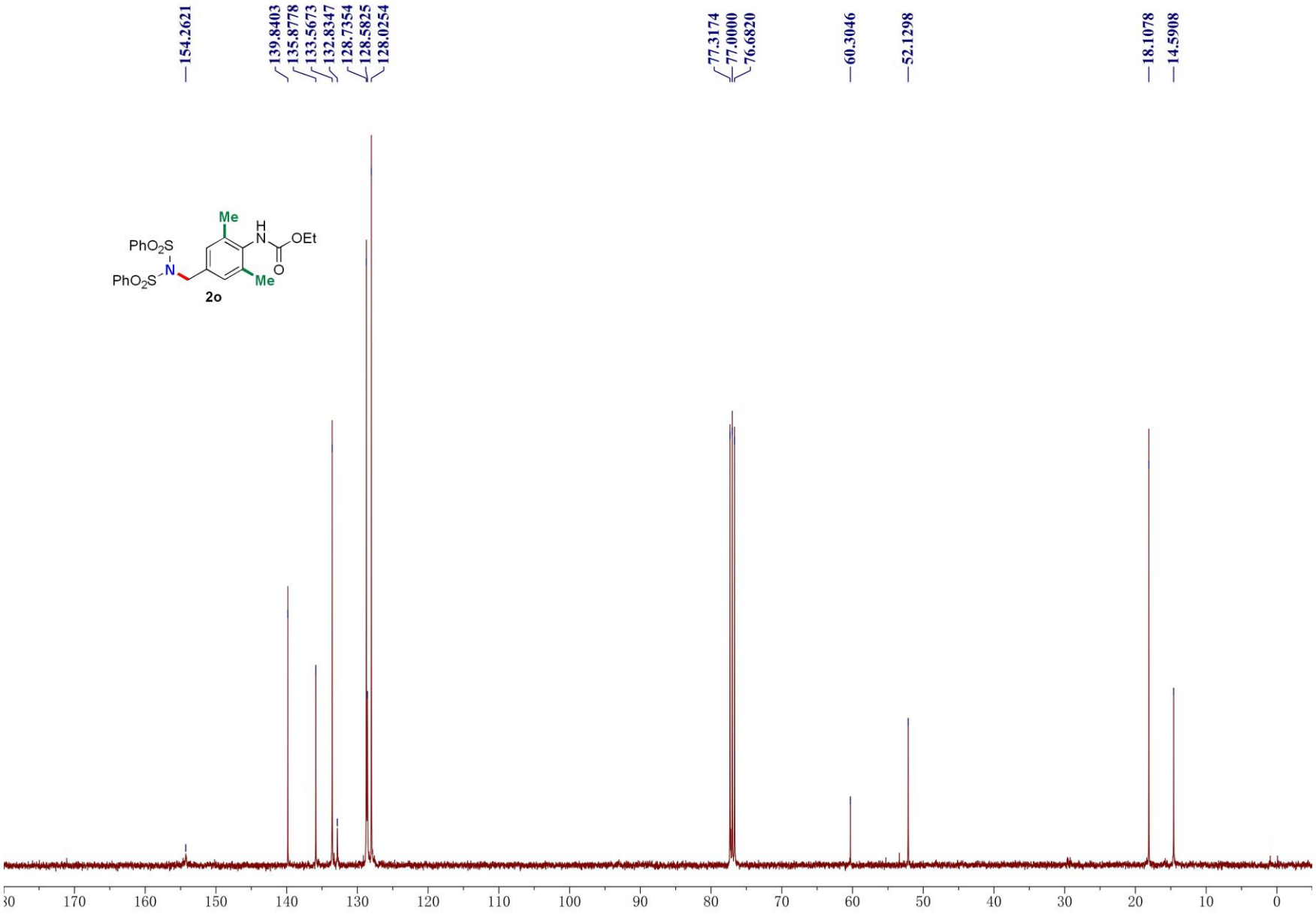

7.8106
7.7919
7.7892
7.5811
7.5625
7.5438
7.4449
7.4248
7.4054
7.3988
7.3784
7.3358
7.3139
7.2876
7.2644
7.2517
7.2461
7.1980
7.1790
4.8881
0.0001
PhO2S
N
PhO2S
H
N
O
O
2k
NAME 2019-07-08 shaozhong-050
EXPNO 1
PROCNO 1
Date_ 20190708
Time 16.10 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300130 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
ppm
3.98
2.05
6.00
3.99
4.08
2.00

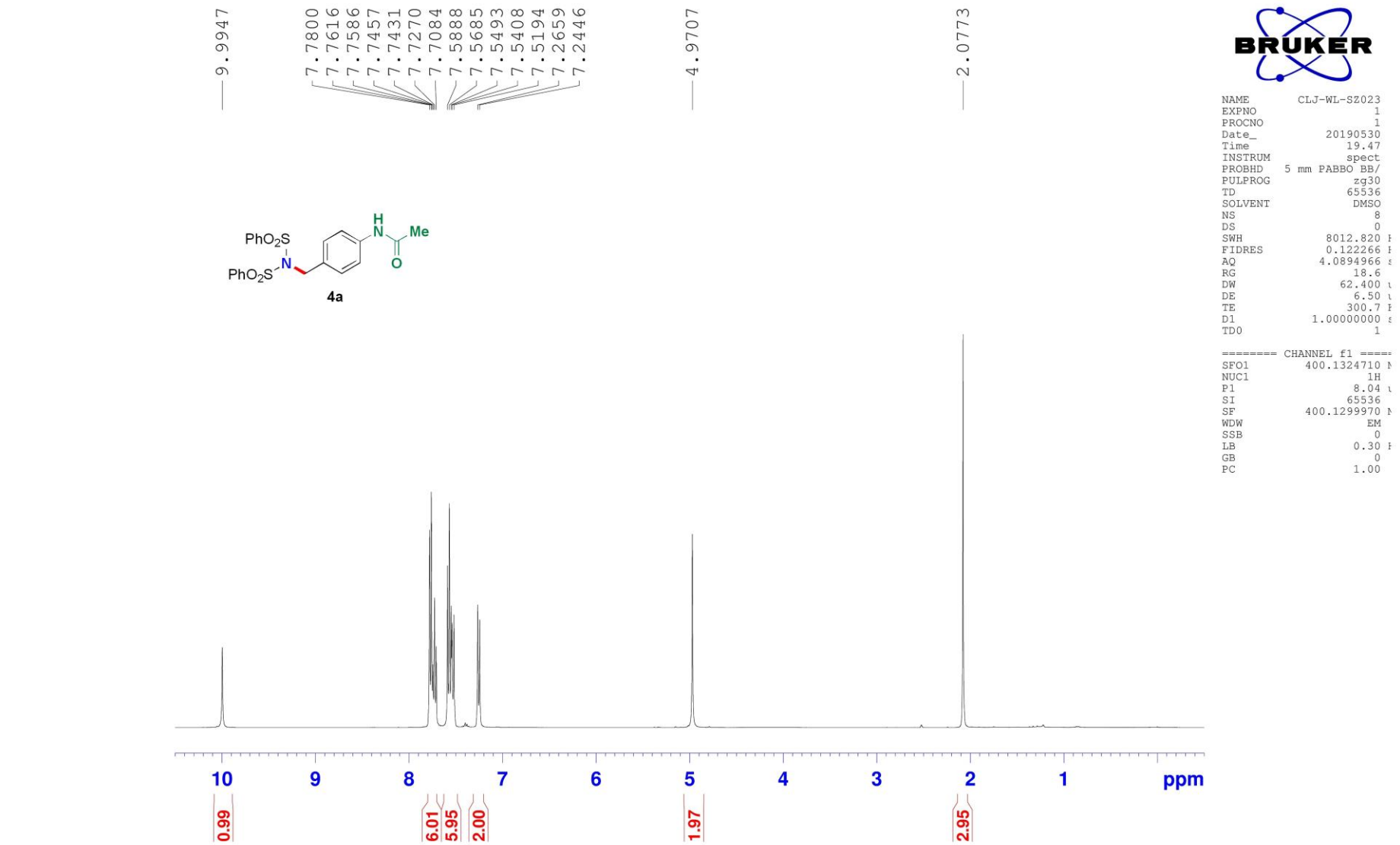

150.393
139.806
137.331
133.656
130.044
129.858
129.407
129.152
128.814
127.997
127.420
125.760
121.582
118.515
77.318
77.000
76.682
51.886
BRUKER
NAME 2019-07-08 shaozhong-050
EXPNO 2
PROCNO 1
Date_ 20190708
Time 16.26 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127784 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
PhO2S
N
PhO2S
H
N
O
O
2k
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


7.7713
7.7684
7.7504
7.7467
7.5470
7.5284
7.5241
7.5127
7.5097
7.5066
7.4110
7.3925
7.3901
7.3715
7.3251
7.3039
7.2407
7.0933
7.0724
4.8891
4.1881
4.1703
4.1526
4.1348
3.2487
1.2429
1.2253
1.2075
-0.0279
Me
N
OEt
O
PhO2S
N
PhO2S
2n
4.00
2.05
4.10
2.04
2.07
2.01
2.09
2.94
3.15
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0


155.3288
143.1603
139.7745
133.5152
129.5451
129.3502
128.6864
127.8948
125.2614
77.3188
77.0001
76.6815
61.6287
51.8354
37.4135
14.4964
Me
N
OEt
O
PhO2S
N
PhO2S
2n
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

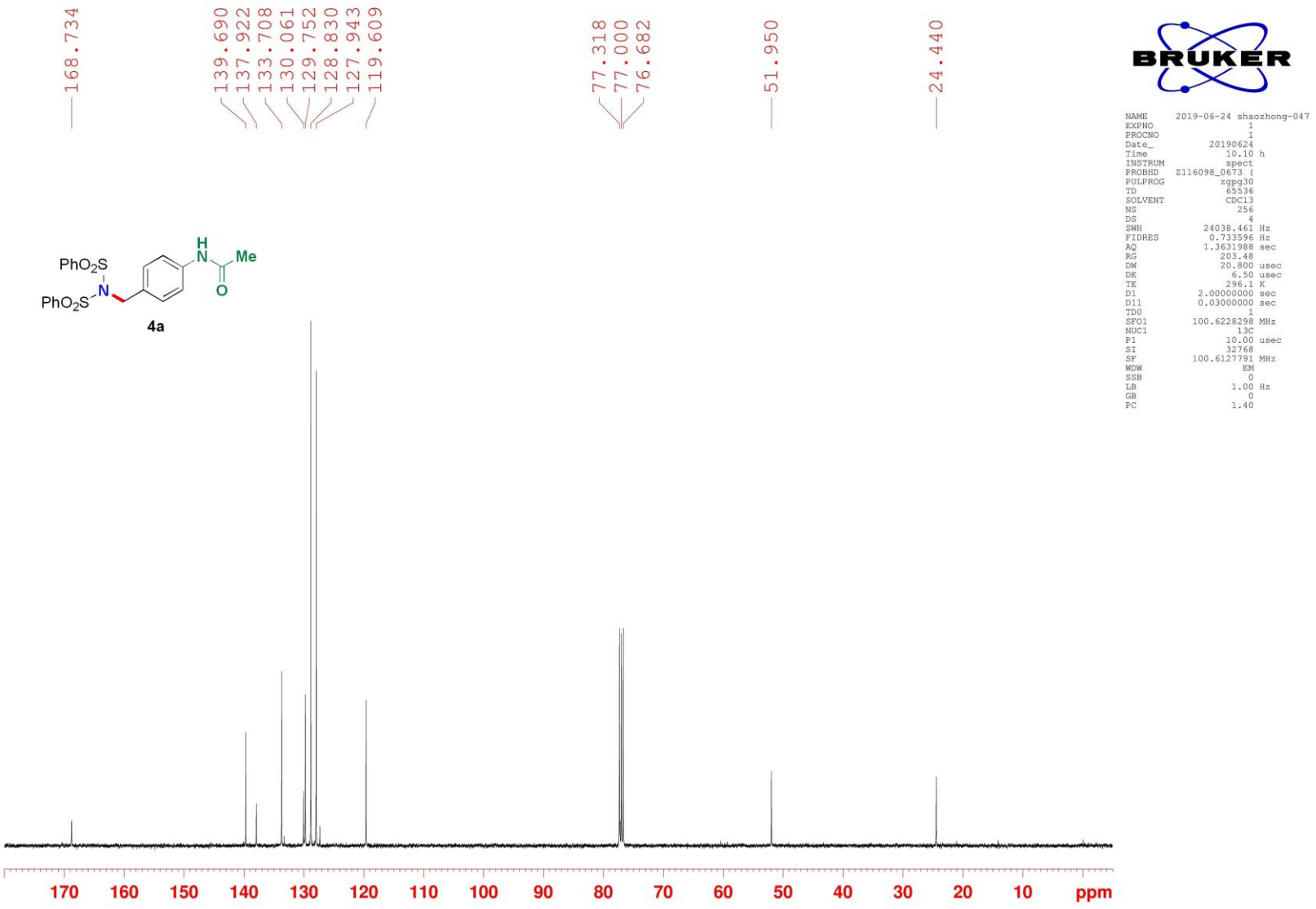

7.7999
7.7804
7.6024
7.5837
7.5792
7.5682
7.5651
7.5620
7.4809
7.4768
7.4611
7.4463
7.4416
7.2620
6.9812
5.9608
4.8680
4.2491
4.2314
4.2136
4.1958
2.1434
1.2753
1.2543
1.2396
0.0000
Me
H
N
OEt
O
PhO2S
N
PhO2S
Me
2o
3.92
2.02
4.00
2.03
0.94
2.06
2.07
5.99
3.03

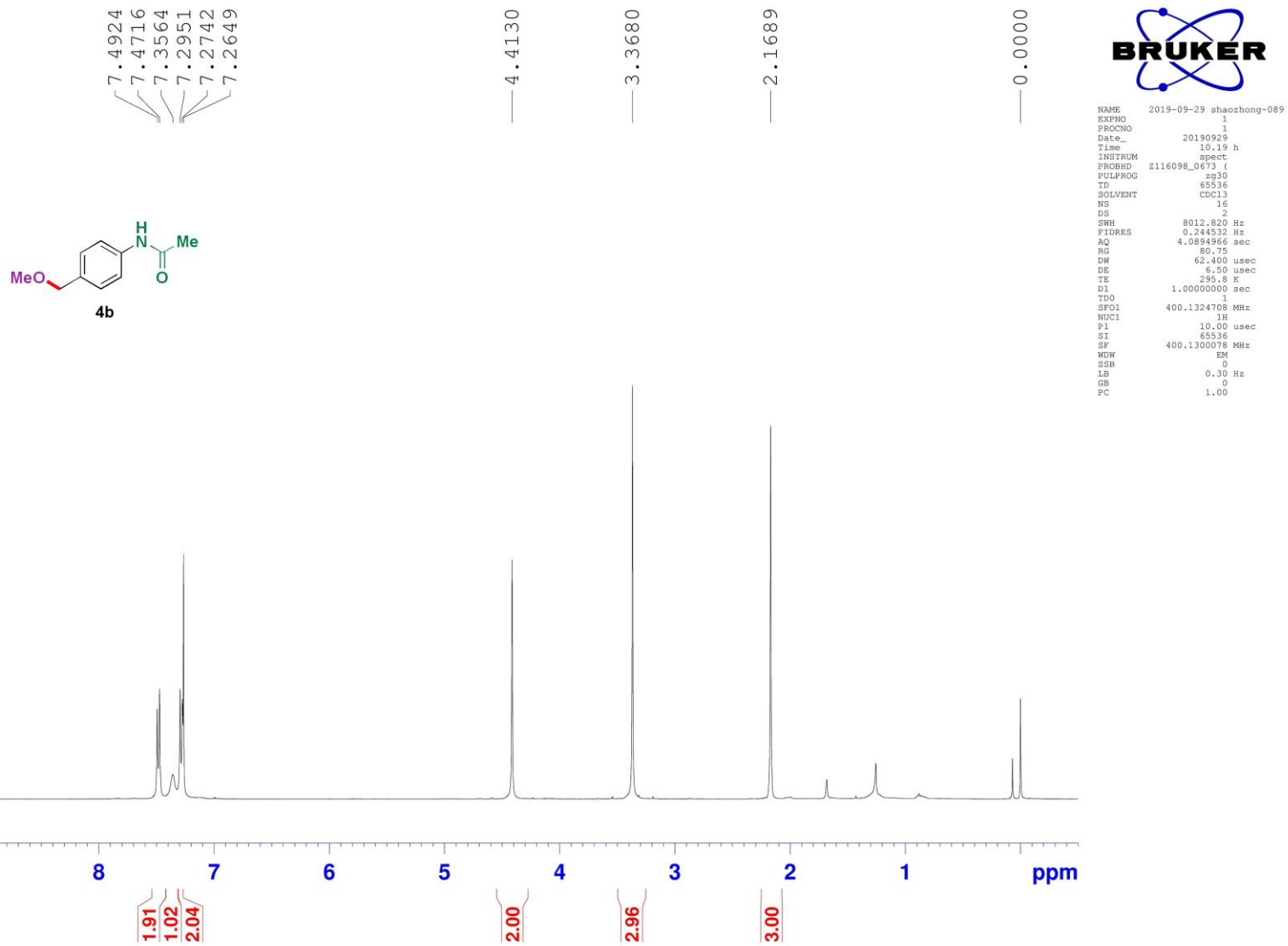

154.2621
139.8403
135.8778
133.5673
132.8347
128.7354
128.5825
128.0254
77.3174
77.0000
76.6820
60.3046
52.1298
18.1078
14.5908
Me
H
N
OEt
O
PhO2S
N
PhO2S
Me
2o
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

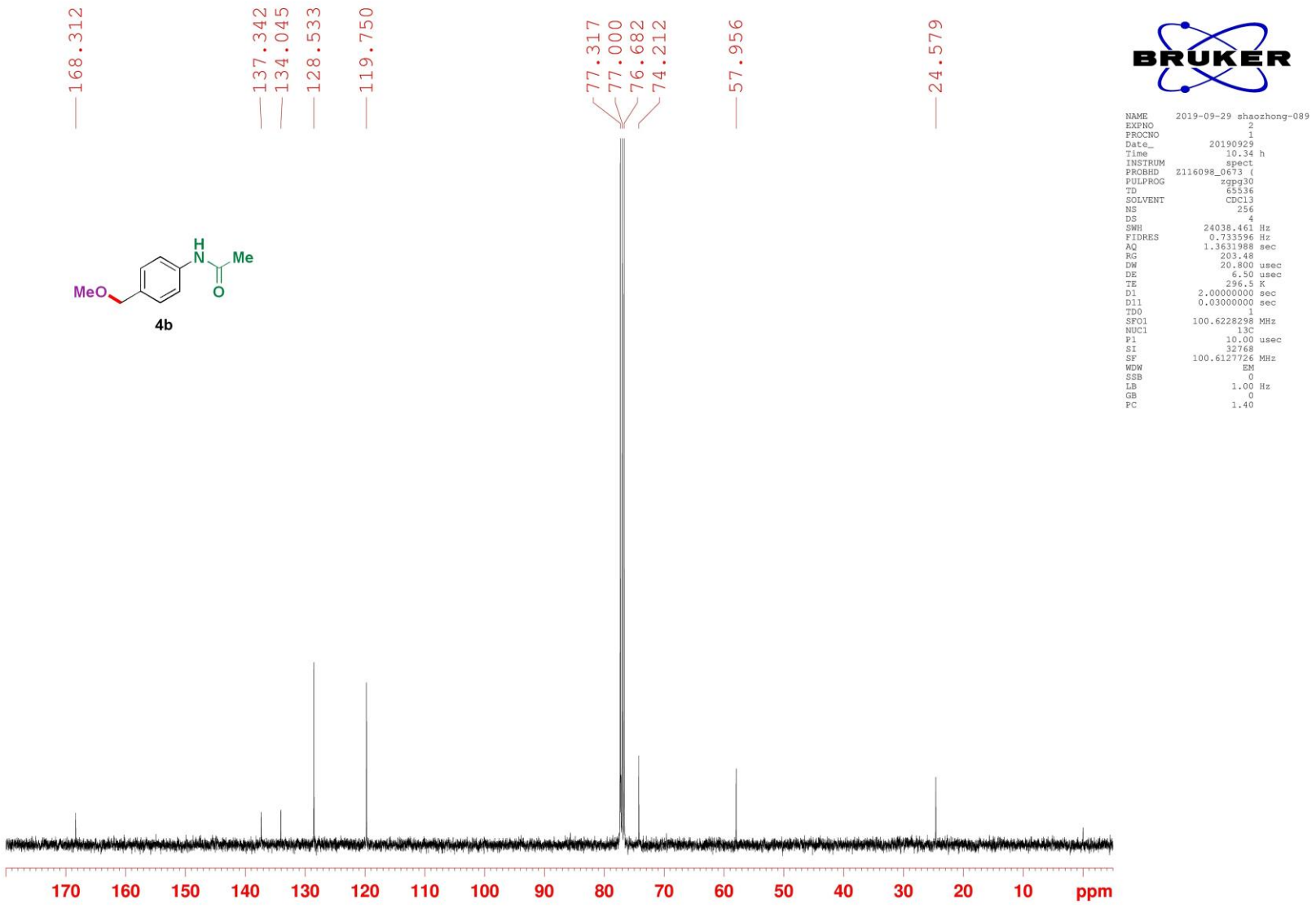


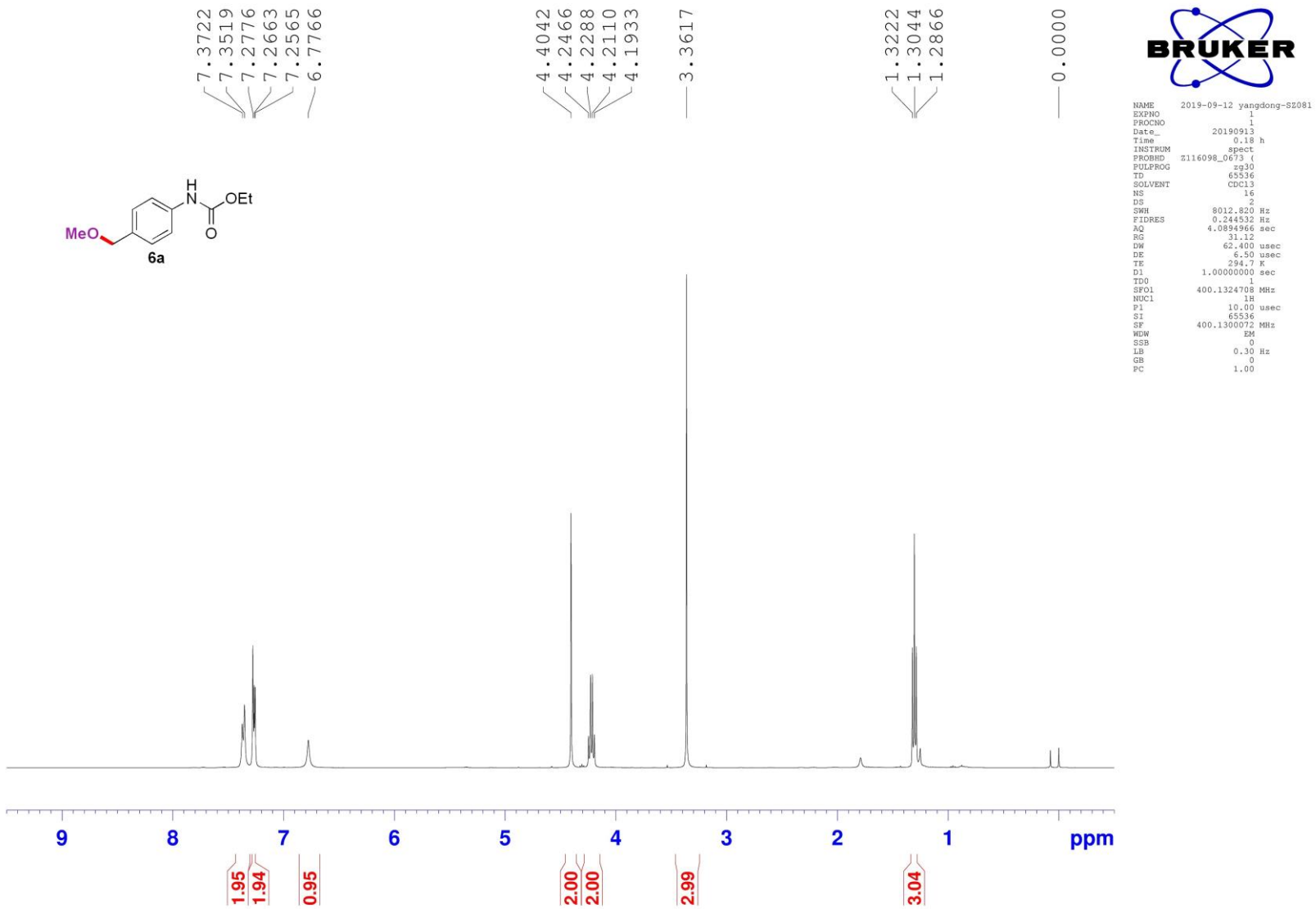
BRUKER

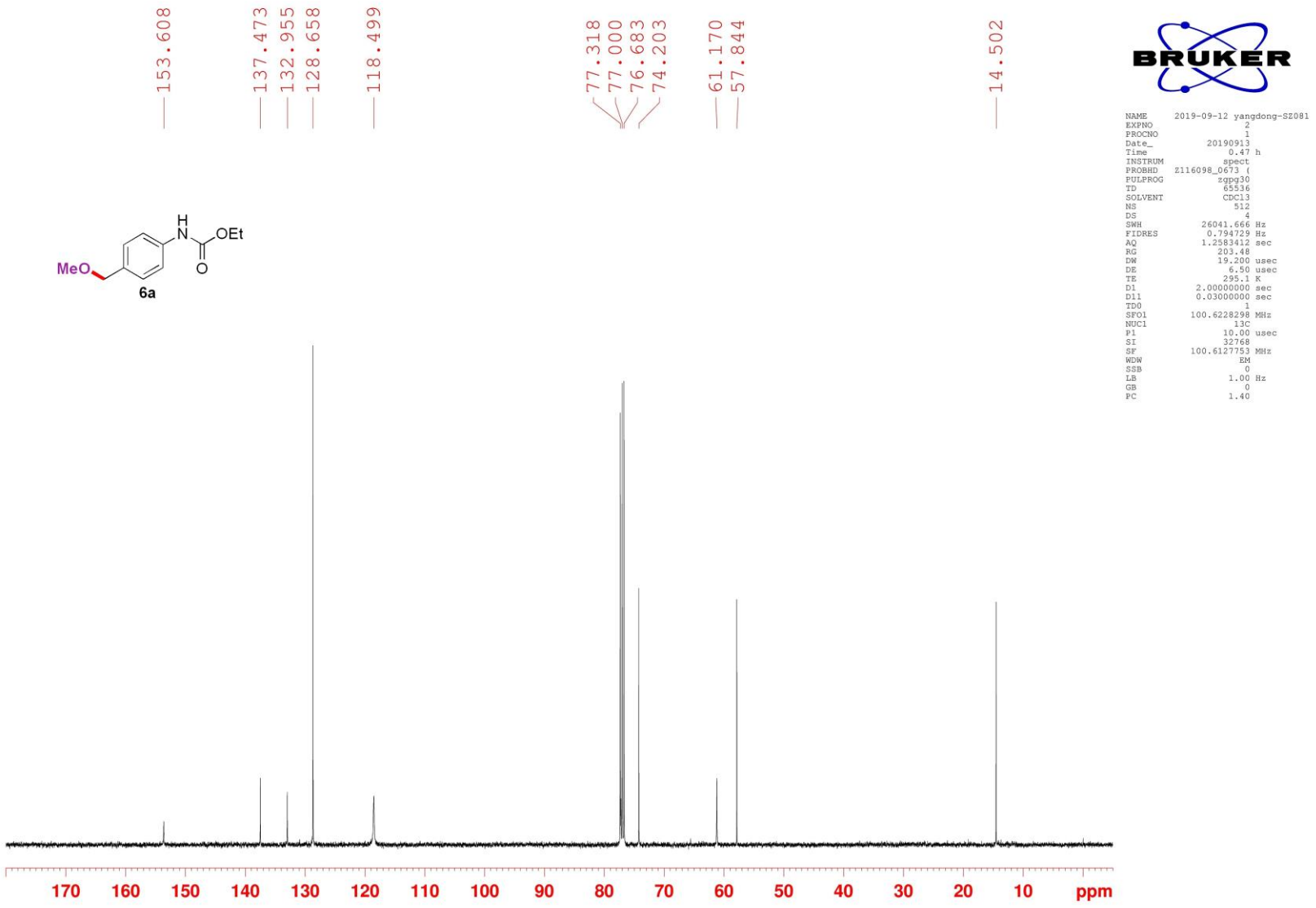
NAME	CLJ-WL-SZ023
EXPNO	1
PROCNO	1
Date_	20190530
Time	19.47
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	8
DS	0
SWH	8012.820
FIDRES	0.122266
AQ	4.0894966
RG	18.6
DW	62.400
DE	6.50
TE	300.7
D1	1.00000000
TD0	1
======== CHANNEL f1 =====	
SFO1	400.1324710
NUC1	1H
P1	8.04
SI	65536
SF	400.1299970
WDW	EM
SSB	0
LB	0.30
GB	0
PC	1.00

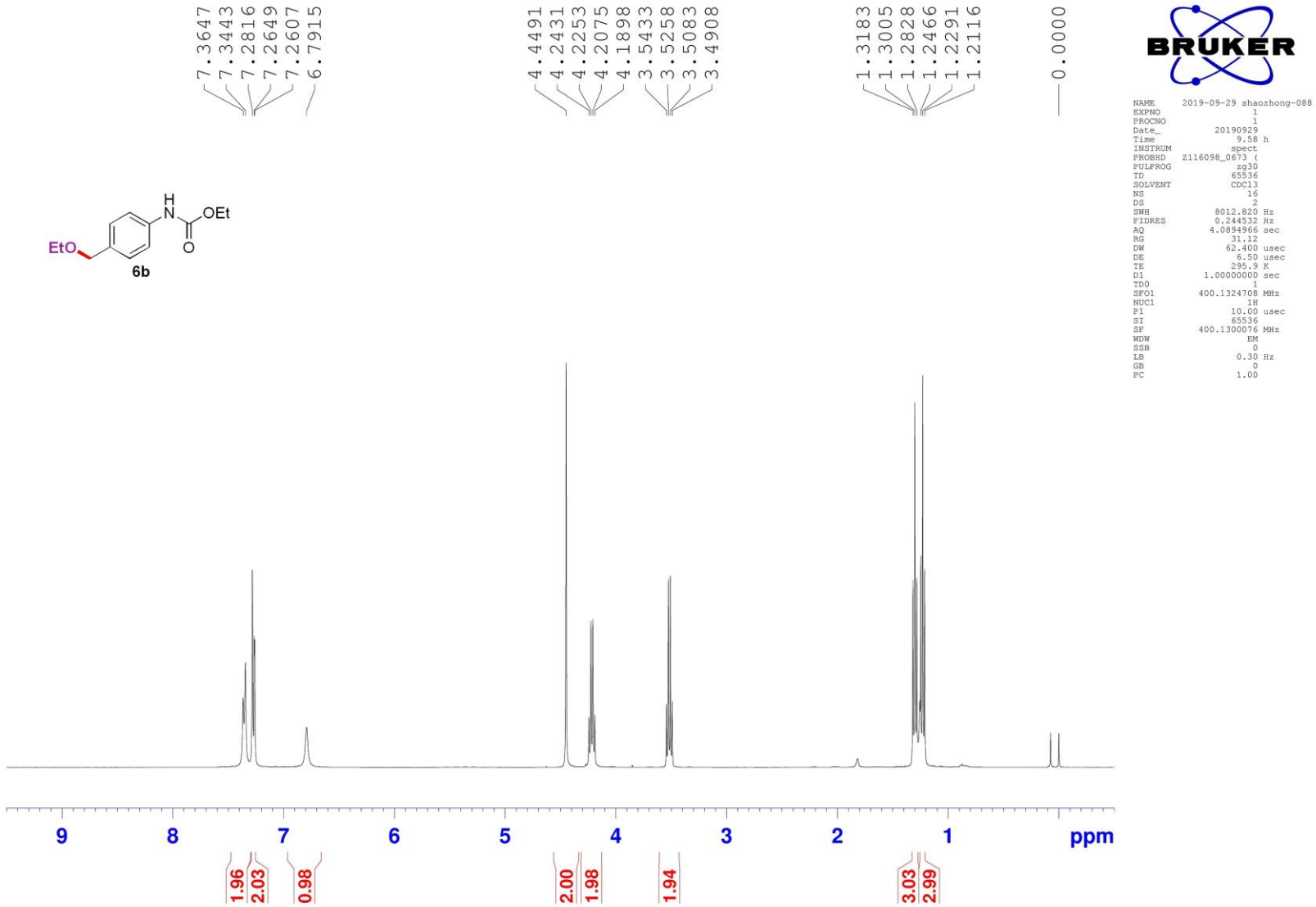

168.734
139.690
137.922
133.708
130.061
129.752
128.830
127.943
119.609
77.318
77.000
76.682
51.950
24.440
BRUKER
NAME 2019-06-24 shaozhong-047
EXPNO 1
PROCNO 1
Date_ 20190624
Time 10.10 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 296.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127791 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
PhO2S
N
PhO2S
H
N
Me
O
4a
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

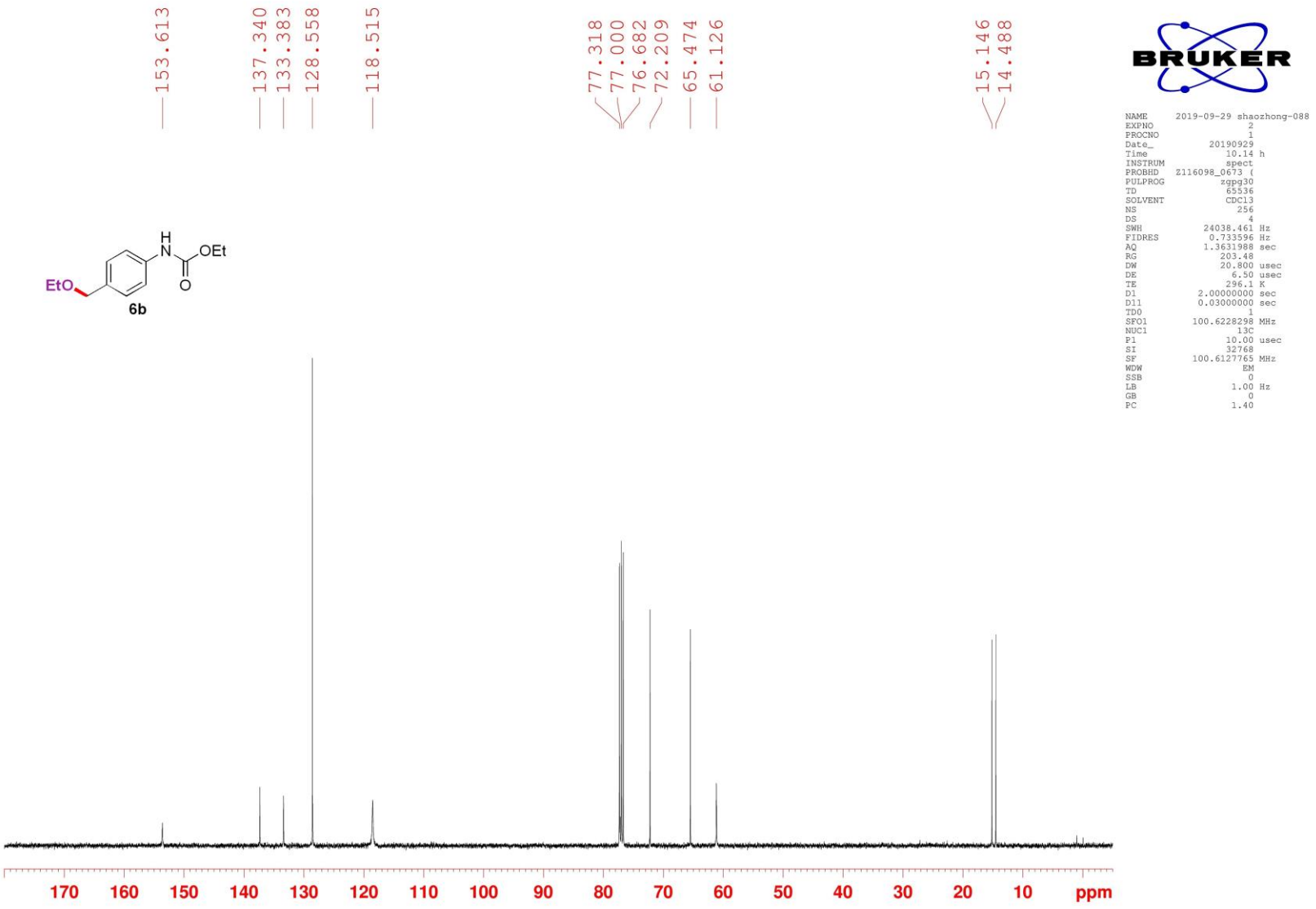

7.4924
7.4716
7.3564
7.2951
7.2742
7.2649
4.4130
3.3680
2.1689
0.0000
MeO
H
N
Me
O
4b
BRUKER
NAME 2019-09-29 shaozhong-089
EXPNO 1
PROCNO 1
Date_ 20190929
Time 10.19 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 80.75
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300078 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9
8
7
6
5
4
3
2
1
ppm
1.91
1.02
2.04
2.00
2.96
3.00

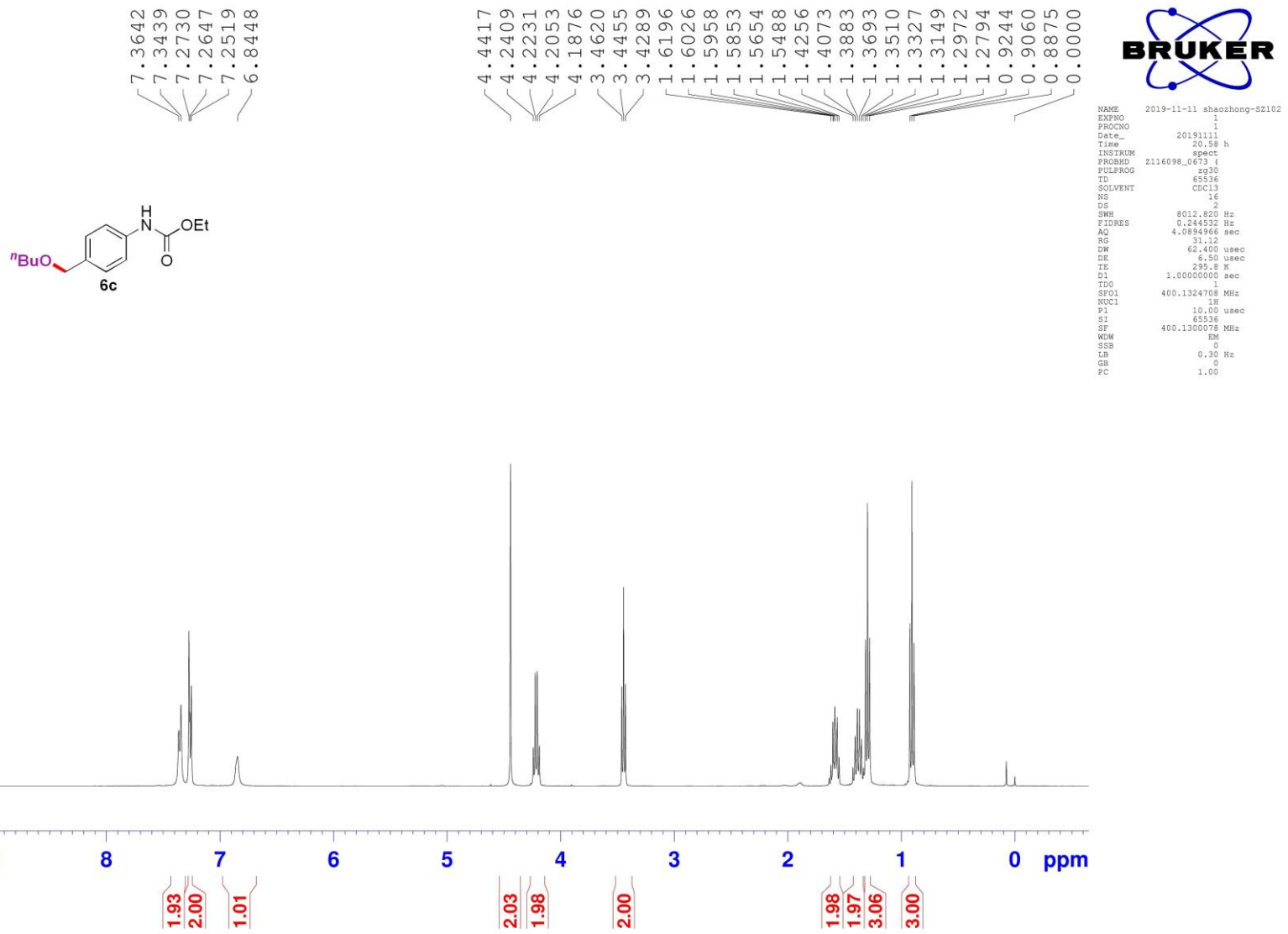

168.312
137.342
134.045
128.533
119.750
77.317
77.000
76.682
74.212
57.956
24.579
MeO
H
N
Me
O
4b
BRUKER
NAME 2019-09-29 shaozhong-089
EXPNO 2
PROCNO 1
Date_ 20190929
Time 10.34 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127726 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

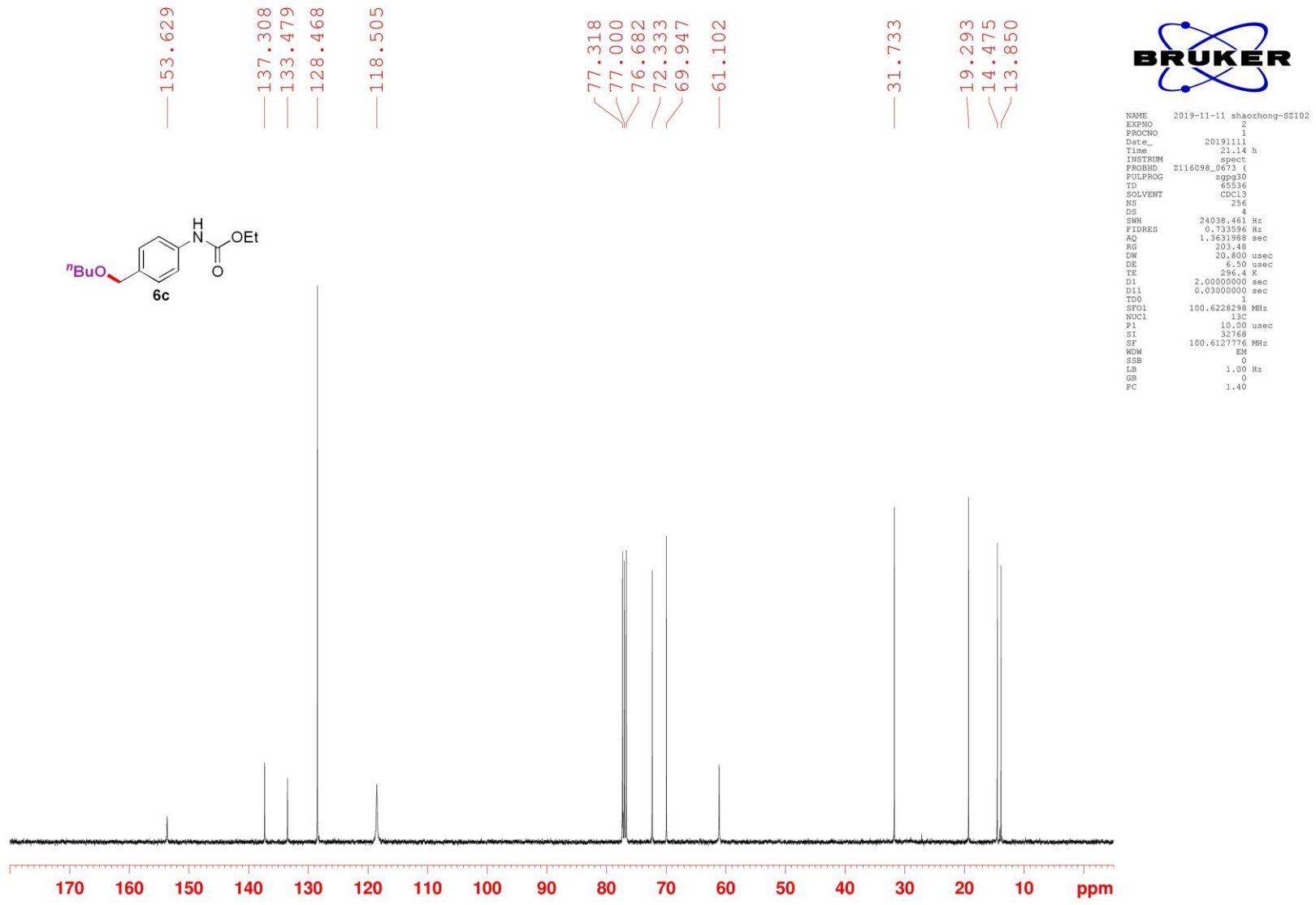

7.3722
7.3519
7.2776
7.2663
7.2565
6.7766
4.4042
4.2466
4.2288
4.2110
4.1933
3.3617
1.3222
1.3044
1.2866
0.0000
BRUKER
NAME 2019-09-12 yangdong-SZ081
EXPNO 1
PROCNO 1
Date_ 20190913
Time 0.18 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 294.7 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300072 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
MeO
6a
9
8
7
6
5
4
3
2
1
ppm
1.95
1.94
0.95
2.00
2.00
2.99
3.04

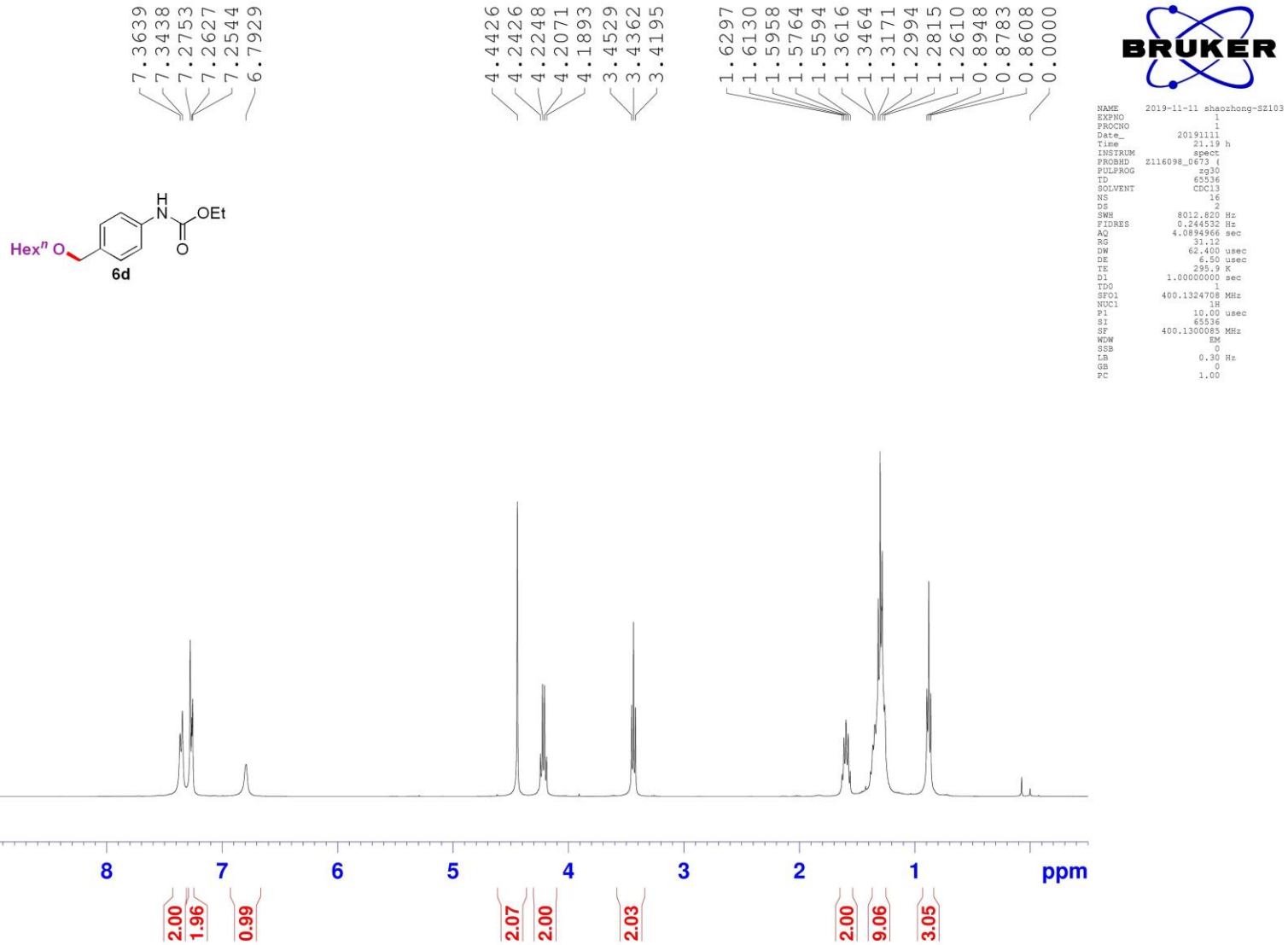

153.608
137.473
132.955
128.658
118.499
77.318
77.000
76.683
74.203
61.170
57.844
14.502
BRUKER
NAME 2019-09-12 yangdong-SZ081
EXPNO 2
PROCNO 1
Date_ 20190913
Time 0.47 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26041.666 Hz
FIDRES 0.794729 Hz
AQ 1.2583412 sec
RG 203.48
DW 19.200 usec
DE 6.50 usec
TE 295.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127753 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
MeO
OEt
H
N
O
6a
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

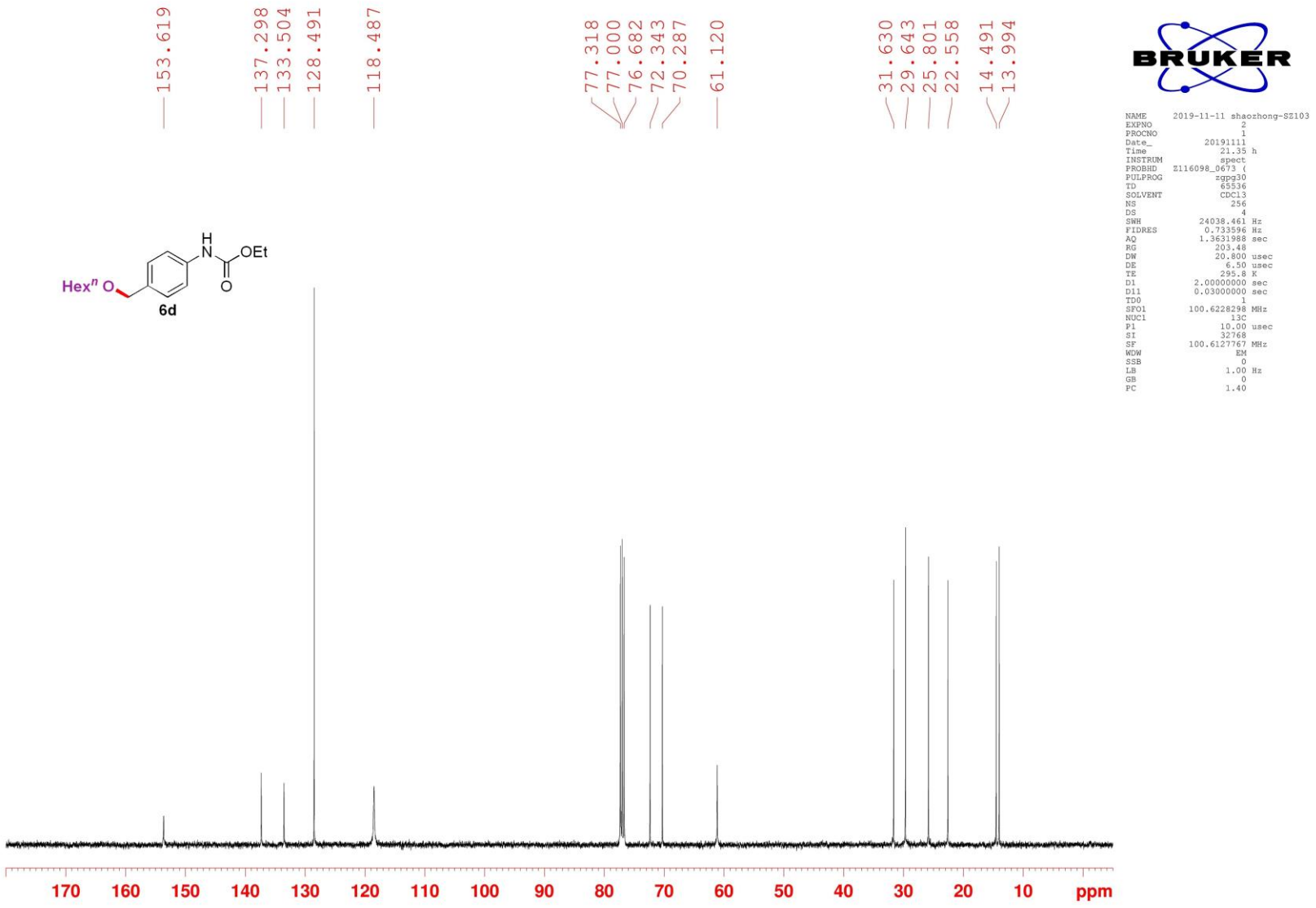

7.3647
7.3443
7.2816
7.2649
7.2607
6.7915
4.4491
4.2431
4.2253
4.2075
4.1898
3.5433
3.5258
3.5083
3.4908
1.3183
1.3005
1.2828
1.2466
1.2291
1.2116
0.0000
BRUKER
NAME 2019-09-29 shaozhong-088
EXPNO 1
PROCNO 1
Date_ 20190929
Time 9.58 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300076 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
EtO
6b
9
8
7
6
5
4
3
2
1
ppm
1.96
2.03
0.98
2.00
1.98
1.94
3.03
2.99

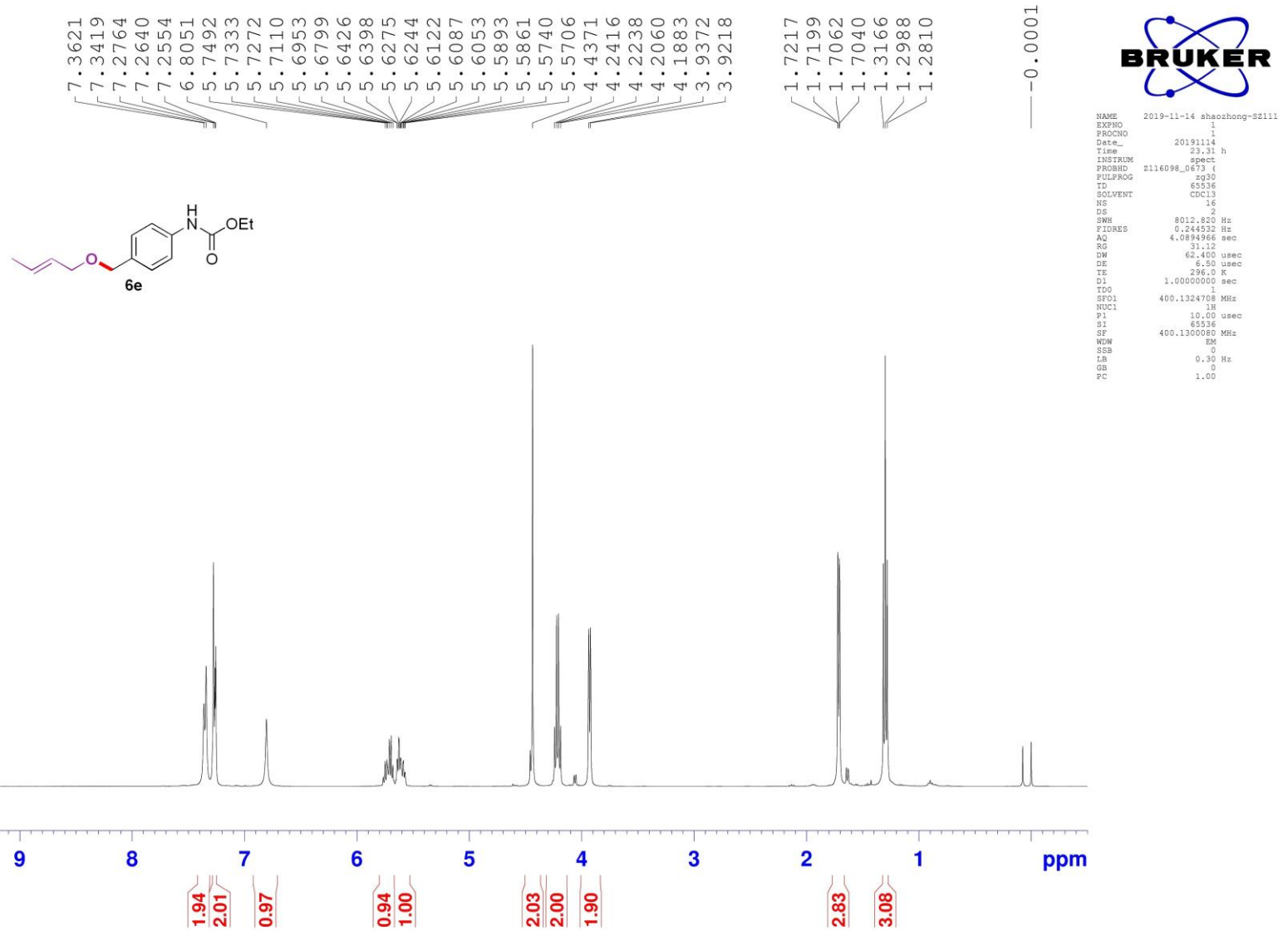

153.613
137.340
133.383
128.558
118.515
77.318
77.000
76.682
72.209
65.474
61.126
15.146
14.488
BRUKER
NAME 2019-09-29 shaozhong-088
EXPNO 2
PROCNO 1
Date_ 20190929
Time 10.14 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 296.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127765 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
EtO
6b
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

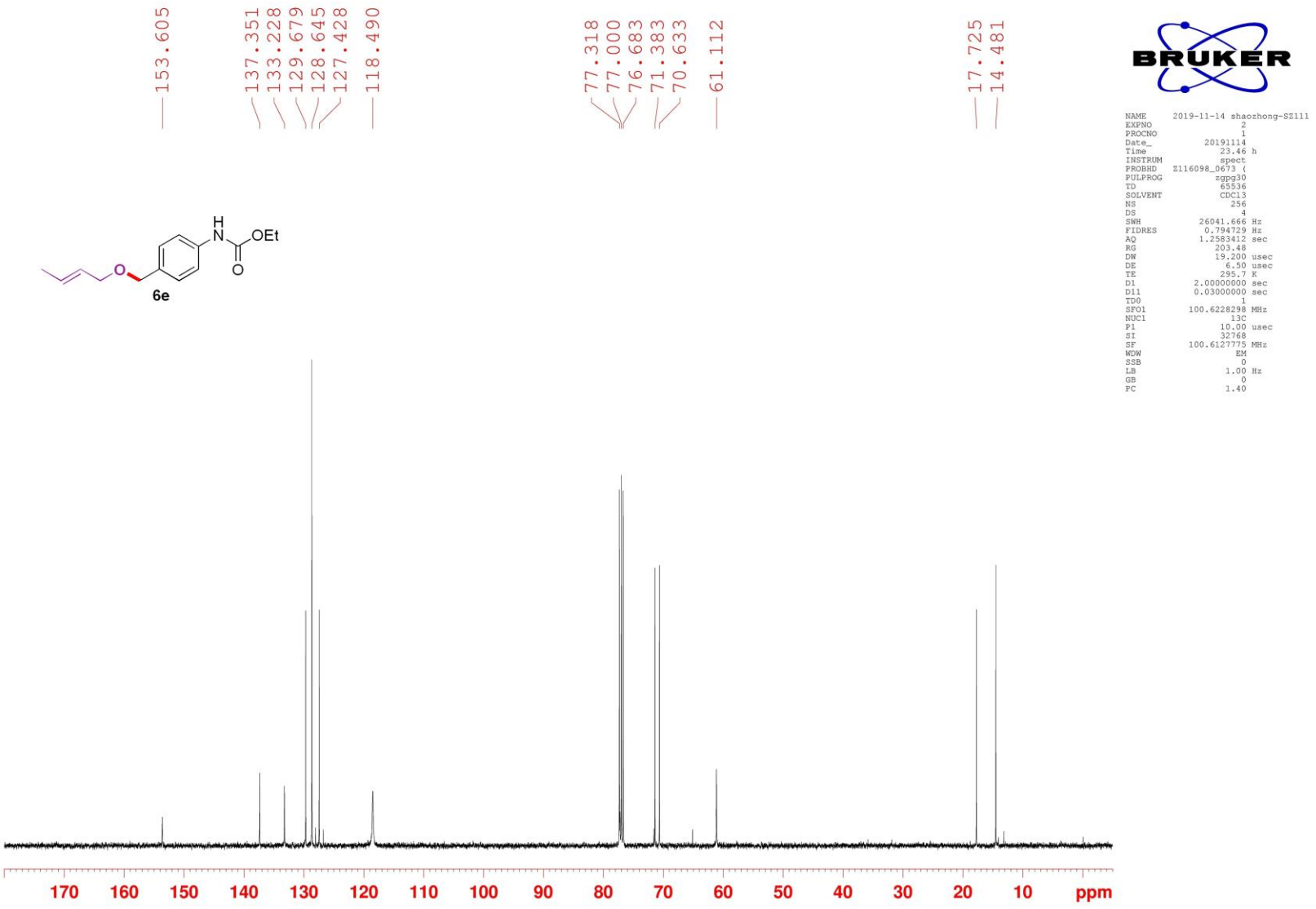

7.3642
7.3439
7.2730
7.2647
7.2519
6.8448
4.4417
4.2409
4.2231
4.2053
4.1876
3.4620
3.4455
3.4289
1.6196
1.6026
1.5958
1.5853
1.5654
1.5488
1.4256
1.4073
1.3883
1.3693
1.3510
1.3327
1.3149
1.2972
1.2794
0.9244
0.9060
0.8875
0.0000
BRUKER
NAME 2019-11-11 shaozhong-SZ102
EXPNO 1
PROCNO 1
Date_ 20191111
Time 20.58 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300078 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
nBuO
6c
9
8
7
6
5
4
3
2
1
0
ppm
1.93
2.00
1.01
2.03
1.98
2.00
1.98
1.97
3.06
3.00

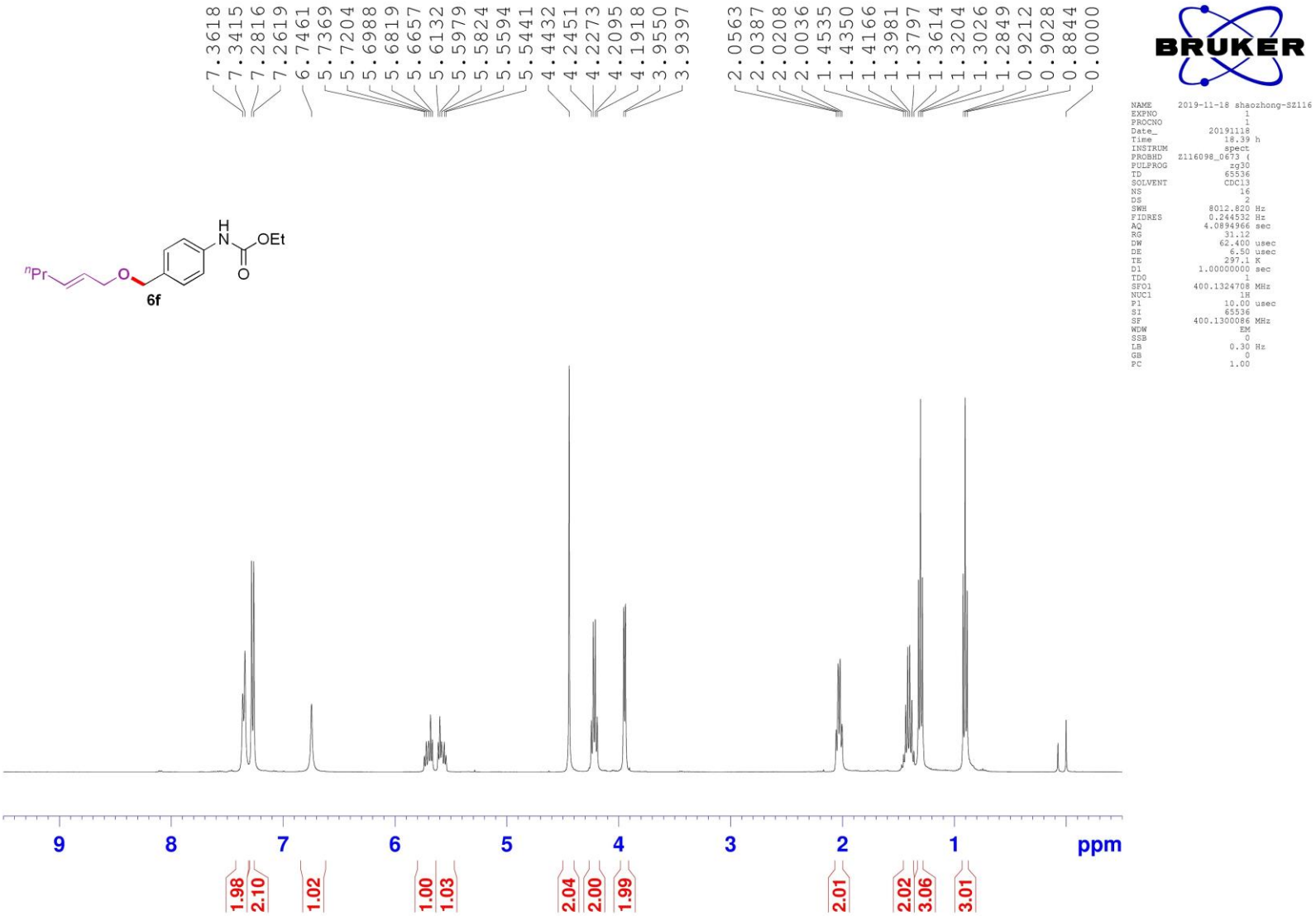

153.629
137.308
133.479
128.468
118.505
77.318
77.000
76.682
72.333
69.947
61.102
31.733
19.293
14.475
13.850
BRUKER
NAME 2019-11-11 shaozhong-SZ102
EXPNO 2
PROCNO 1
Date_ 20191111
Time 21.14 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 296.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127776 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
nBuO
6c
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


7.3639
7.3438
7.2753
7.2627
7.2544
6.7929
4.4426
4.2426
4.2248
4.2071
4.1893
3.4529
3.4362
3.4195
1.6297
1.6130
1.5958
1.5764
1.5594
1.3616
1.3464
1.3171
1.2994
1.2815
1.2610
0.8948
0.8783
0.8608
0.0000
BRUKER
NAME 2019-11-11 shaozhong-SZ103
EXPNO 1
PROCNO 1
Date_ 20191111
Time 21.19 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 295.9 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300085 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Hex^n O
H
N
OEt
O
6d
9
8
7
6
5
4
3
2
1
ppm
2.00
1.96
0.99
2.07
2.00
2.03
2.00
9.06
3.05


153.619
137.298
133.504
128.491
118.487
77.318
77.000
76.682
72.343
70.287
61.120
31.630
29.643
25.801
22.558
14.491
13.994
BRUKER
NAME 2019-11-11 shaozhong-SZ103
EXPNO 2
PROCNO 1
Date_ 20191111
Time 21.35 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127767 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Hex^n O
H
N
OEt
O
6d
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


7.3621
7.3419
7.2764
7.2640
7.2554
6.8051
5.7492
5.7333
5.7272
5.7110
5.6953
5.6799
5.6426
5.6398
5.6275
5.6244
5.6122
5.6087
5.6053
5.5893
5.5861
5.5740
5.5706
4.4371
4.2416
4.2238
4.2060
4.1883
3.9372
3.9218
1.7217
1.7199
1.7062
1.7040
1.3166
1.2988
1.2810
0.0001
BRUKER
NAME 2019-11-14 shaozhong-SZ111
EXPNO 1
PROCNO 1
Date_ 20191114
Time 23.31 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300080 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
O
6e
9
8
7
6
5
4
3
2
1
ppm
1.94
2.01
0.97
0.94
1.00
2.03
2.00
1.90
2.83
3.08


153.605
137.351
133.228
129.679
128.645
127.428
118.490
77.318
77.000
76.683
71.383
70.633
61.112
17.725
14.481
BRUKER
NAME 2019-11-14 shaozhong-SZ111
EXPNO 2
PROCNO 1
Date_ 20191114
Time 23.46 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 26041.666 Hz
FIDRES 0.794729 Hz
AQ 1.2583412 sec
RG 203.48
DW 19.200 usec
DE 6.50 usec
TE 295.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127775 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
O
6e
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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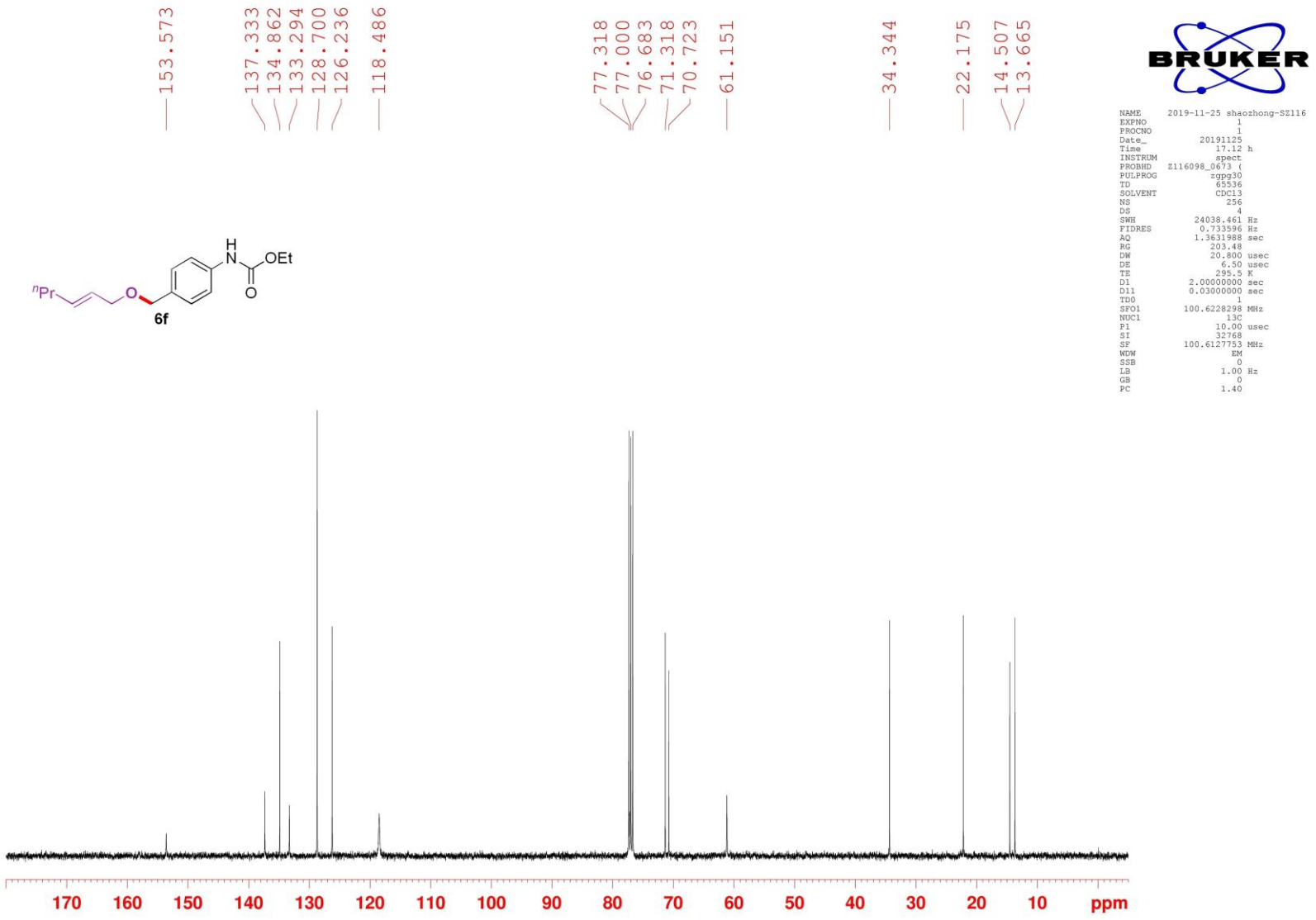
7.3415
7.2816
7.2619
6.7461
5.7369
5.7204
5.6988
5.6819
5.6657
5.6132
5.5979
5.5824
5.5594
5.5441
4.4432
4.2451
4.2273
4.2095
4.1918
3.9550
3.9397
2.0563
2.0387
2.0208
2.0036
1.4535
1.4350
1.4166
1.3981
1.3797
1.3614
1.3204
1.3026
1.2849
0.9212
0.9028
0.8844
0.0000
BRUKER
NAME 2019-11-18 shaozhong-SZ116
EXPNO 1
PROCNO 1
Date_ 20191118
Time 18.39 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 297.1 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300086 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
O
nPr
6f
9
8
7
6
5
4
3
2
1
ppm
1.98
2.10
1.02
1.00
1.03
2.04
2.00
1.99
2.01
2.02
3.06
3.01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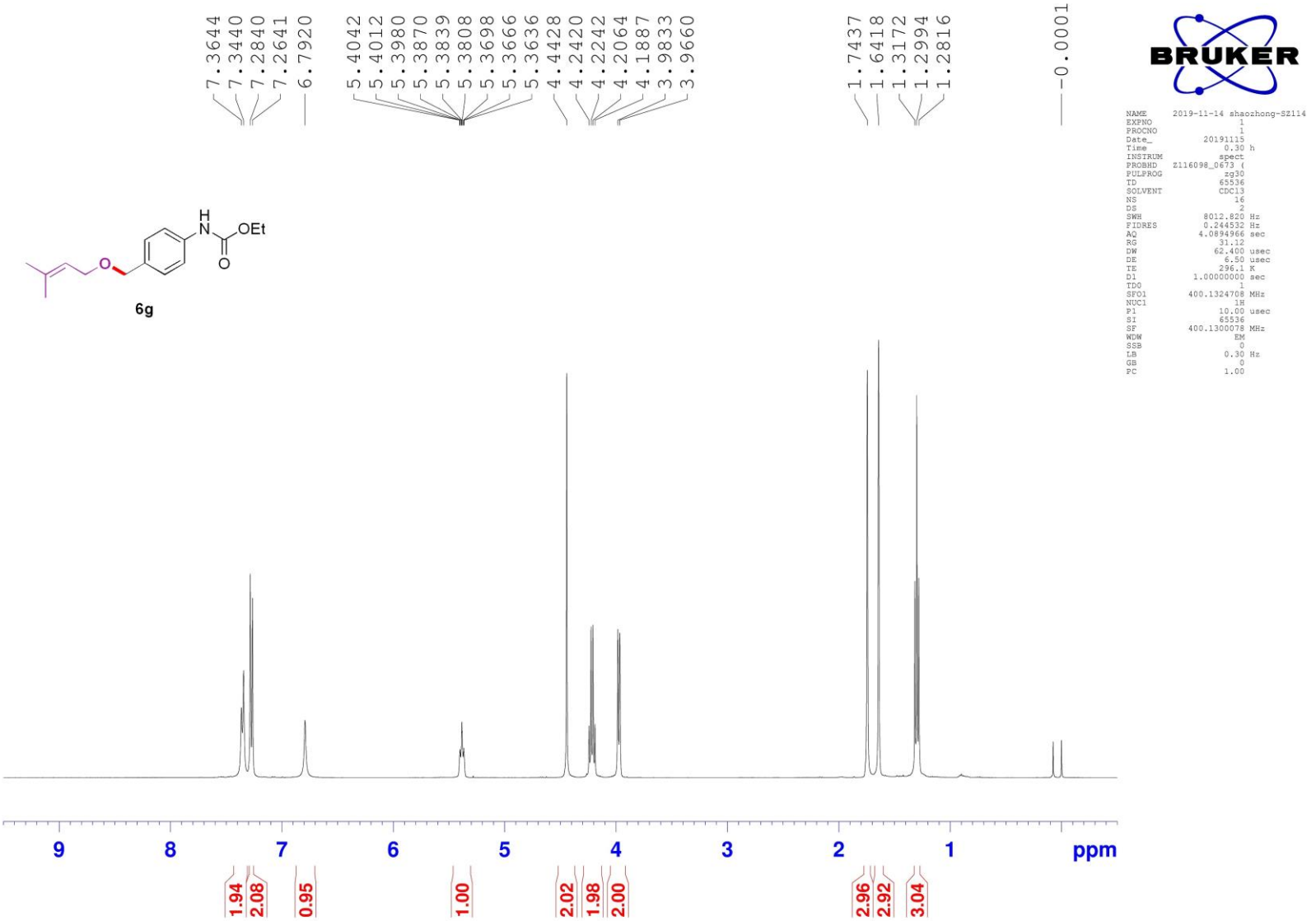
137.333
134.862
133.294
128.700
126.236
118.486
77.318
77.000
76.683
71.318
70.723
61.151
34.344
22.175
14.507
13.665
BRUKER
NAME 2019-11-25 shaozhong-SZ116
EXPNO 1
PROCNO 1
Date_ 20191125
Time 17.12 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127753 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
nPr
O
H
N
OEt
O
6f
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm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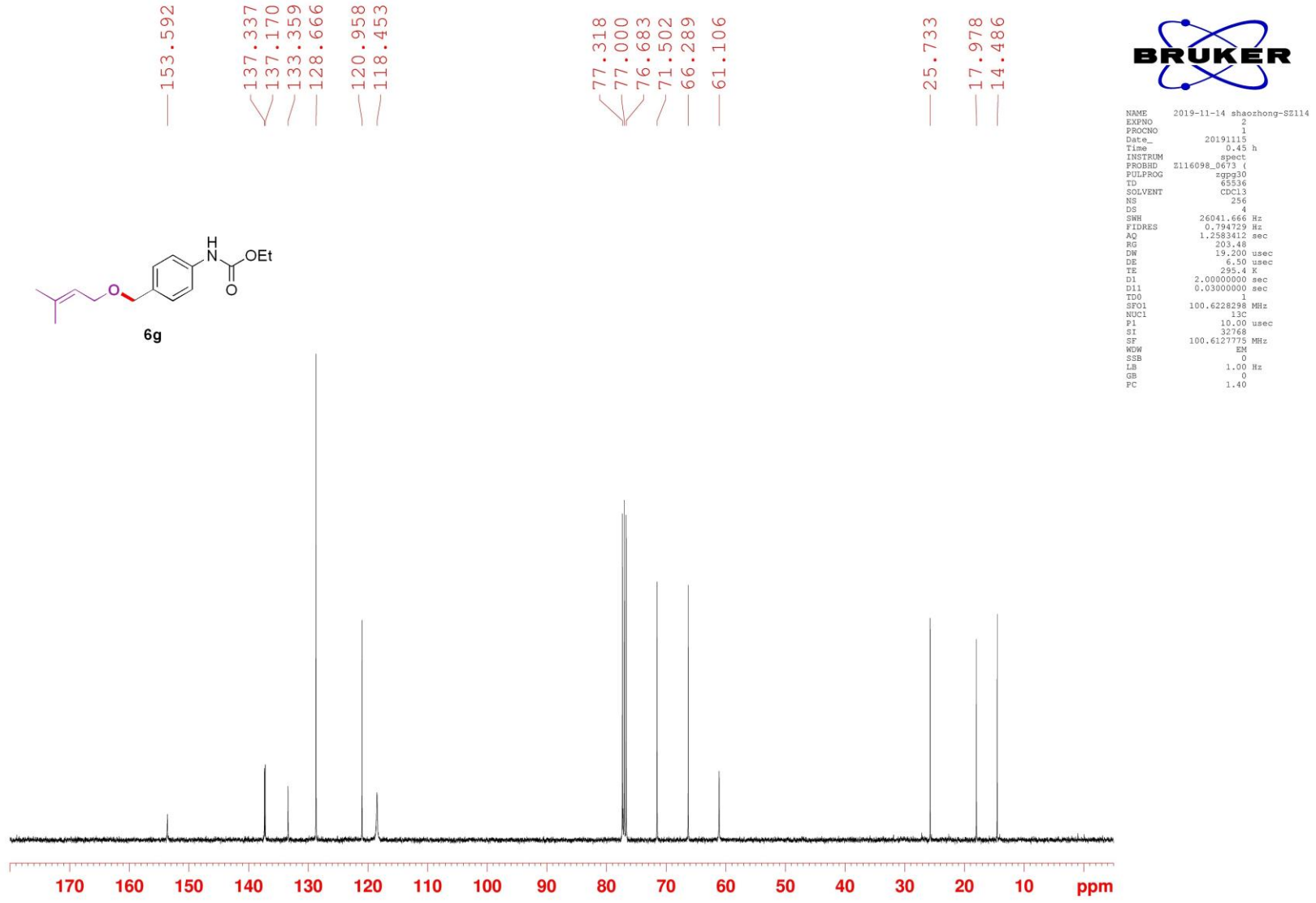
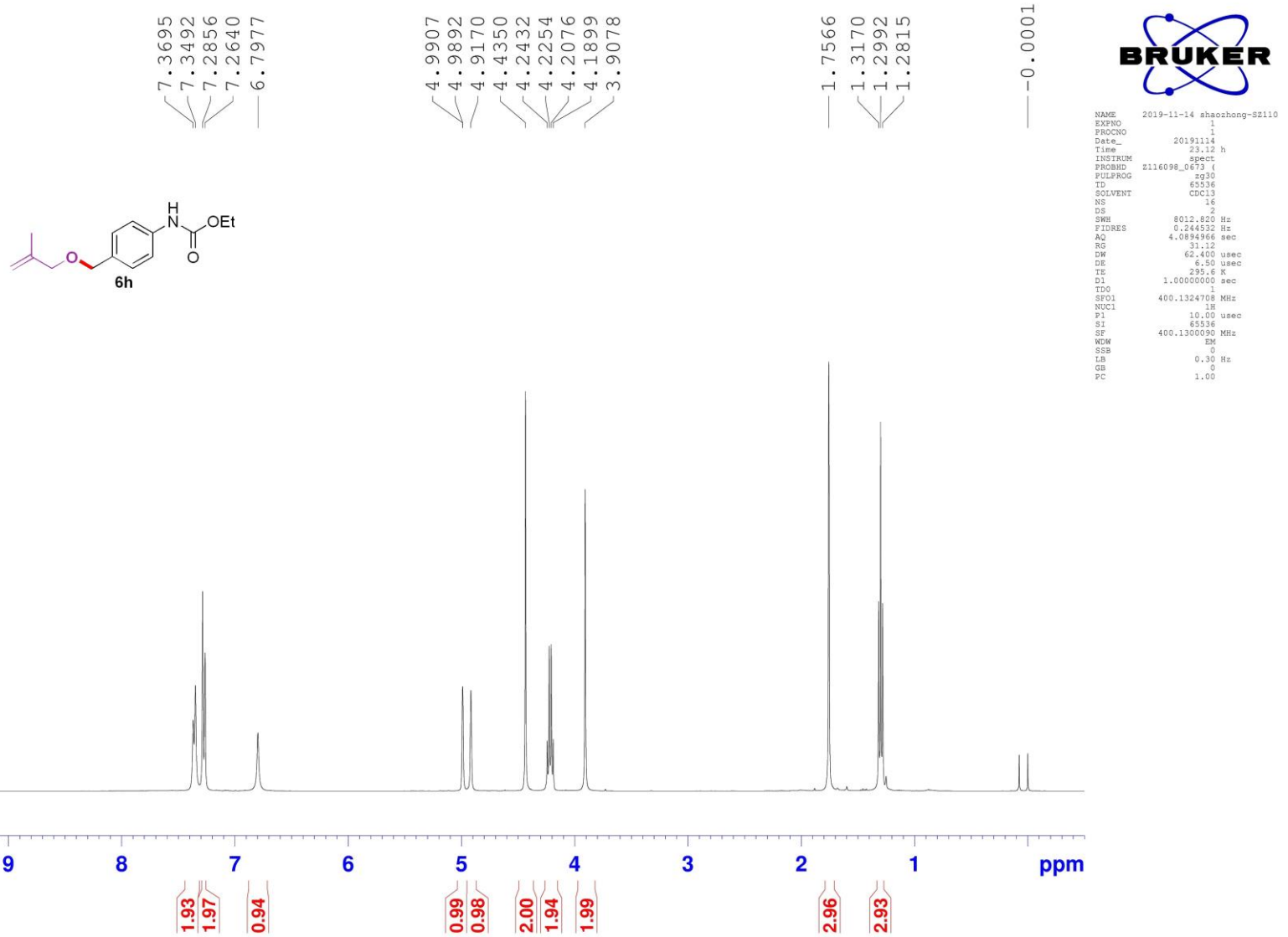
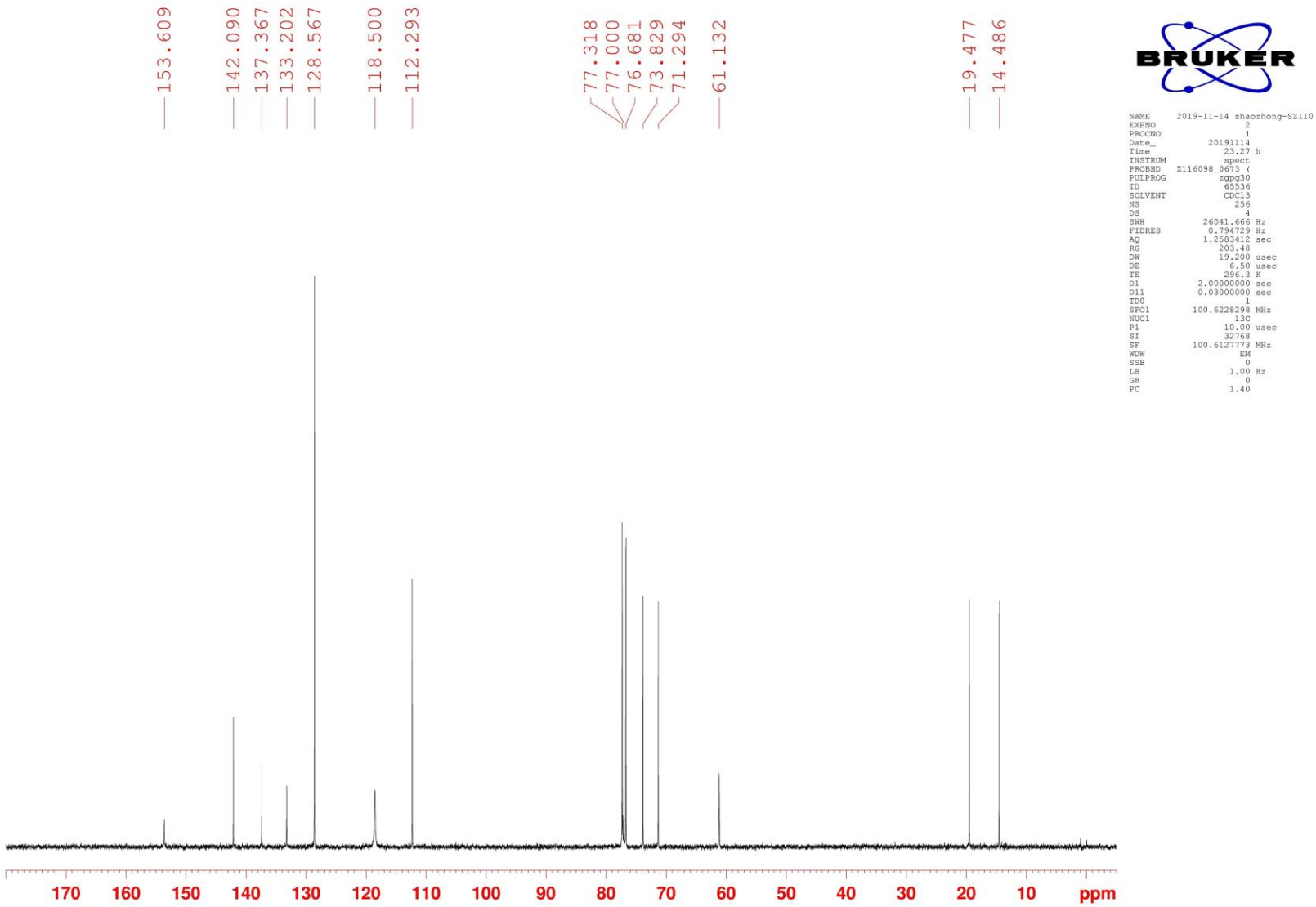
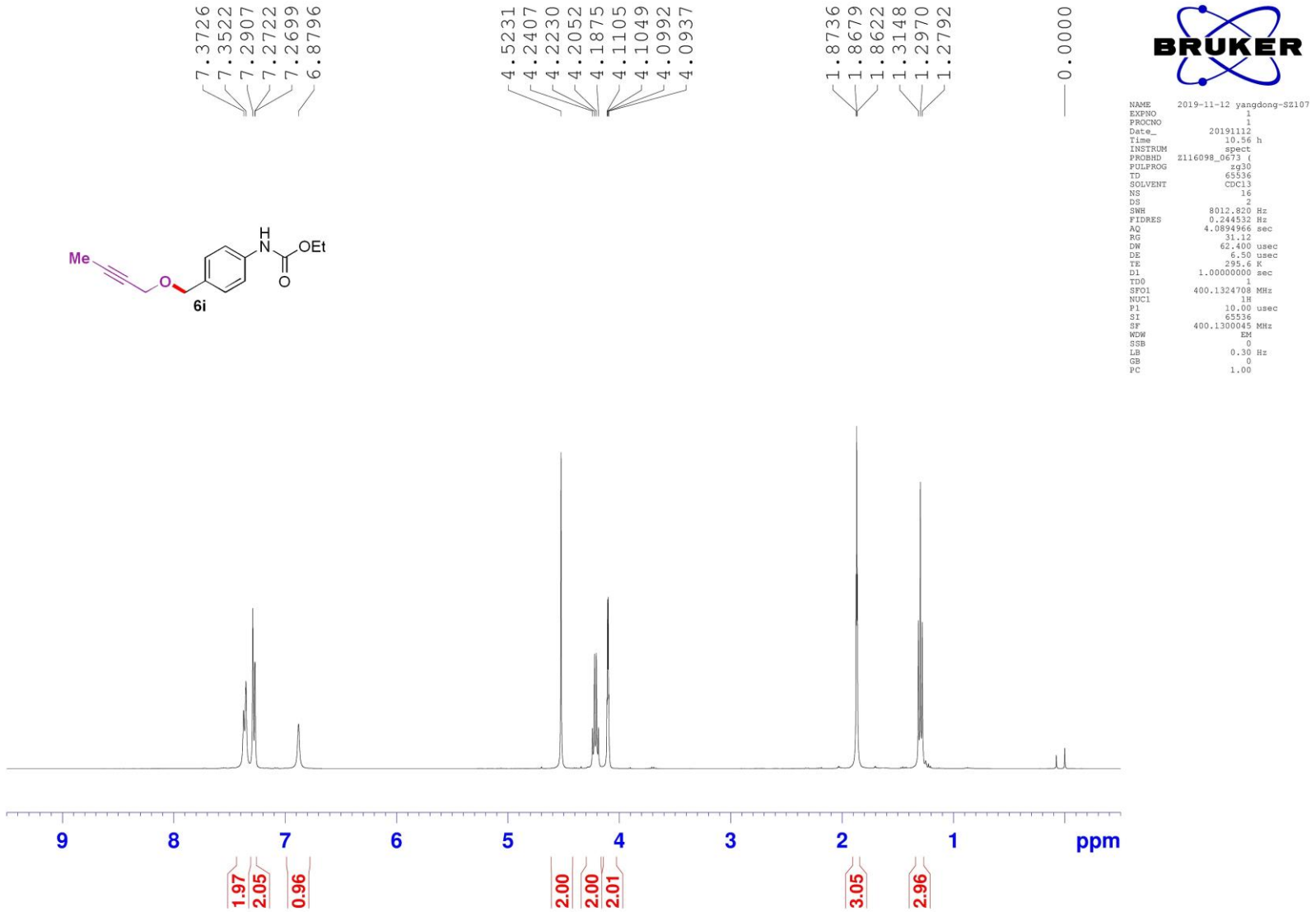
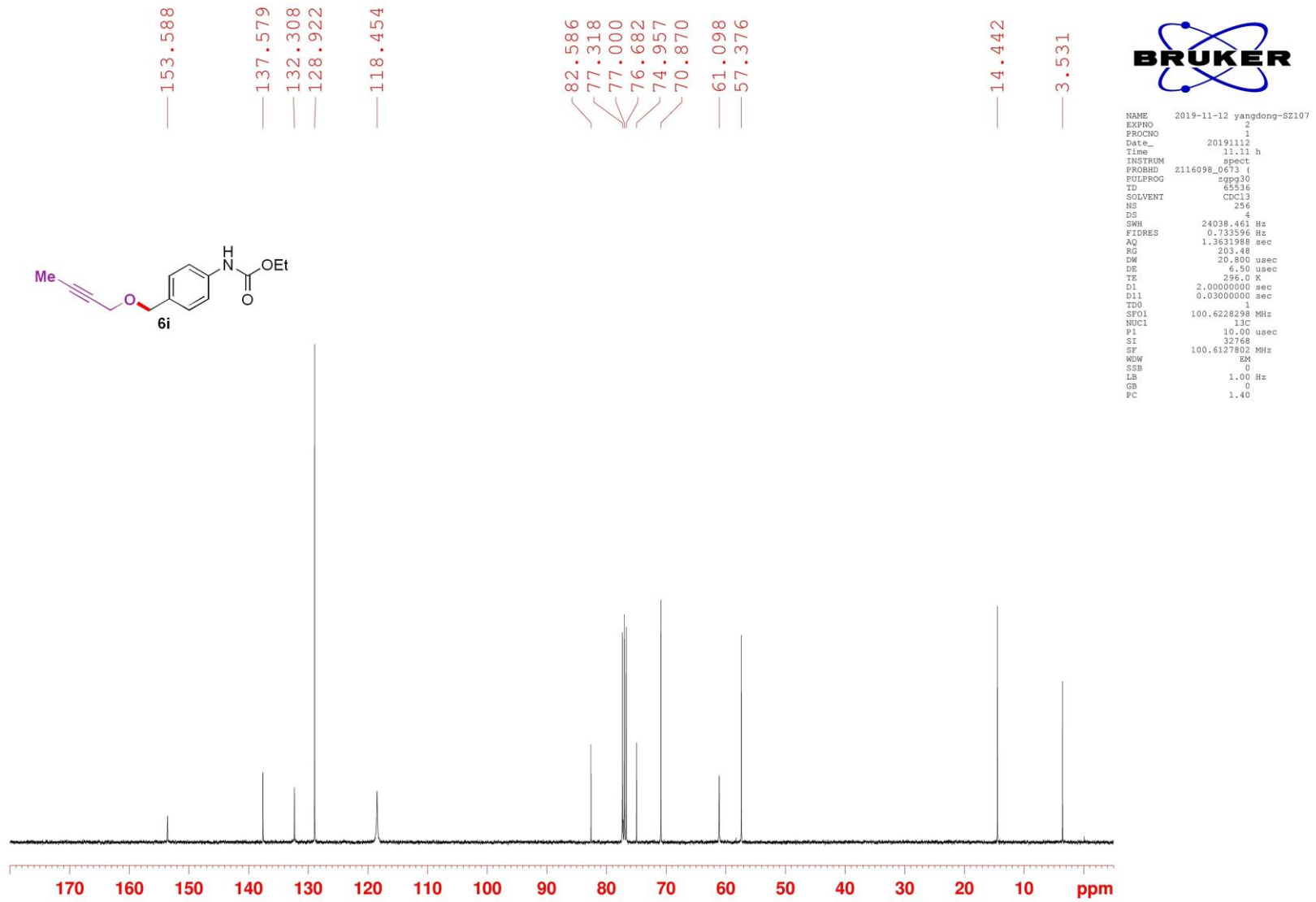
7.2840
7.2641
6.7920
5.4042
5.4012
5.3980
5.3870
5.3839
5.3808
5.3698
5.3666
5.3636
4.4428
4.2420
4.2242
4.2064
4.1887
3.9833
3.9660
1.7437
1.6418
1.3172
1.2994
1.2816
0.0001
BRUKER
NAME 2019-11-14 shaozhong-SZ114
EXPNO 1
PROCNO 1
Date_ 20191115
Time 0.30 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 296.1 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300078 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
O
6g
9
8
7
6
5
4
3
2
1
ppm
1.94
2.08
0.95
1.00
2.02
1.98
2.00
2.96
2.92
3.04


153.592
137.337
137.170
133.359
128.666
120.958
118.453
77.318
77.000
76.683
71.502
66.289
61.106
25.733
17.978
14.486
BRUKER
NAME 2019-11-14 shaozhong-SZ114
EXPNO 2
PROCNO 1
Date_ 20191115
Time 0.45 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 26041.666 Hz
FIDRES 0.794729 Hz
AQ 1.2583412 sec
RG 203.48
DW 19.200 usec
DE 6.50 usec
TE 295.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127775 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
O
6g
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

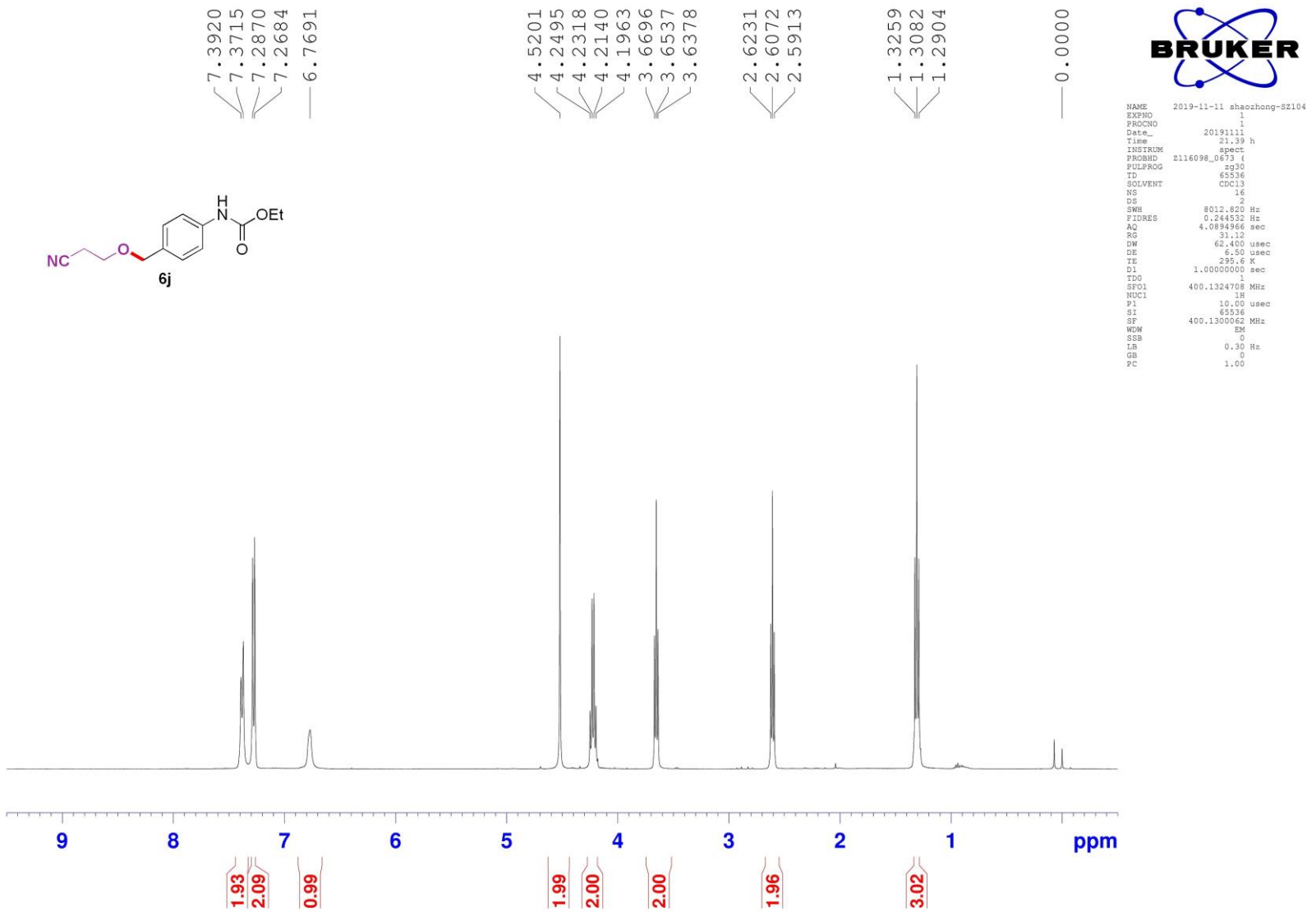

7.3695
7.3492
7.2856
7.2640
6.7977
4.9907
4.9892
4.9170
4.4350
4.2432
4.2254
4.2076
4.1899
3.9078
1.7566
1.3170
1.2992
1.2815
0.0001
BRUKER
NAME 2019-11-14 shaozhong-SZ110
EXPNO 1
PROCNO 1
Date_ 20191114
Time 23.12 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300090 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
O
6h
9
8
7
6
5
4
3
2
1
ppm
1.93
1.97
0.94
0.99
0.98
2.00
1.94
1.99
2.96
2.93


153.609
142.090
137.367
133.202
128.567
118.500
112.293
77.318
77.000
76.681
73.829
71.294
61.132
19.477
14.486
BRUKER
NAME 2019-11-14 shaozhong-SZ110
EXPNO 2
PROCNO 1
Date_ 20191114
Time 23.27 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 26041.666 Hz
FIDRES 0.794729 Hz
AQ 1.2583412 sec
RG 203.48
DW 19.200 usec
DE 6.50 usec
TE 296.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127773 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


7.3726
7.3522
7.2907
7.2722
7.2699
6.8796
4.5231
4.2407
4.2230
4.2052
4.1875
4.1105
4.1049
4.0992
4.0937
1.8736
1.8679
1.8622
1.3148
1.2970
1.2792
0.0000
BRUKER
NAME 2019-11-12 yangdong-SZ107
EXPNO 1
PROCNO 1
Date_ 20191112
Time 10.56 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300045 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me
O
H
N
OEt
O
6i
9
8
7
6
5
4
3
2
1
ppm
1.97
2.05
0.96
2.00
2.00
2.01
3.05
2.96




```
NAME        2019-11-12 yangdong-SZ107
EXPNO                2
PROCNO               1
Date_         20191112
Time             11.11 h
INSTRUM            spect
PROBHD    Z116098_0673 (
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  256
DS                    4
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            1.3631988 sec
RG               203.48
DW               20.800 usec
DE                6.50 usec
TE               296.0 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1
SFO1        100.6228298 MHz
NUC1               13C
P1               10.00 usec
SI                32768
SF          100.6127802 MHz
WDW                EM
SSB                   0
LB                1.00 Hz
GB                    0
PC                1.40
```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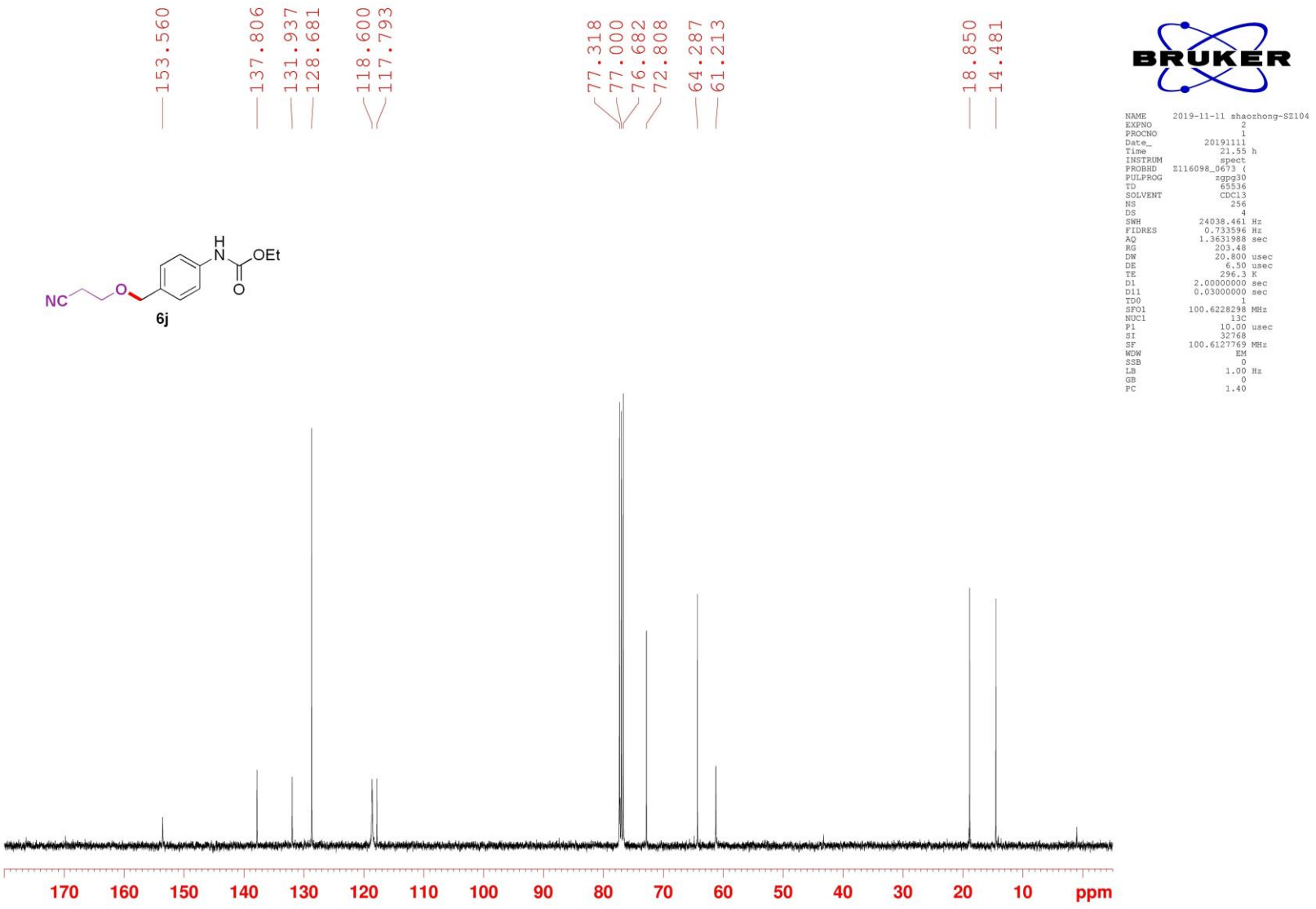
7.3715
7.2870
7.2684
6.7691
4.5201
4.2495
4.2318
4.2140
4.1963
3.6696
3.6537
3.6378
2.6231
2.6072
2.5913
1.3259
1.3082
1.2904
0.0000
BRUKER
NAME 2019-11-11 shaozhong-SZ104
EXPNO 1
PROCNO 1
Date_ 20191111
Time 21.39 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300062 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
NC
O
H
N
OEt
O
6j
9
8
7
6
5
4
3
2
1
ppm
1.93
2.09
0.99
1.99
2.00
2.00
1.96
3.02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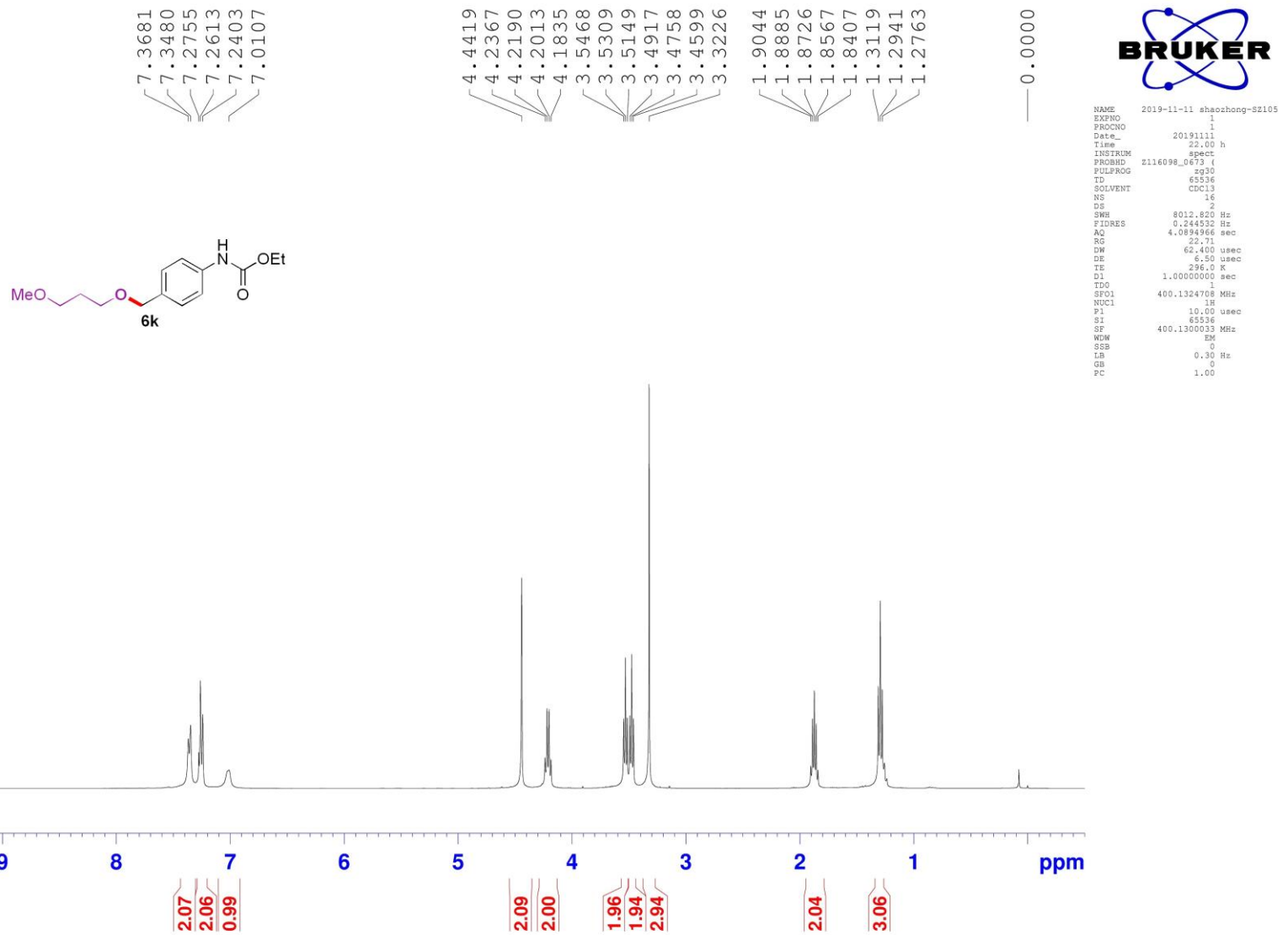
137.806
131.937
128.681
118.600
117.793
77.318
77.000
76.682
72.808
64.287
61.213
18.850
14.481
BRUKER
NAME 2019-11-11 shaozhong-SZ104
EXPNO 2
PROCNO 1
Date_ 20191111
Time 21.55 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 296.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127769 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
NC
O
H
N
OEt
O
6j
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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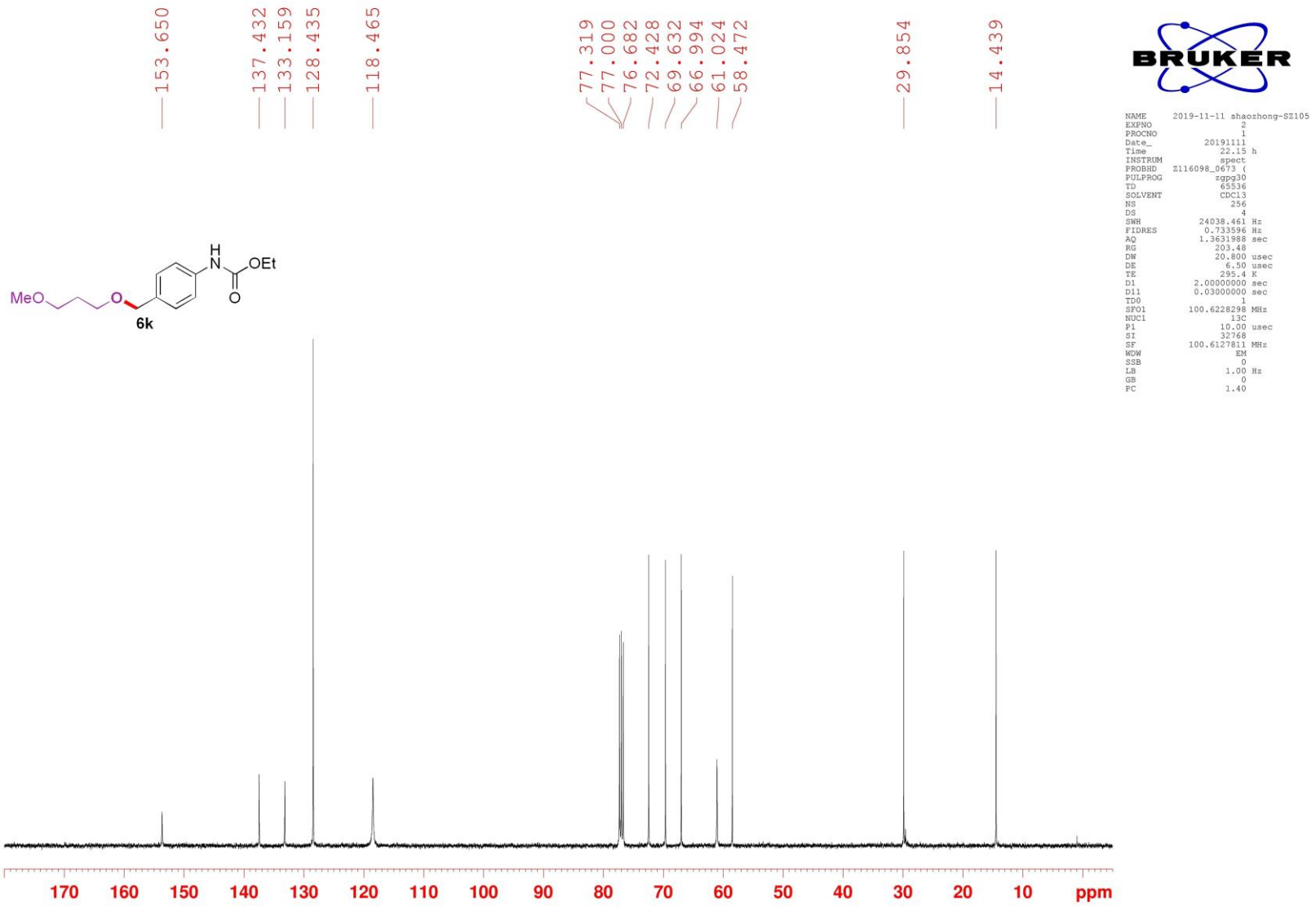
7.3480
7.2755
7.2613
7.2403
7.0107
4.4419
4.2367
4.2190
4.2013
4.1835
3.5468
3.5309
3.5149
3.4917
3.4758
3.4599
3.3226
1.9044
1.8885
1.8726
1.8567
1.8407
1.3119
1.2941
1.2763
0.0000
BRUKER
NAME 2019-11-11 shaozhong-SZ105
EXPNO 1
PROCNO 1
Date_ 20191111
Time 22.00 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 22.71
DW 62.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300033 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
MeO
O
H
N
OEt
O
6k
9
8
7
6
5
4
3
2
1
ppm
2.07
2.06
0.99
2.09
2.00
1.96
1.94
2.94
2.04
3.06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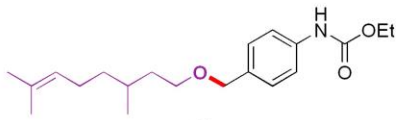
137.432
133.159
128.435
118.465
77.319
77.000
76.682
72.428
69.632
66.994
61.024
58.472
29.854
14.439
BRUKER
NAME 2019-11-11 shaozhong-SZ105
EXPNO 2
PROCNO 1
Date_ 20191111
Time 22.15 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127811 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
MeO
O
H
N
OEt
O
6k
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


H
N
OEt
O
O

6l

7.3645
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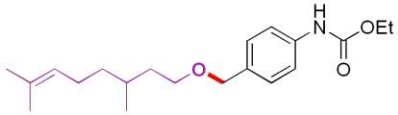
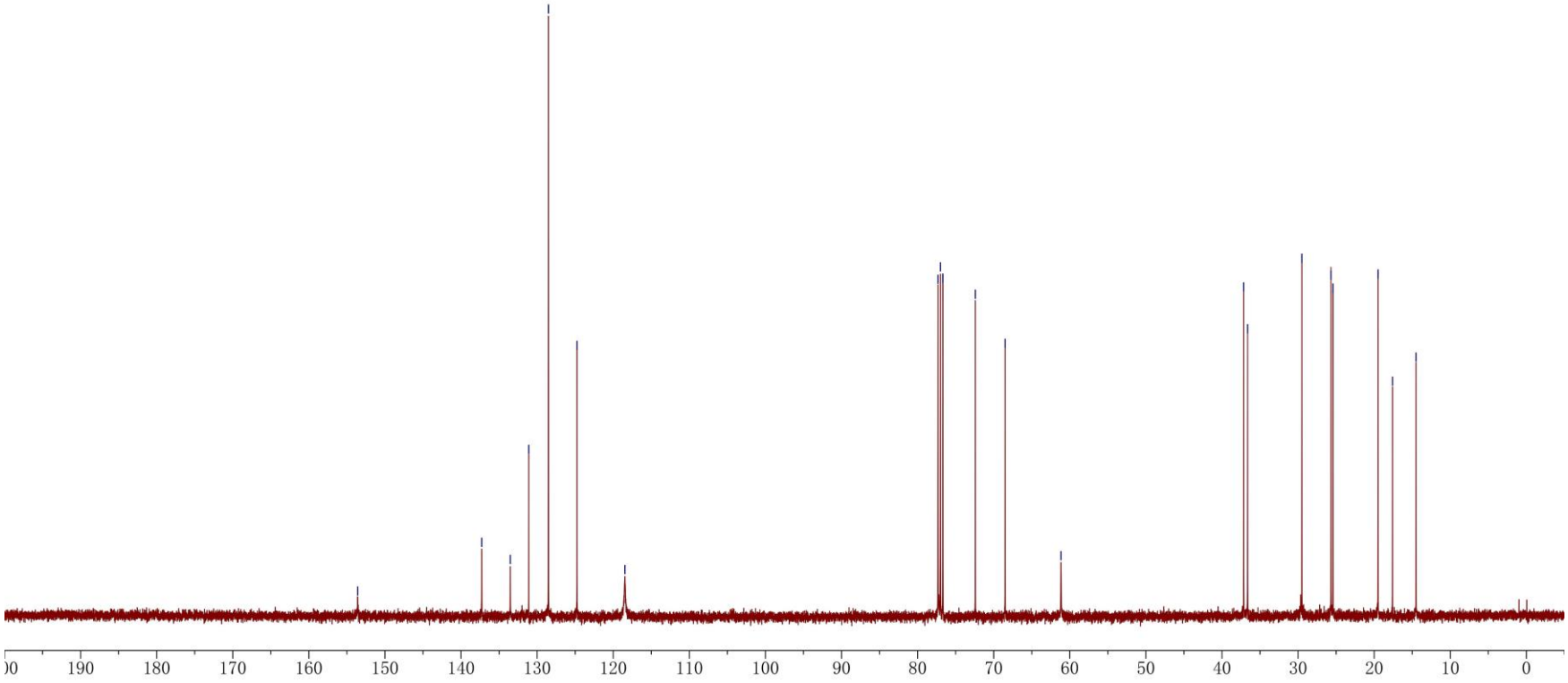
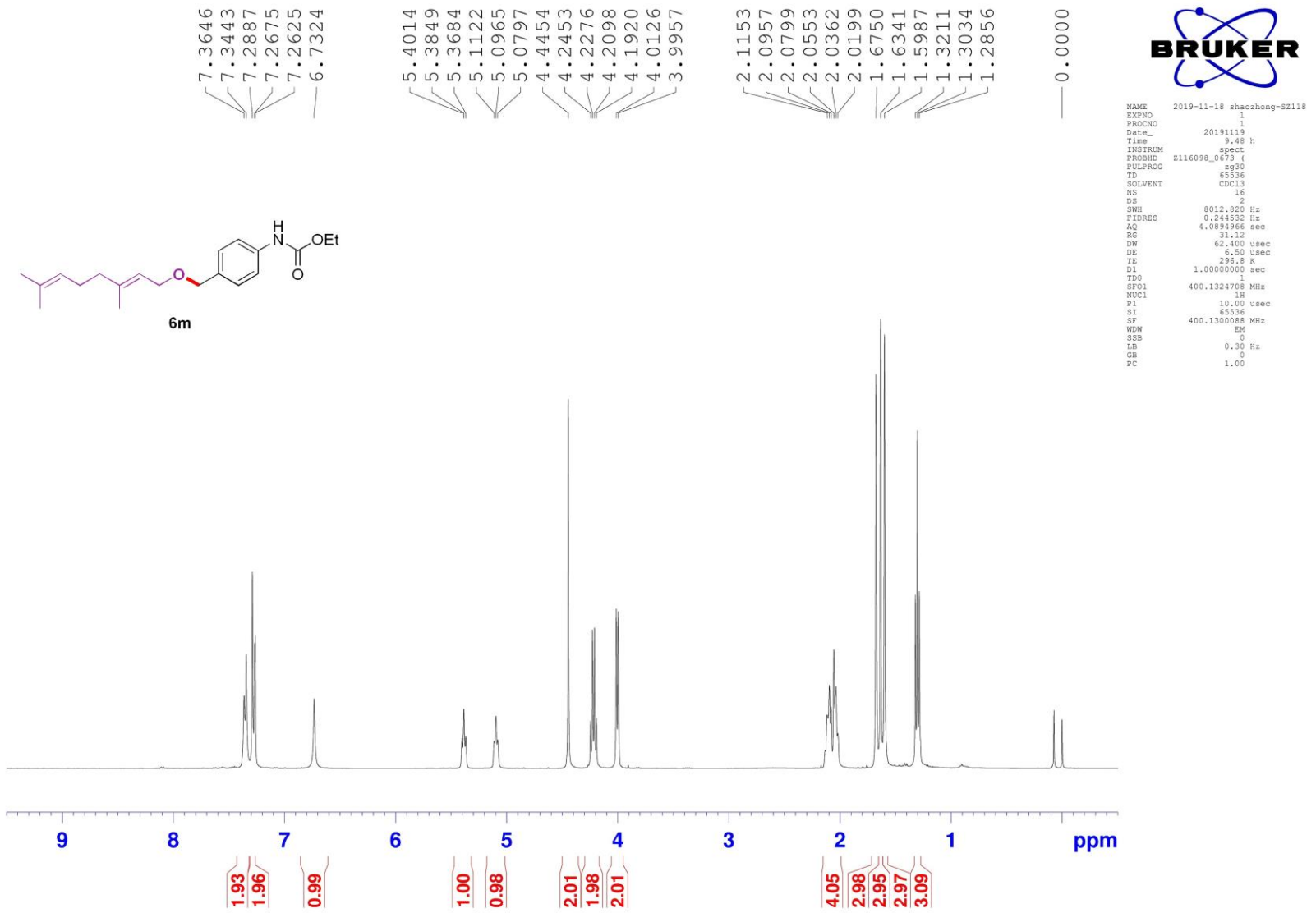
7.2783
7.2625
7.2570
6.7192
5.1098
5.1061
5.0884
5.0743
5.0707
5.0670
4.4411
4.2449
4.2272
4.2094
4.1916
3.5190
3.4961
3.4811
3.4776
3.4689
3.4514
3.4282
2.0317
2.0289
2.0103
1.9690
1.9662
1.9465
1.9446
1.9421
1.9251
1.9066
1.6997
1.6781
1.6498
1.6355
1.6179
1.5639
1.5489
1.4518
1.4332
1.4180
1.3997
1.3849
1.3534
1.3359
1.3210
1.3032
1.2854
1.1917
1.1765
1.1577
1.1341
1.1153
0.8843
0.8678
-0.0000
1.95
2.07
0.93
0.96
2.02
1.98
2.00
1.98
4.07
3.96
2.01
3.03
1.09
3.07
5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0

153.5788
137.2846
133.5224
131.0981
128.5148
124.7664
118.4648
77.3184
77.0000
76.6817
72.4134
68.4986
61.1510
37.1507
36.6326
29.5028
25.6830
25.4105
19.4905
17.5903
14.5098



6l

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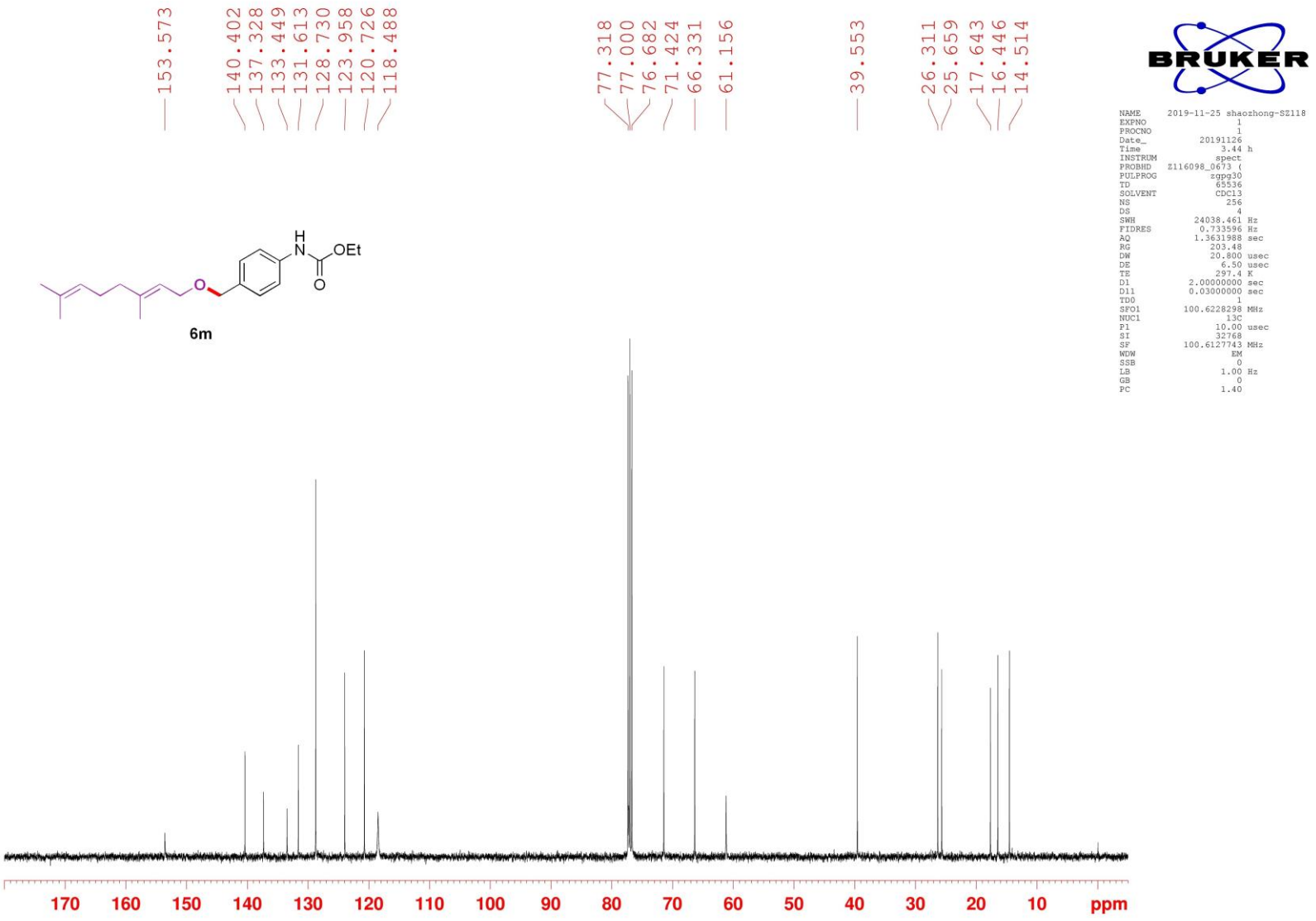
7.2625
6.7324
5.4014
5.3849
5.3684
5.1122
5.0965
5.0797
4.4454
4.2453
4.2276
4.2098
4.1920
4.0126
3.9957
2.1153
2.0957
2.0799
2.0553
2.0362
2.0199
1.6750
1.6341
1.5987
1.3211
1.3034
1.2856
0.0000
BRUKER
NAME 2019-11-18 shaozhong-SZ118
EXPNO 1
PROCNO 1
Date_ 20191119
Time 9.48 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 296.8 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300088 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
O
6m
9
8
7
6
5
4
3
2
1
ppm
1.93
1.96
0.99
1.00
0.98
2.01
1.98
2.01
4.05
2.98
2.95
2.97
3.09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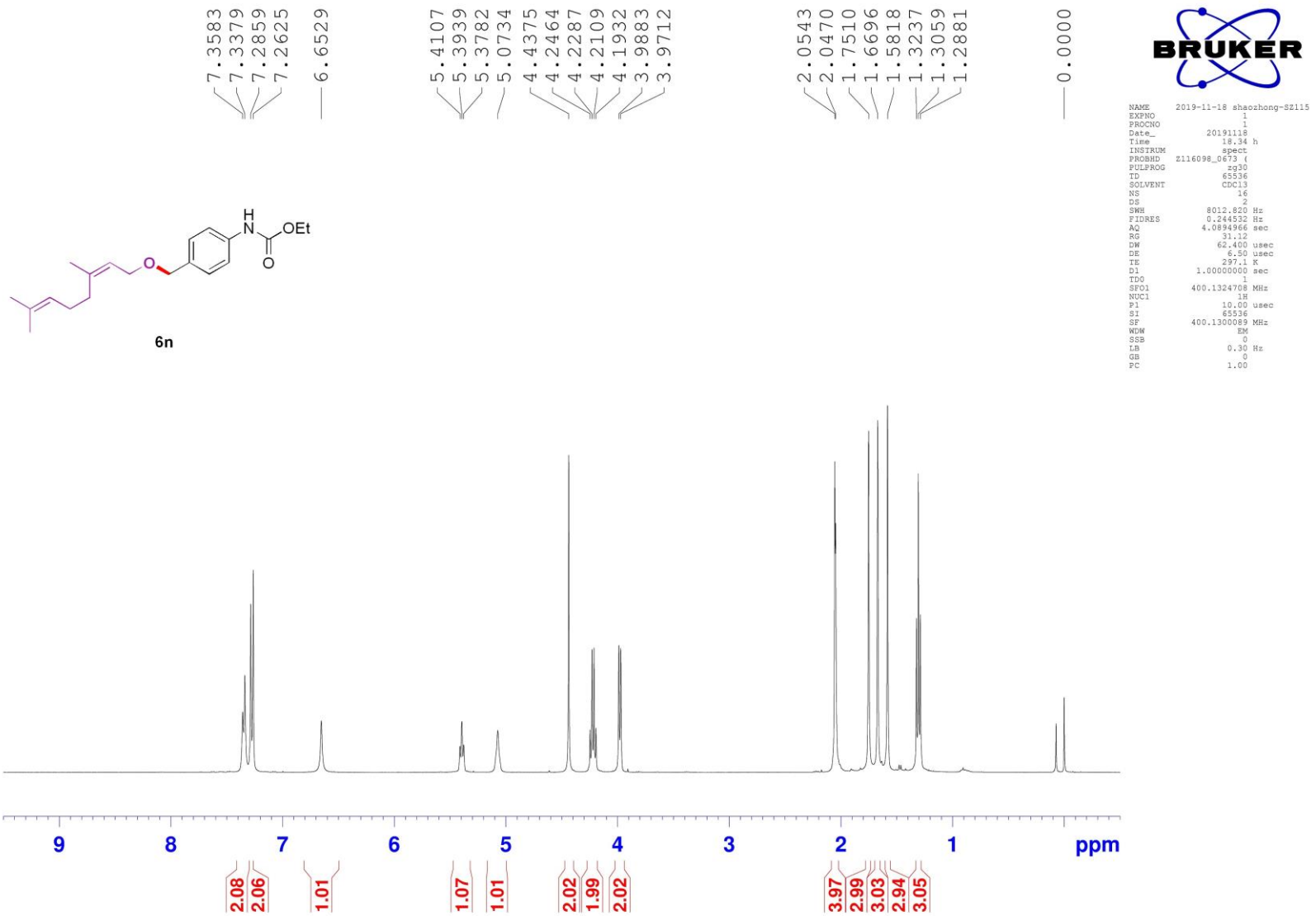
133.449
131.613
128.730
123.958
120.726
118.488
77.318
77.000
76.682
71.424
66.331
61.156
39.553
26.311
25.659
17.643
16.446
14.514
BRUKER
NAME 2019-11-25 shaozhong-SZ118
EXPNO 1
PROCNO 1
Date_ 20191126
Time 3.44 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 297.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127743 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
O
6m
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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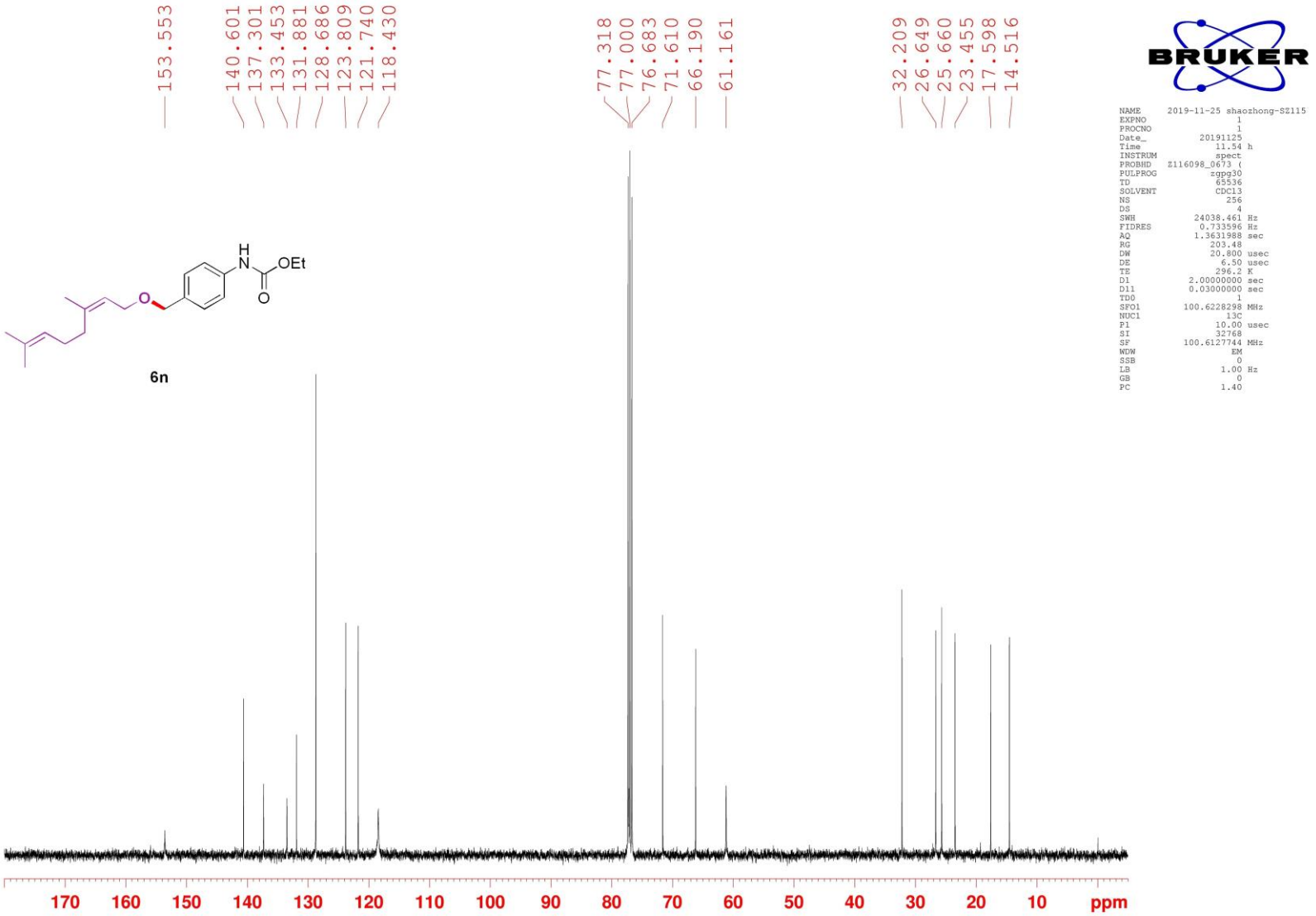
7.3379
7.2859
7.2625
6.6529
5.4107
5.3939
5.3782
5.0734
4.4375
4.2464
4.2287
4.2109
4.1932
3.9883
3.9712
2.0543
2.0470
1.7510
1.6696
1.5818
1.3237
1.3059
1.2881
0.0000
BRUKER
NAME 2019-11-18 shaozhong-SZ115
EXPNO 1
PROCNO 1
Date_ 20191118
Time 18.34 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 31.12
DW 62.400 usec
DE 6.50 usec
TE 297.1 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300089 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
O
6n
9
8
7
6
5
4
3
2
1
ppm
2.08
2.06
1.01
1.07
1.01
2.02
1.99
2.02
3.97
2.99
3.03
2.94
3.05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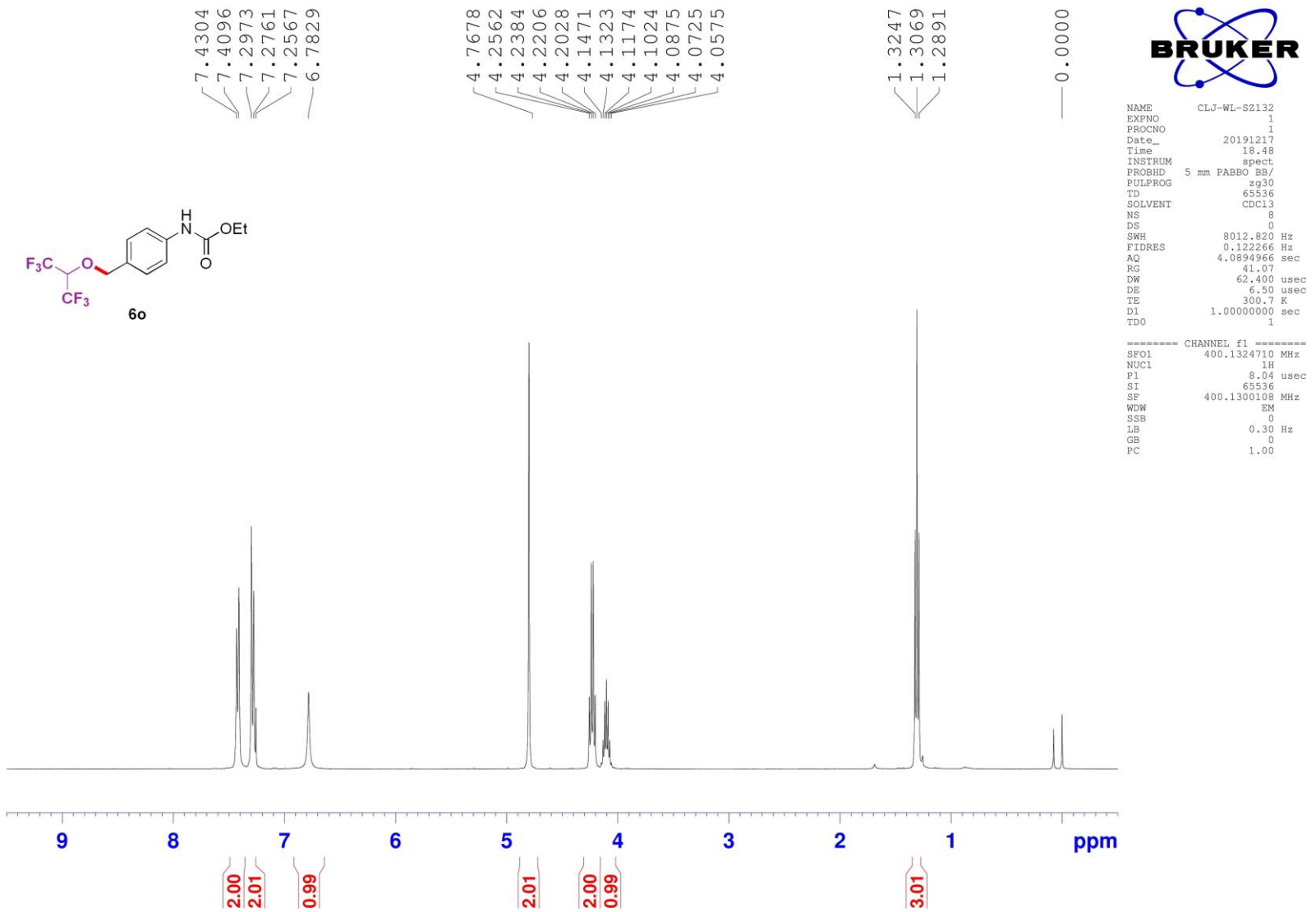
131.881
128.686
123.809
121.740
118.430
77.318
77.000
76.683
71.610
66.190
61.161
32.209
26.649
25.660
23.455
17.598
14.516
BRUKER
NAME 2019-11-25 shaozhong-SZ115
EXPNO 1
PROCNO 1
Date_ 20191125
Time 11.54 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 296.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127744 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
O
6n
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm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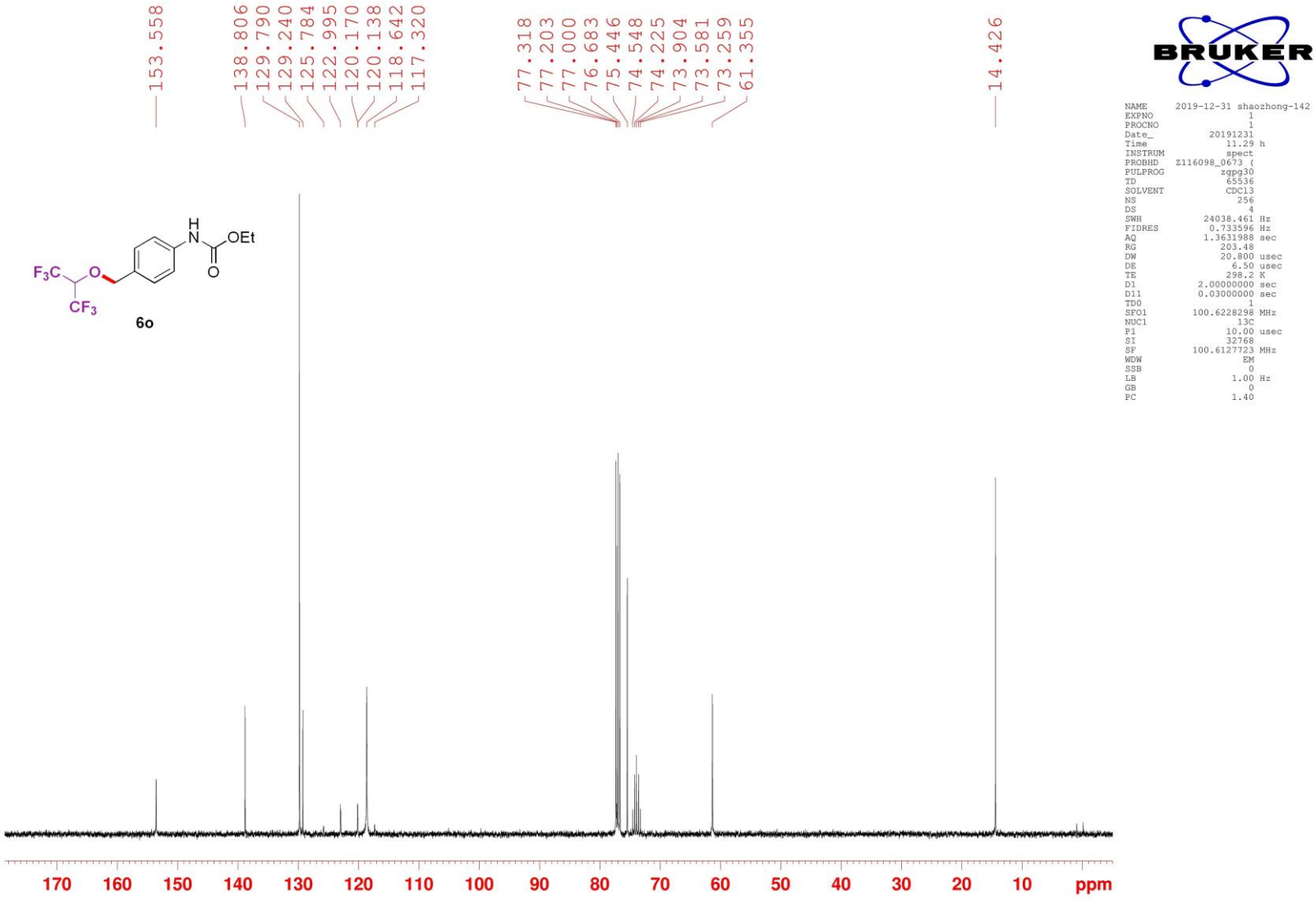
7.2761
7.2567
6.7829
4.7678
4.2562
4.2384
4.2206
4.2028
4.1471
4.1323
4.1174
4.1024
4.0875
4.0725
4.0575
1.3247
1.3069
1.2891
0.0000
BRUKER
NAME CLJ-WL-SZ132
EXPNO 1
PROCNO 1
Date_ 20191217
Time 18.48
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 41.07
DW 62.400 usec
DE 6.50 usec
TE 300.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300108 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
F3C
O
CF3
H
N
OEt
O
6o
9
8
7
6
5
4
3
2
1
ppm
2.00
2.01
0.99
2.01
2.00
0.99
3.01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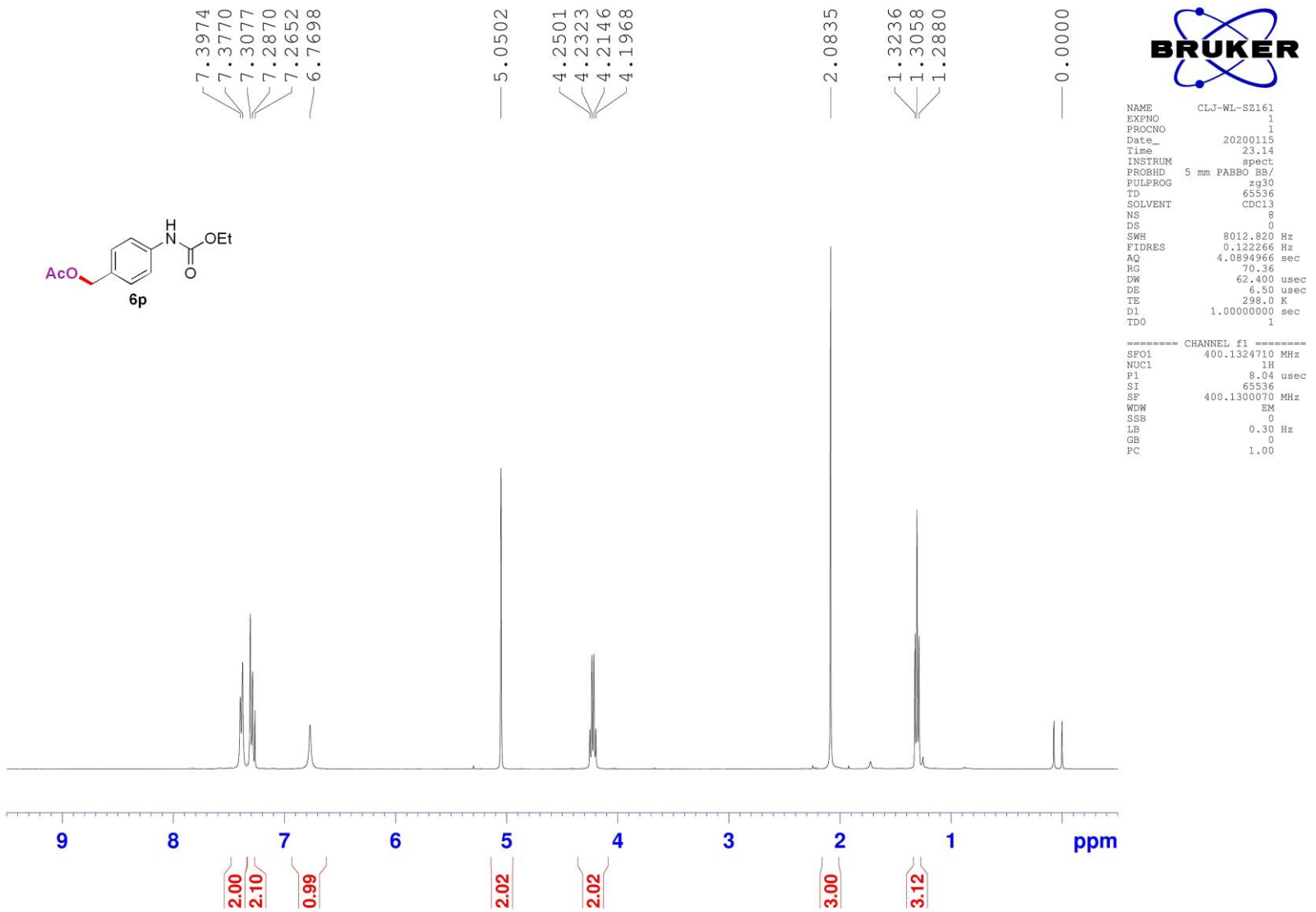
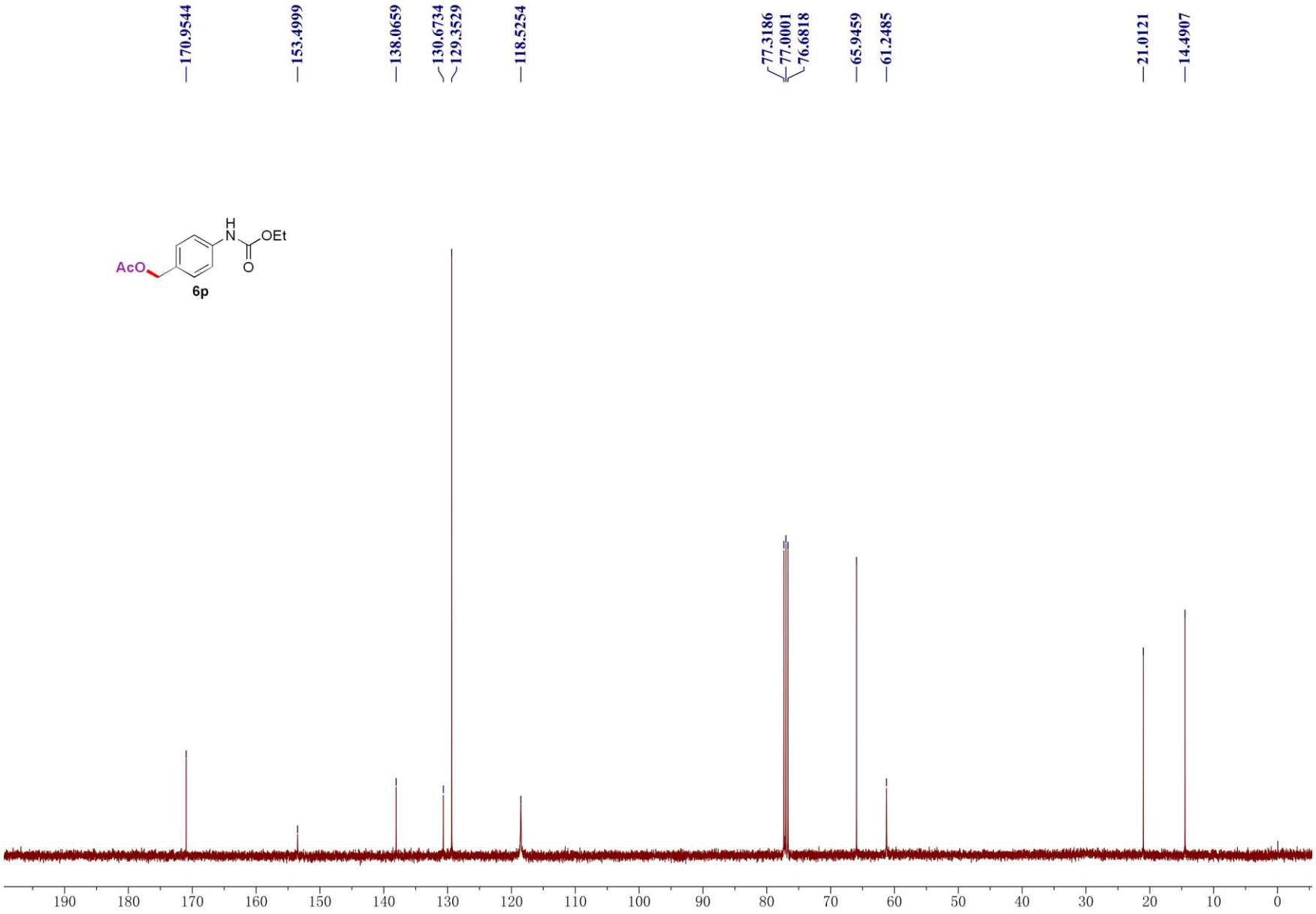
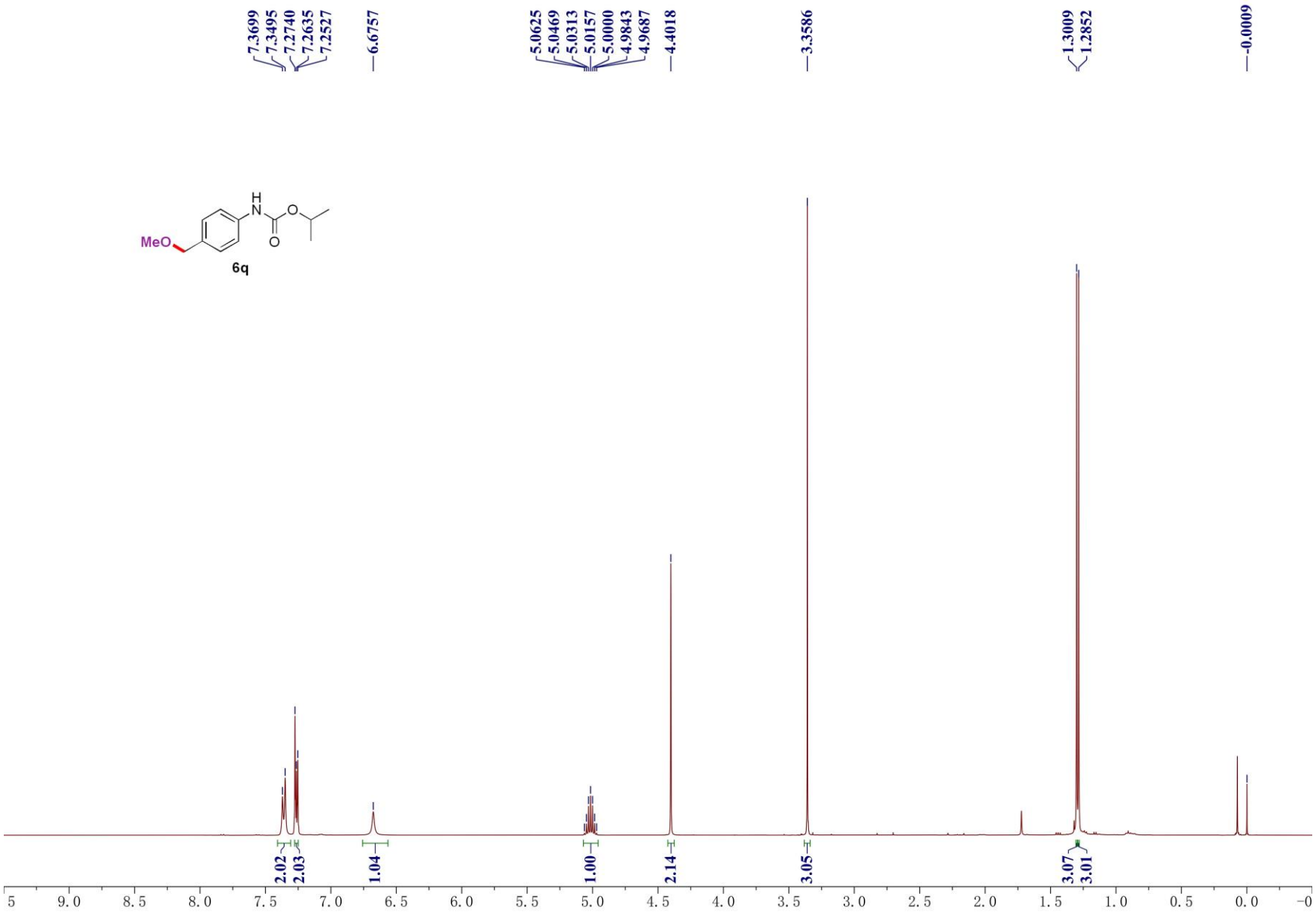
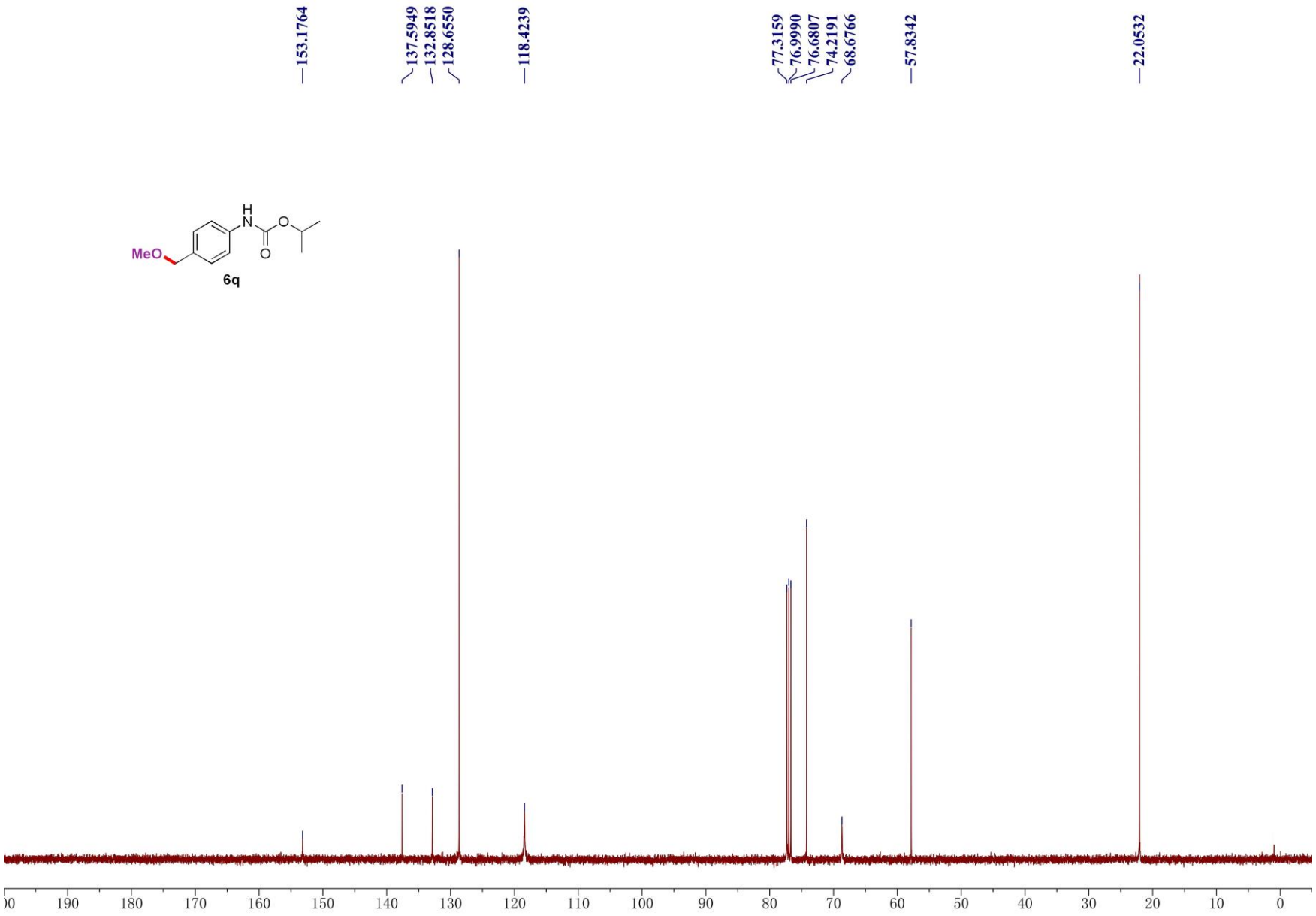
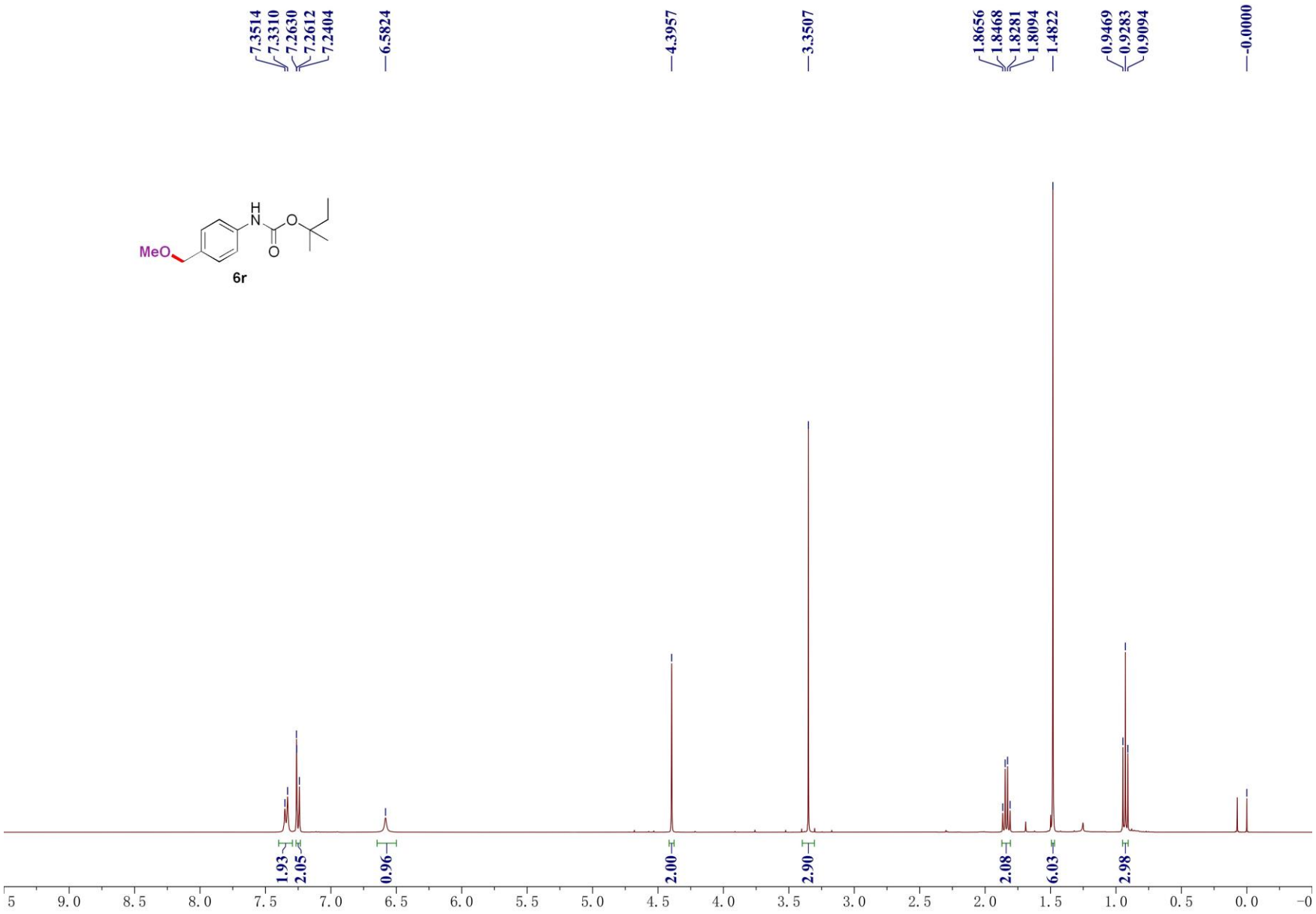
129.790
129.240
125.784
122.995
120.170
120.138
118.642
117.320
77.318
77.203
77.000
76.683
75.446
74.548
74.225
73.904
73.581
73.259
61.355
14.426
BRUKER
NAME 2019-12-31 shaozhong-142
EXPNO 1
PROCNO 1
Date_ 20191231
Time 11.29 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127723 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
F3C
O
CF3
H
N
OEt
O
6o
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

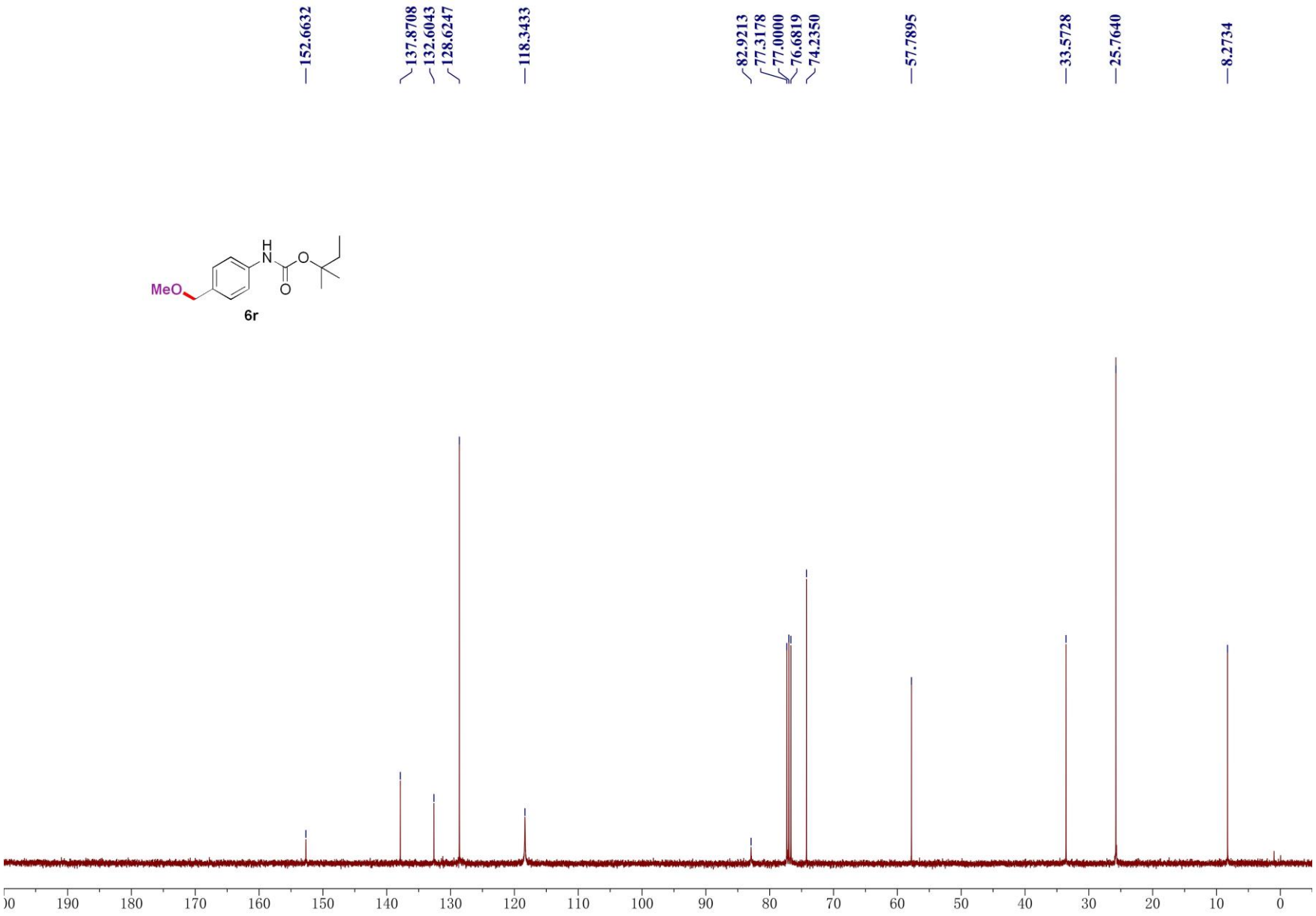

7.3974
7.3770
7.3077
7.2870
7.2652
6.7698
5.0502
4.2501
4.2323
4.2146
4.1968
2.0835
1.3236
1.3058
1.2880
0.0000
BRUKER
NAME CLJ-WL-SZ161
EXPNO 1
PROCNO 1
Date_ 20200115
Time 23.14
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 70.36
DW 62.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300070 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
AcO
OEt
H
N
O
6p
9
8
7
6
5
4
3
2
1
ppm
2.00
2.10
0.99
2.02
2.02
3.00
3.12

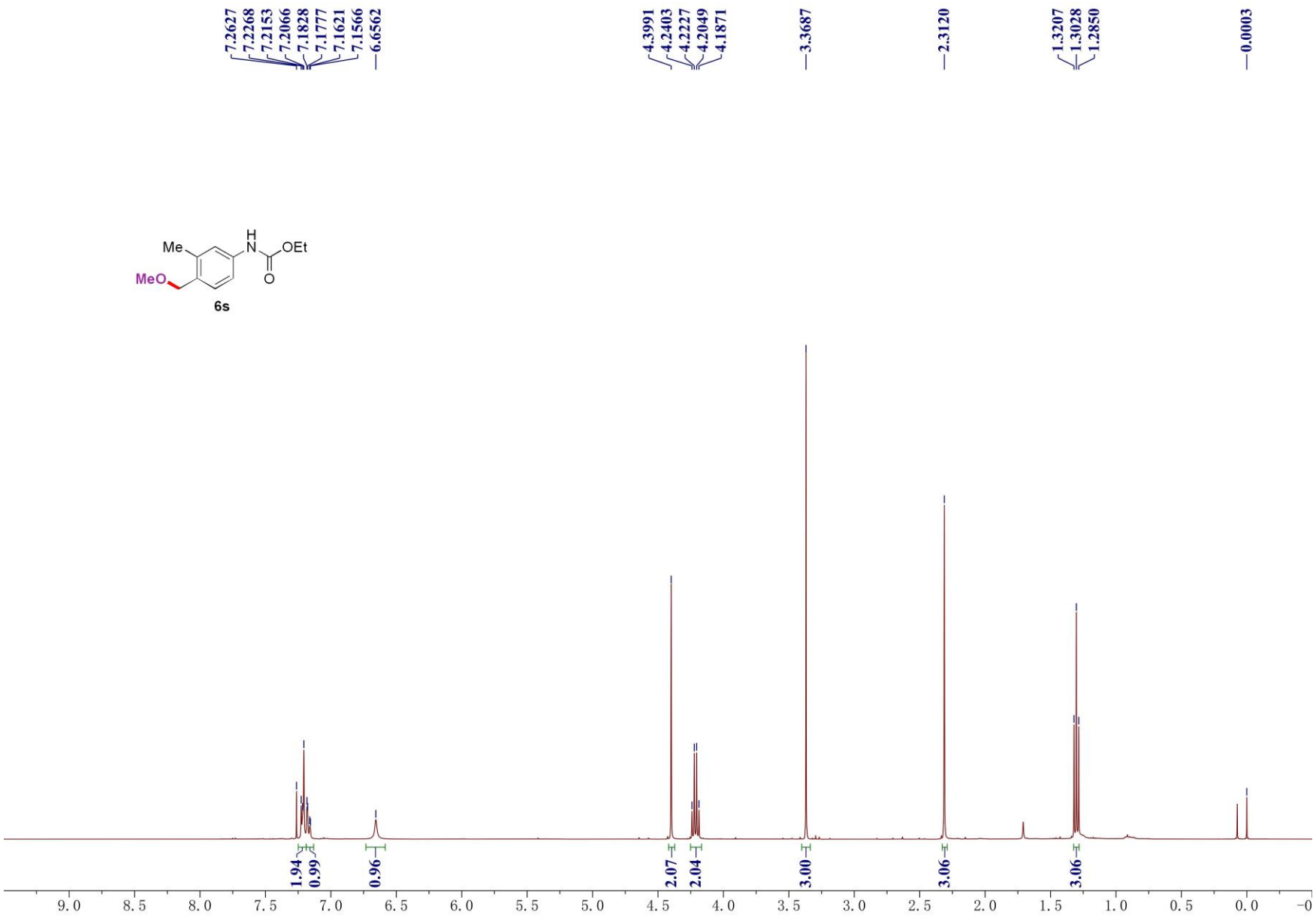

170.9544
153.4999
138.0659
130.6734
129.3529
118.5254
77.3186
77.0001
76.6818
65.9459
61.2485
21.0121
14.4907
AcO
H
N
OEt
O
6p
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

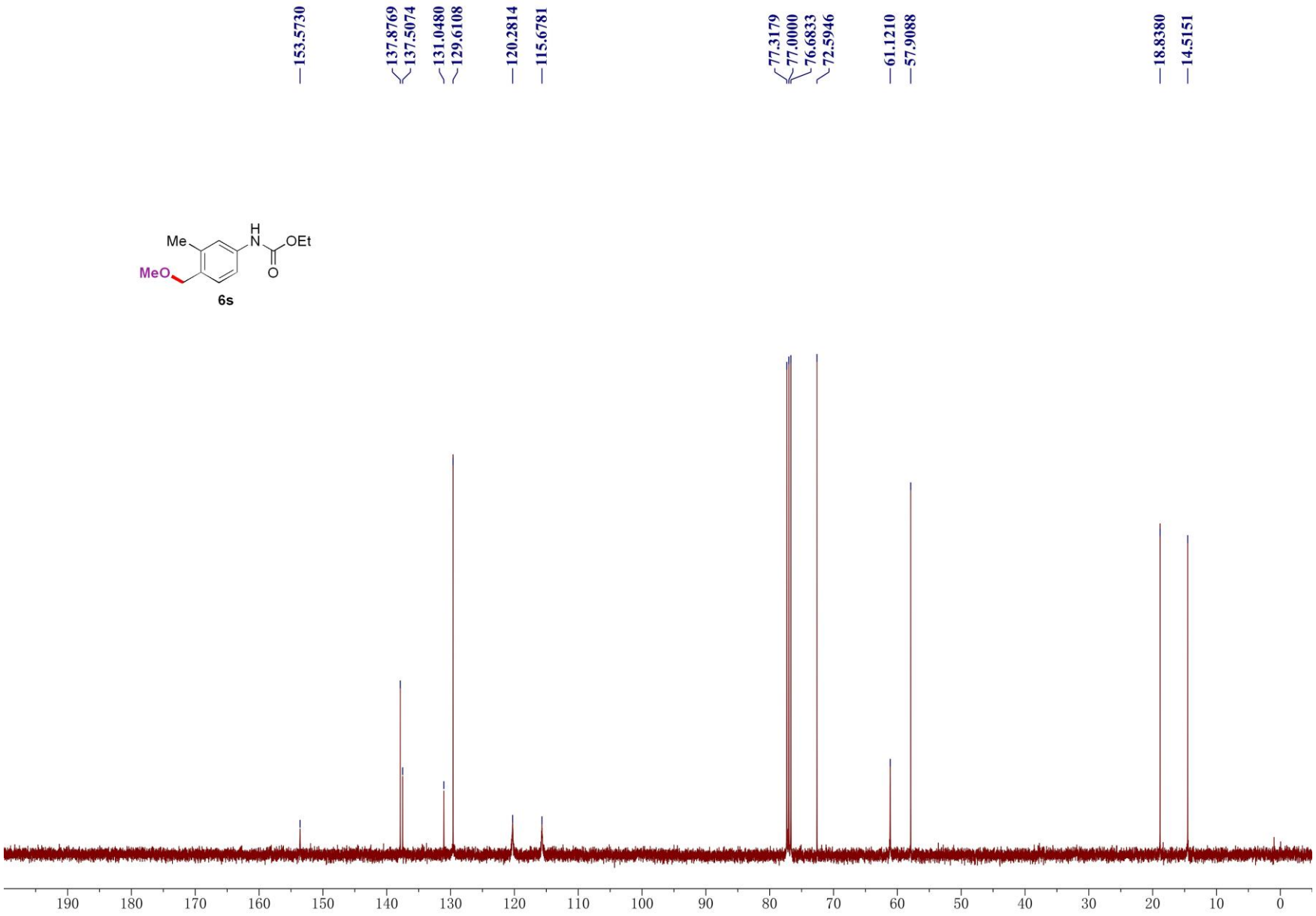

7.3699
7.3495
7.2740
7.2635
7.2527
6.6757
5.0625
5.0469
5.0313
5.0157
5.0000
4.9843
4.9687
4.4018
3.3586
1.3009
1.2852
0.0009
MeO
6q
2.02
2.03
1.04
1.00
2.14
3.05
3.07
3.01

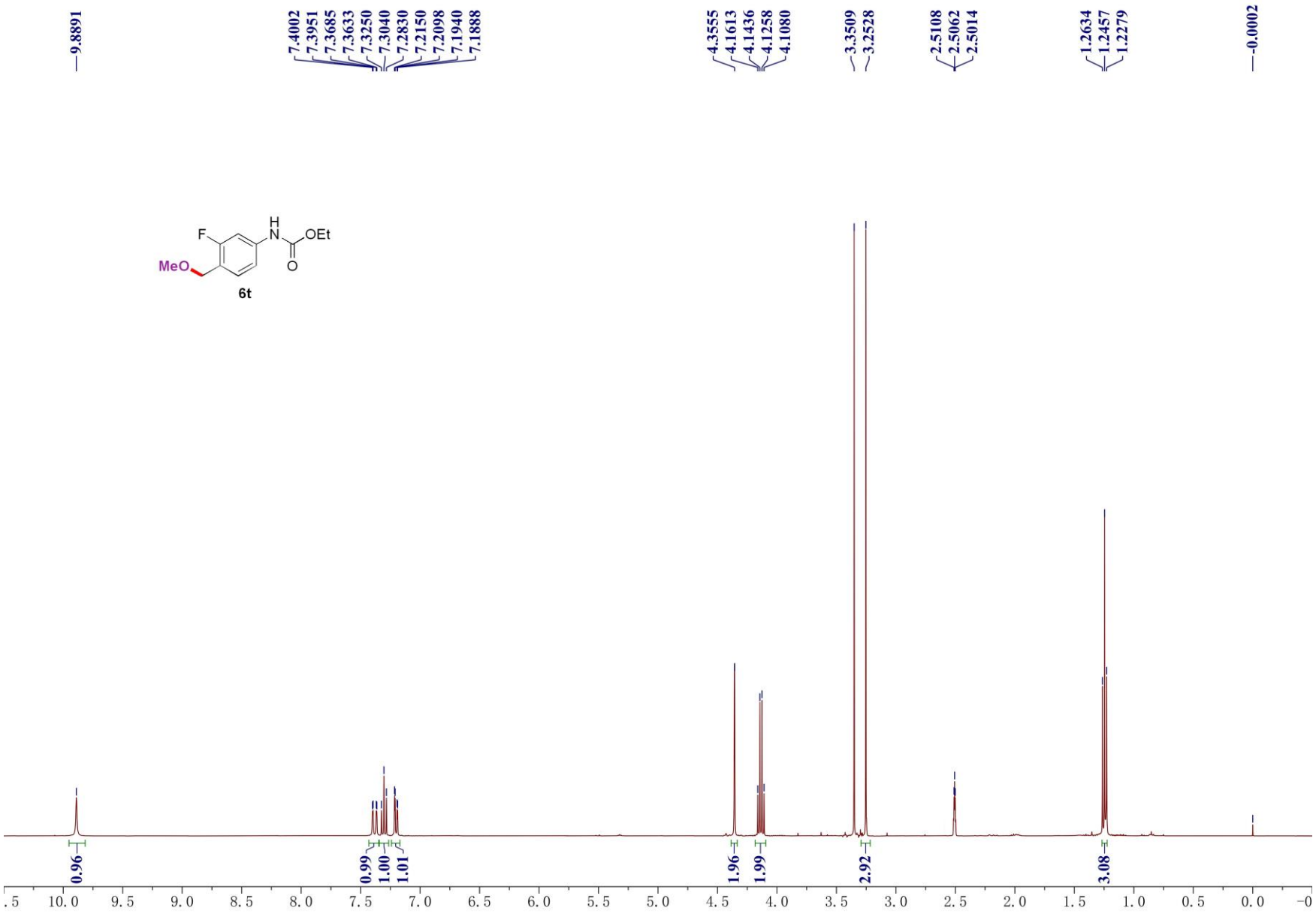

153.1764
137.5949
132.8518
128.6550
118.4239
77.3159
76.9990
76.6807
74.2191
68.6766
57.8342
22.0532
MeO
6q
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

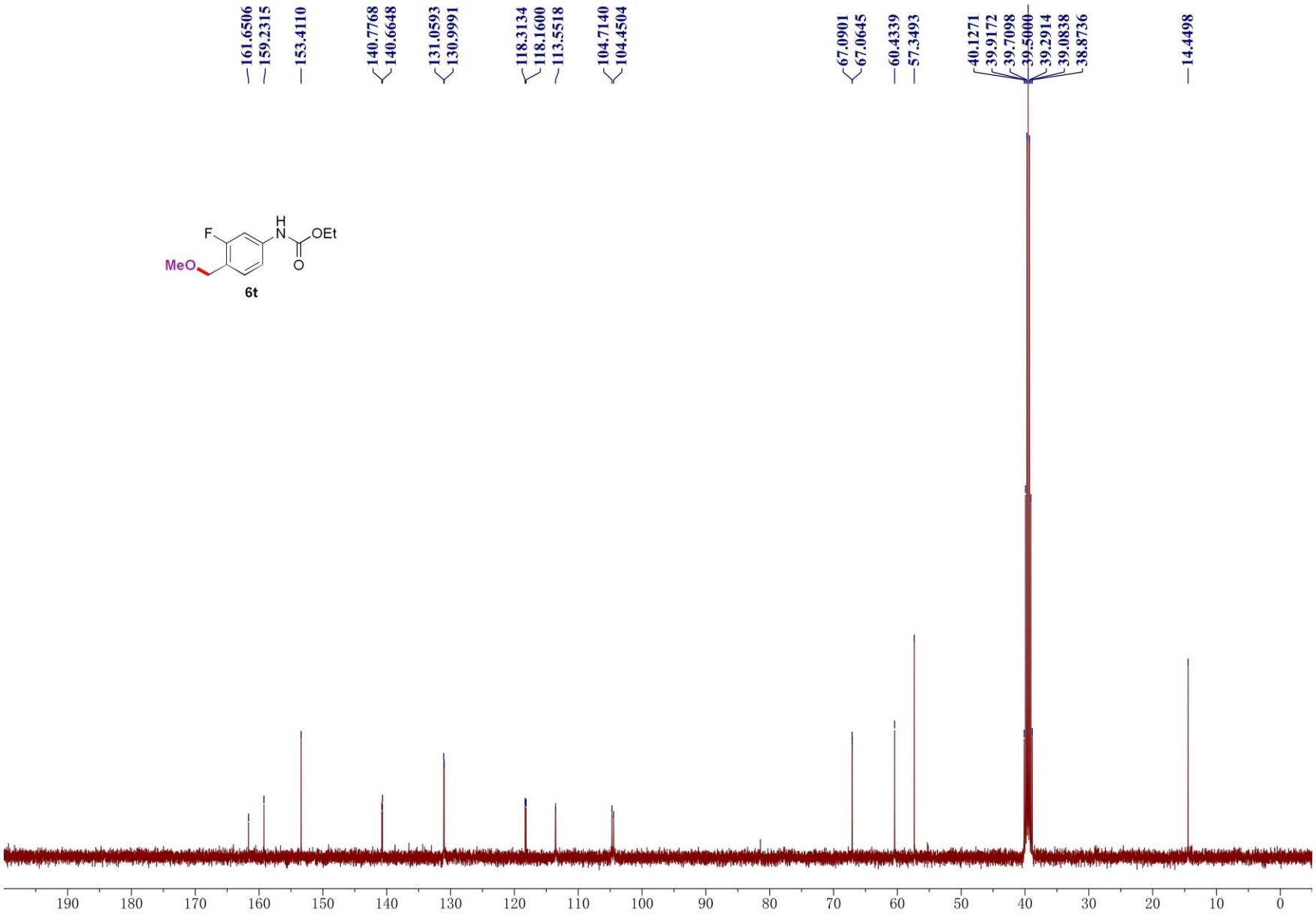

7.3514
7.3310
7.2630
7.2612
7.2404
6.5824
4.3957
3.3507
1.8656
1.8468
1.8281
1.8094
1.4822
0.9469
0.9283
0.9094
0.0000
MeO
6r
1.93
2.05
0.96
2.00
2.90
2.08
6.03
2.98

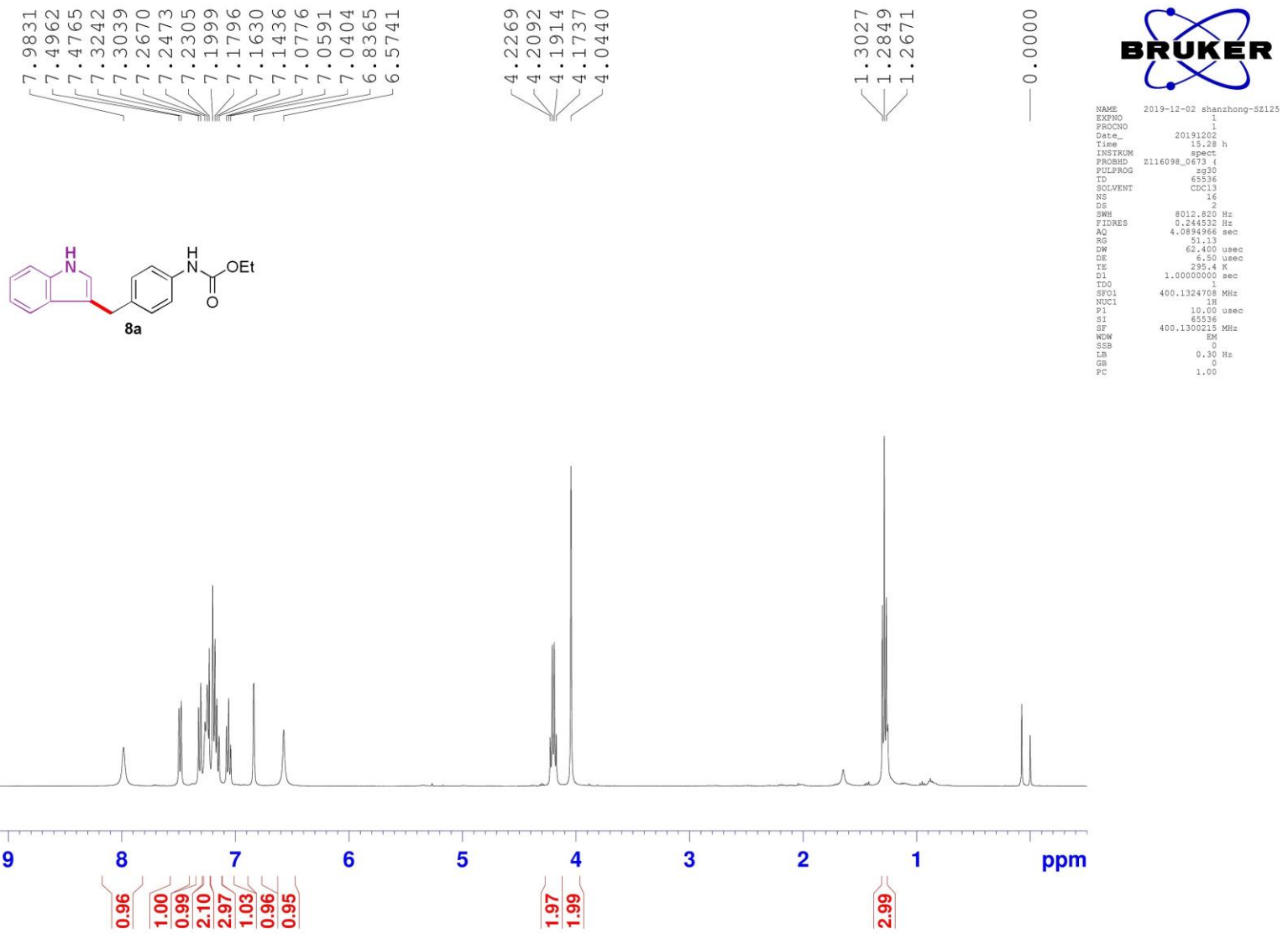

152.6632
137.8708
132.6043
128.6247
118.3433
82.9213
77.3178
77.0000
76.6819
74.2350
57.7895
33.5728
25.7640
8.2734
MeO
H
N
O
O
6r
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

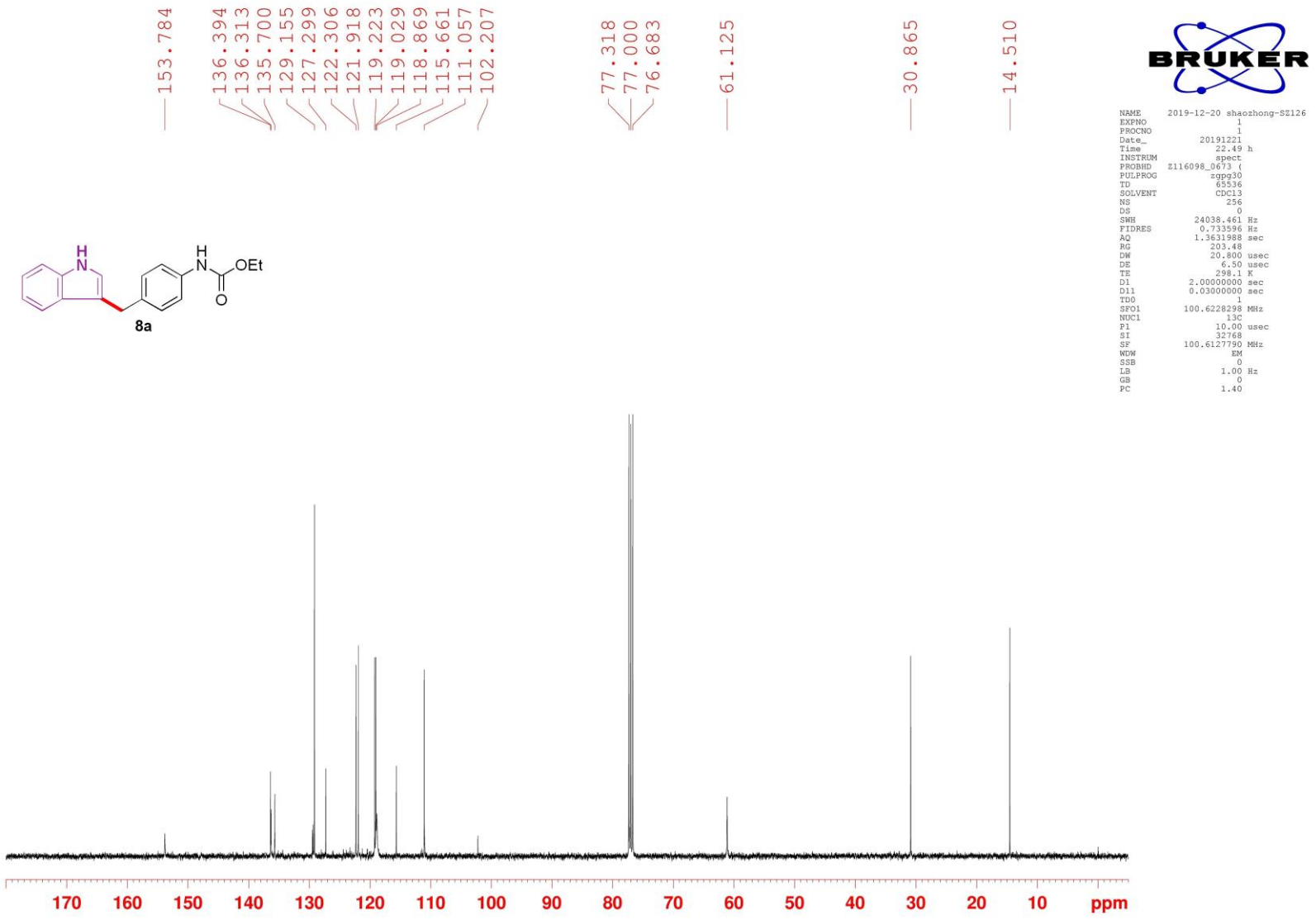

7.2627
7.2268
7.2153
7.2066
7.1828
7.1777
7.1621
7.1566
6.6562
4.3991
4.2403
4.2227
4.2049
4.1871
3.3687
2.3120
1.3207
1.3028
1.2850
0.0003
Me
H
N
OEt
O
MeO
6s
1.94
0.99
0.96
2.07
2.04
3.00
3.06
3.06
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0

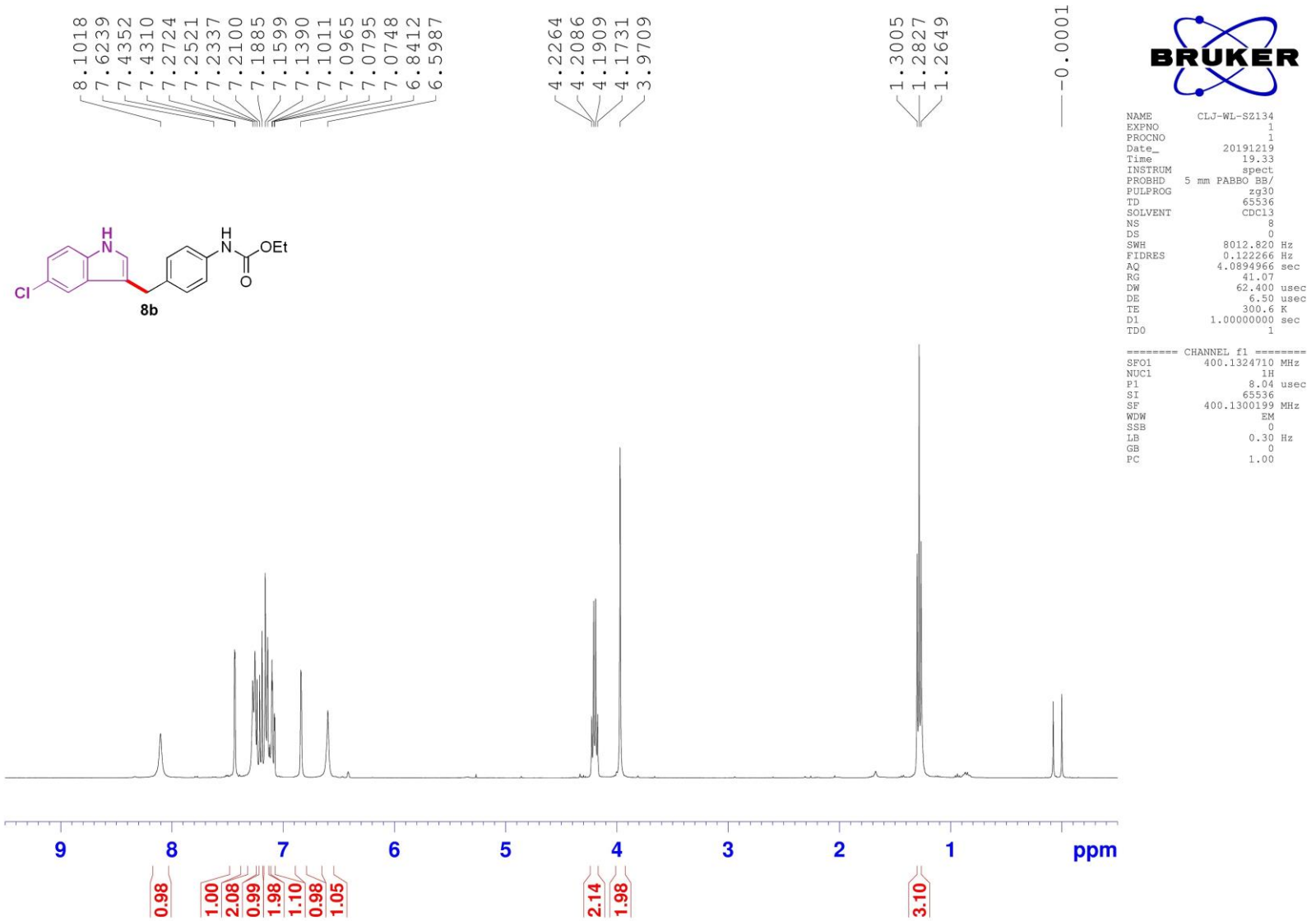

153.5730
137.8769
137.5074
131.0480
129.6108
120.2814
115.6781
77.3179
77.0000
76.6833
72.5946
61.1210
57.9088
18.8380
14.5151
Me
H
N
OEt
O
MeO
6s
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

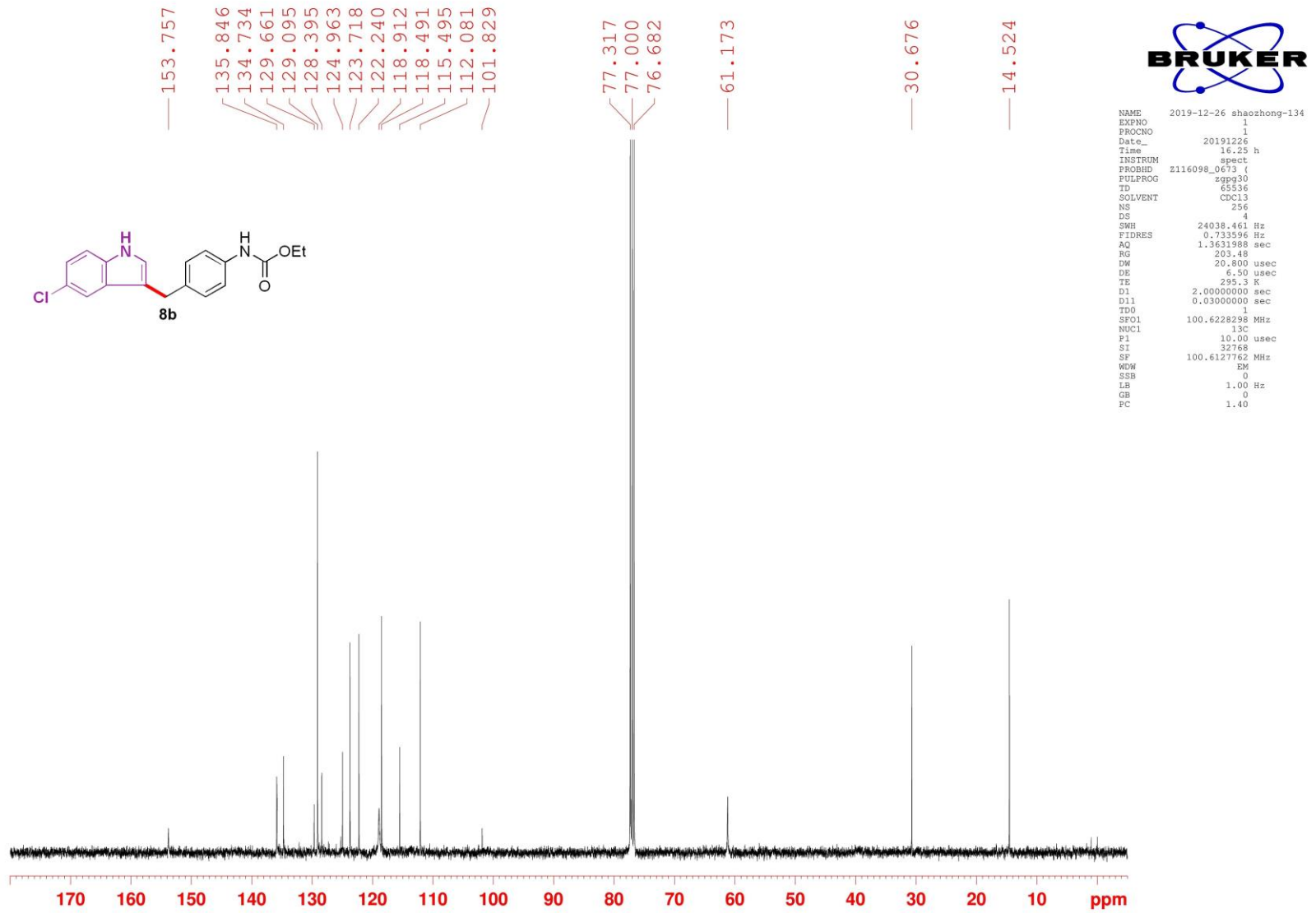

9.8891
7.4002
7.3951
7.3685
7.3633
7.3250
7.3040
7.2830
7.2150
7.2098
7.1940
7.1888
4.3555
4.1613
4.1436
4.1258
4.1080
3.3509
3.2528
2.5108
2.5062
2.5014
1.2634
1.2457
1.2279
-0.0002
F
H
N
OEt
O
MeO
6t
0.96
0.99
1.00
1.01
1.96
1.99
2.92
3.08

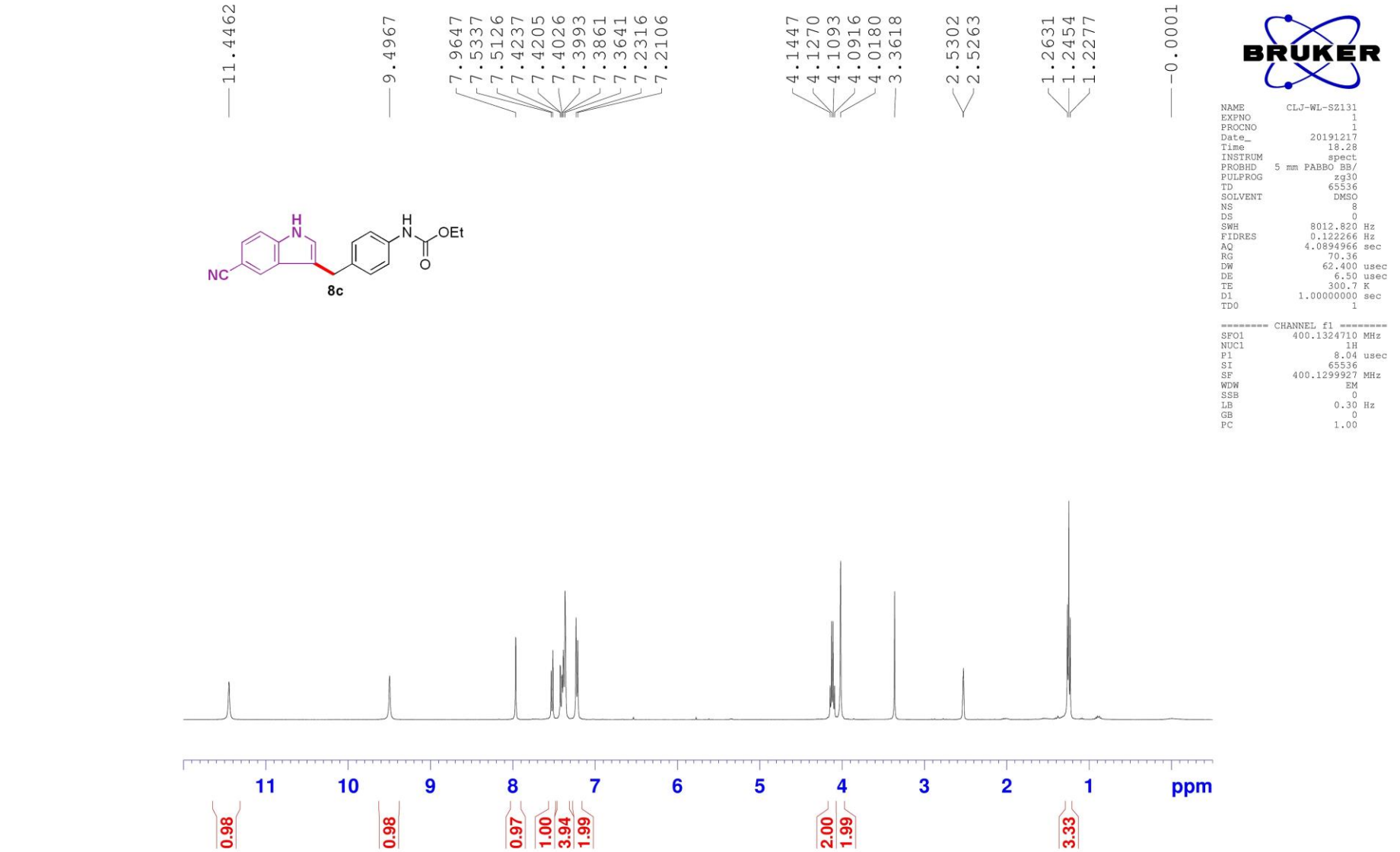

161.6506
159.2315
153.4110
140.7768
140.6648
131.0593
130.9991
118.3134
118.1600
113.5518
104.7140
104.4504
67.0901
67.0645
60.4339
57.3493
40.1271
39.9172
39.7098
39.5000
39.2914
39.0838
38.8736
14.4498
F
H
N
OEt
O
MeO
6t
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

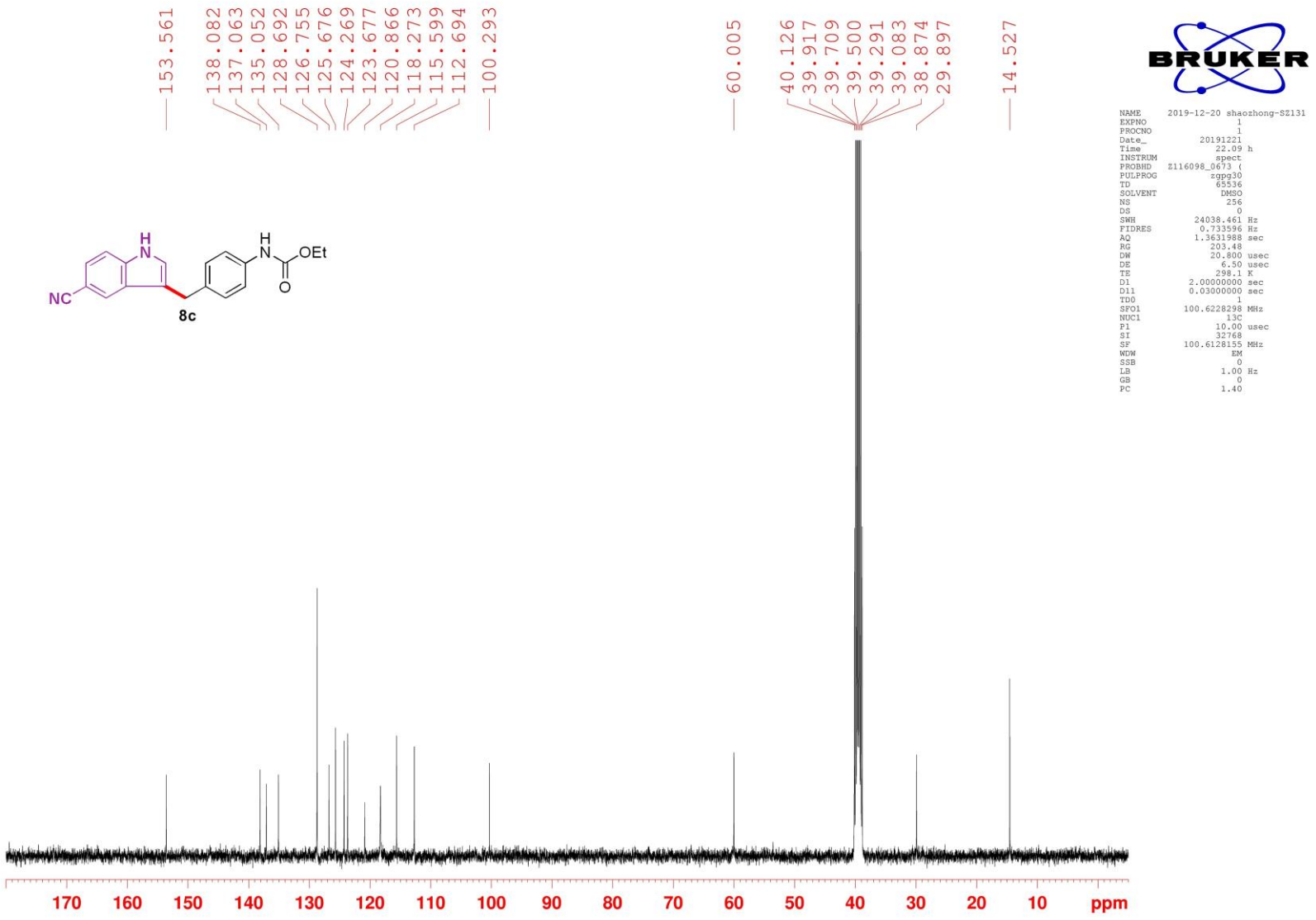

7.9831
7.4962
7.4765
7.3242
7.3039
7.2670
7.2473
7.2305
7.1999
7.1796
7.1630
7.1436
7.0776
7.0591
7.0404
6.8365
6.5741
4.2269
4.2092
4.1914
4.1737
4.0440
1.3027
1.2849
1.2671
0.0000
BRUKER
NAME 2019-12-02 shanzhong-SZ125
EXPNO 1
PROCNO 1
Date_ 20191202
Time 15.28 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 51.13
DW 62.400 usec
DE 6.50 usec
TE 295.4 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300215 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
H
N
OEt
O
8a
9
8
7
6
5
4
3
2
1
ppm
0.96
1.00
0.99
2.10
2.97
1.03
0.96
0.95
1.97
1.99
2.99

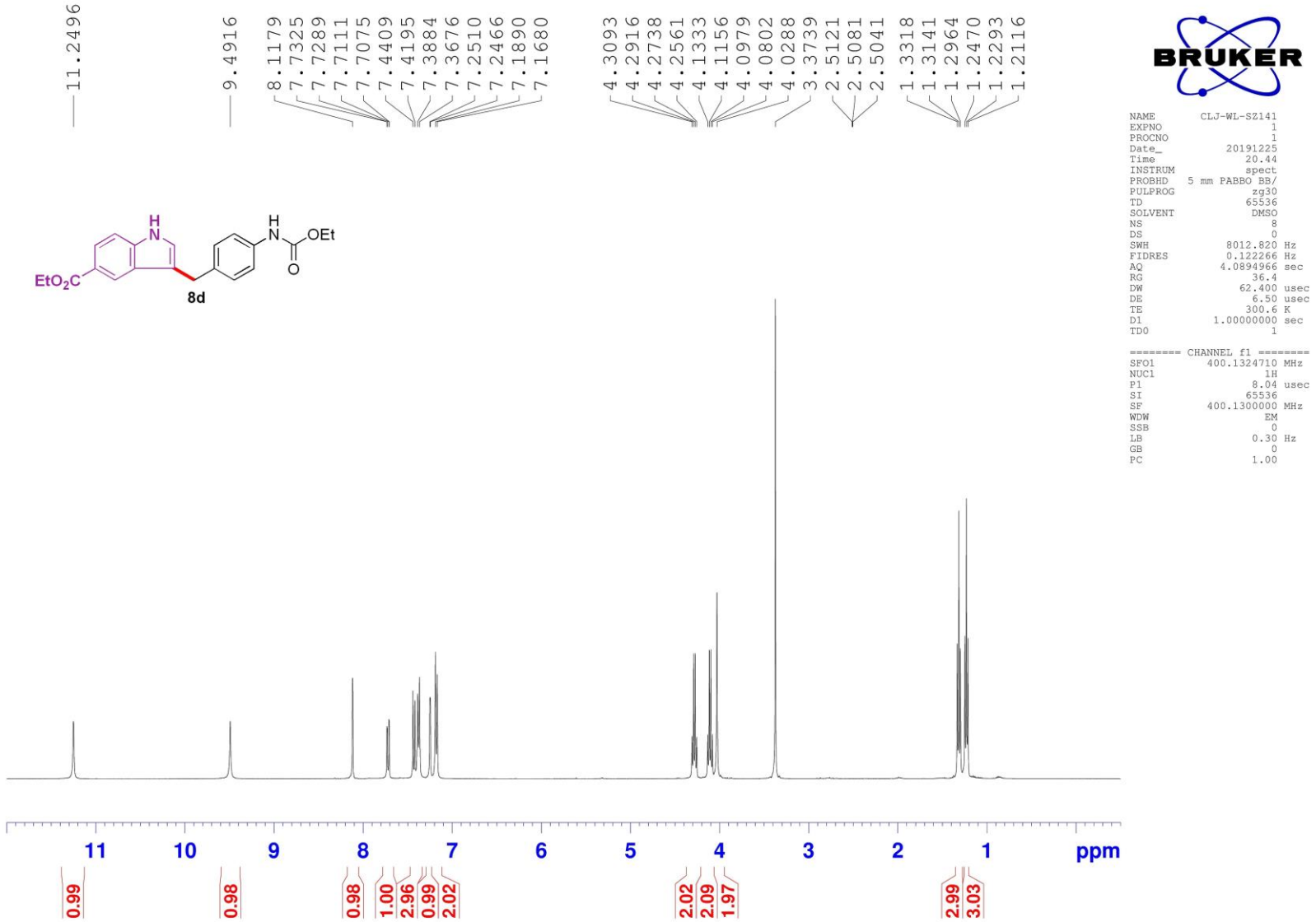

153.784
136.394
136.313
135.700
129.155
127.299
122.306
121.918
119.223
119.029
118.869
115.661
111.057
102.207
77.318
77.000
76.683
61.125
30.865
14.510
BRUKER
NAME 2019-12-20 shaozhong-SZ126
EXPNO 1
PROCNO 1
Date_ 20191221
Time 22.49 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 0
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127790 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
H
N
OEt
O
8a
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


8.1018
7.6239
7.4352
7.4310
7.2724
7.2521
7.2337
7.2100
7.1885
7.1599
7.1390
7.1011
7.0965
7.0795
7.0748
6.8412
6.5987
4.2264
4.2086
4.1909
4.1731
3.9709
1.3005
1.2827
1.2649
0.0001
BRUKER
NAME CLJ-WL-SZ134
EXPNO 1
PROCNO 1
Date_ 20191219
Time 19.33
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 41.07
DW 62.400 usec
DE 6.50 usec
TE 300.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300199 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
H
N
OEt
O
Cl
8b
9
8
7
6
5
4
3
2
1
ppm
0.98
1.00
2.08
0.99
1.98
1.10
0.98
1.05
2.14
1.98
3.10


153.757
135.846
134.734
129.661
129.095
128.395
124.963
123.718
122.240
118.912
118.491
115.495
112.081
101.829
77.317
77.000
76.682
61.173
30.676
14.524
BRUKER
NAME 2019-12-26 shaozhong-134
EXPNO 1
PROCNO 1
Date_ 20191226
Time 16.25 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 295.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127762 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
Cl
H
N
OEt
O
8b
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

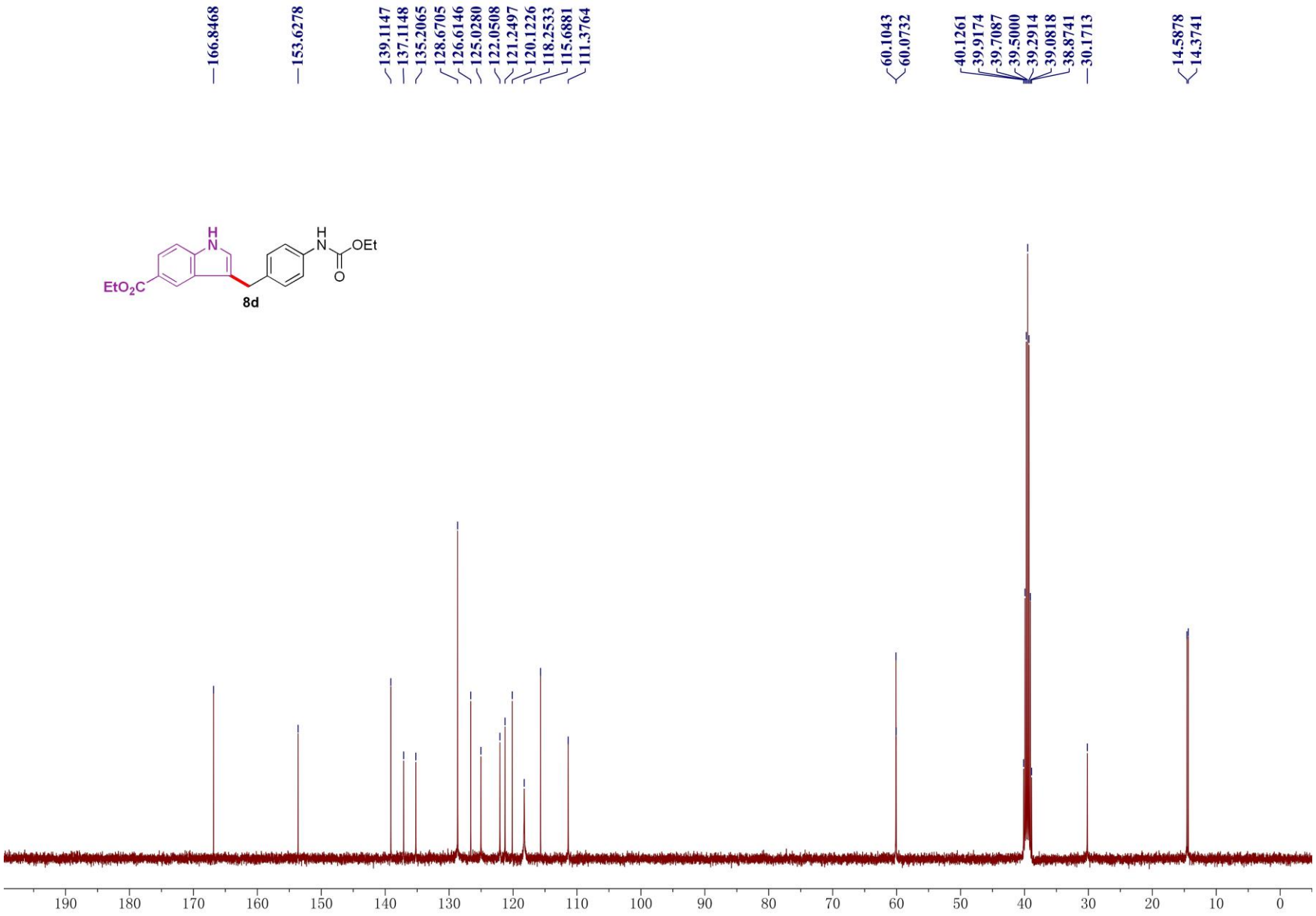

11.4462
9.4967
7.9647
7.5337
7.5126
7.4237
7.4205
7.4026
7.3993
7.3861
7.3641
7.2316
7.2106
4.1447
4.1270
4.1093
4.0916
4.0180
3.3618
2.5302
2.5263
1.2631
1.2454
1.2277
0.0001
NC
H
N
H
N
OEt
O
8c
BRUKER
NAME CLJ-WL-SZ131
EXPNO 1
PROCNO 1
Date_ 20191217
Time 18.28
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 70.36
DW 62.400 usec
DE 6.50 usec
TE 300.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1299927 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
11
10
9
8
7
6
5
4
3
2
1
ppm
0.98
0.98
0.97
1.00
3.94
1.99
2.00
1.99
3.33

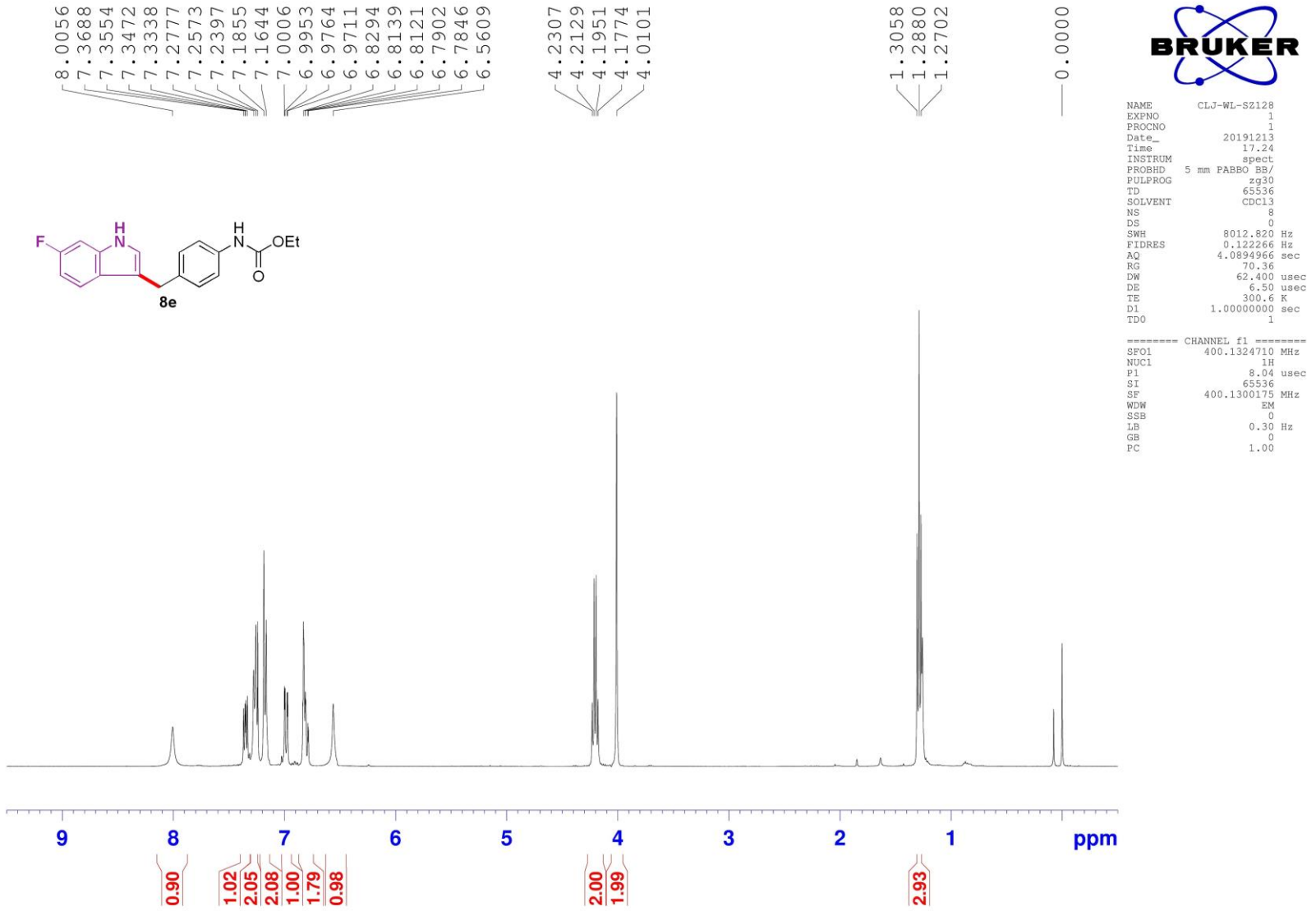

153.561
138.082
137.063
135.052
128.692
126.755
125.676
124.269
123.677
120.866
118.273
115.599
112.694
100.293
60.005
40.126
39.917
39.709
39.500
39.291
39.083
38.874
29.897
14.527
BRUKER
NAME 2019-12-20 shaozhong-SZ131
EXPNO 1
PROCNO 1
Date_ 20191221
Time 22.09 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 256
DS 0
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6128155 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
NC
H
N
H
N
OEt
O
8c
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm



BRUKER

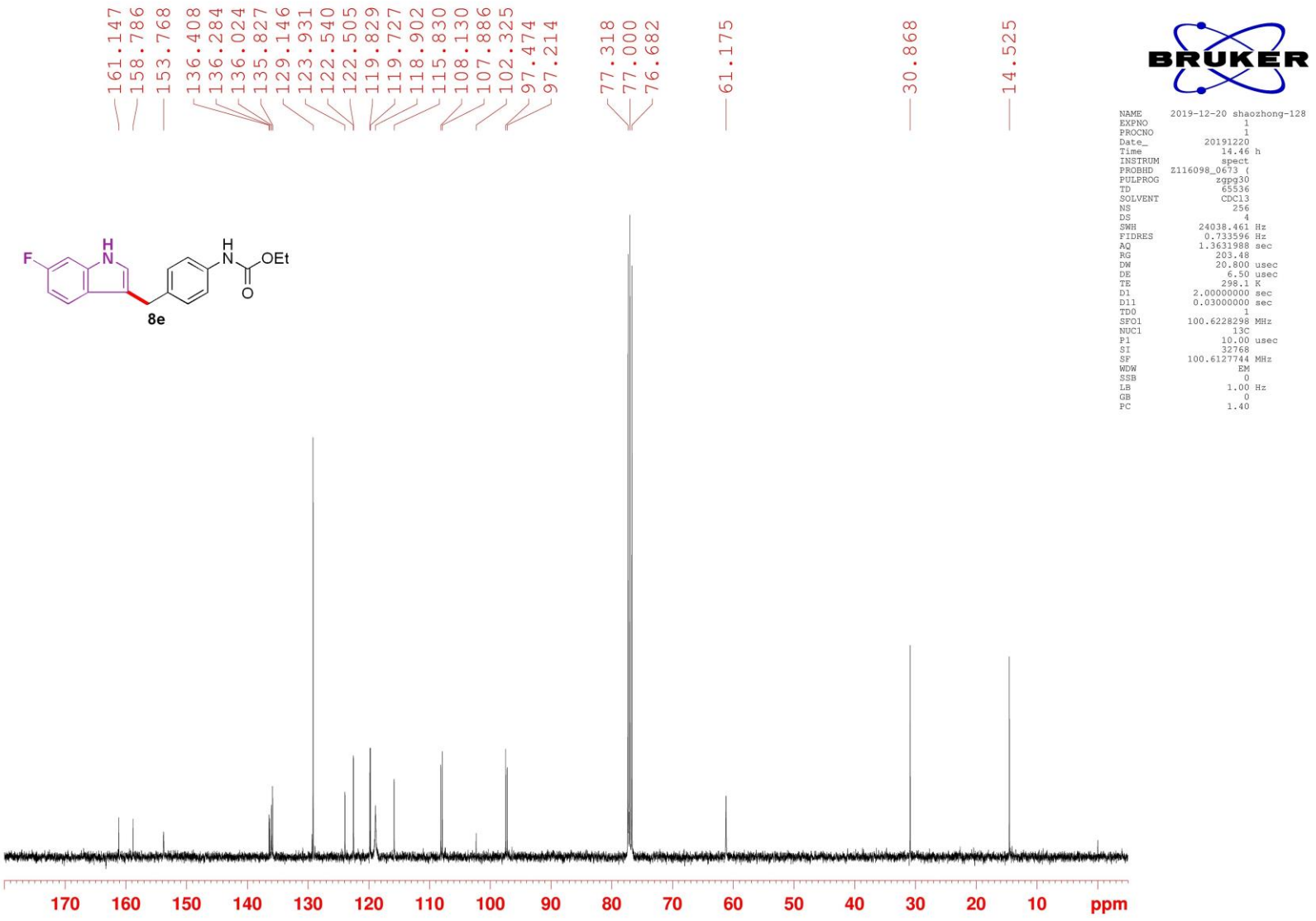
NAME	CLJ-WL-SZ141
EXPNO	1
PROCNO	1
Date_	20191225
Time	20.44
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	36.4
DW	62.400 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300000 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

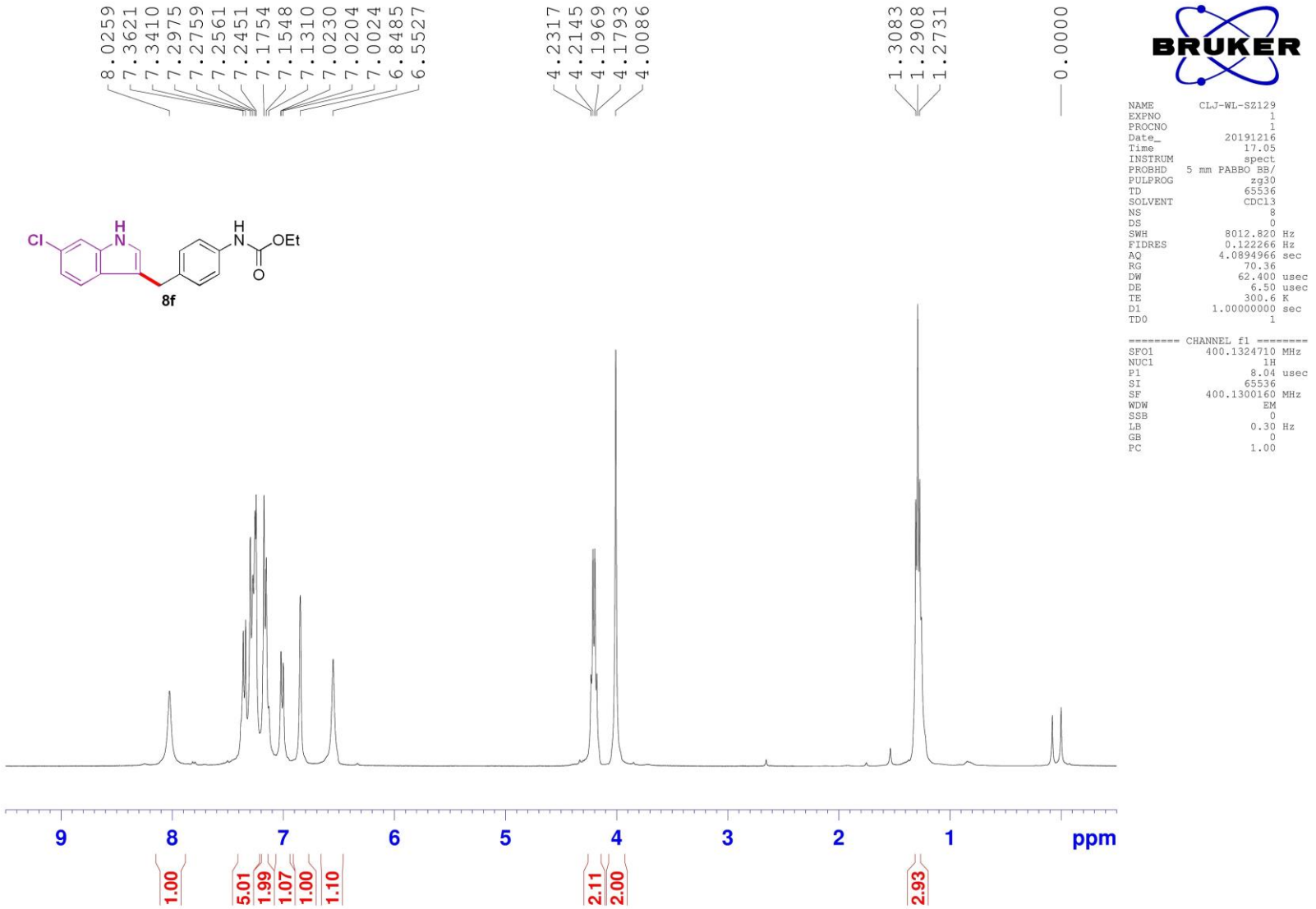

166.8468
153.6278
139.1147
137.1148
135.2065
128.6705
126.6146
125.0280
122.0508
121.2497
120.1226
118.2533
115.6881
111.3764
60.1043
60.0732
40.1261
39.9174
39.7087
39.5000
39.2914
39.0818
38.8741
30.1713
14.5878
14.3741
EtO2C
H
N
H
N
OEt
O
8d
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0



BRUKER

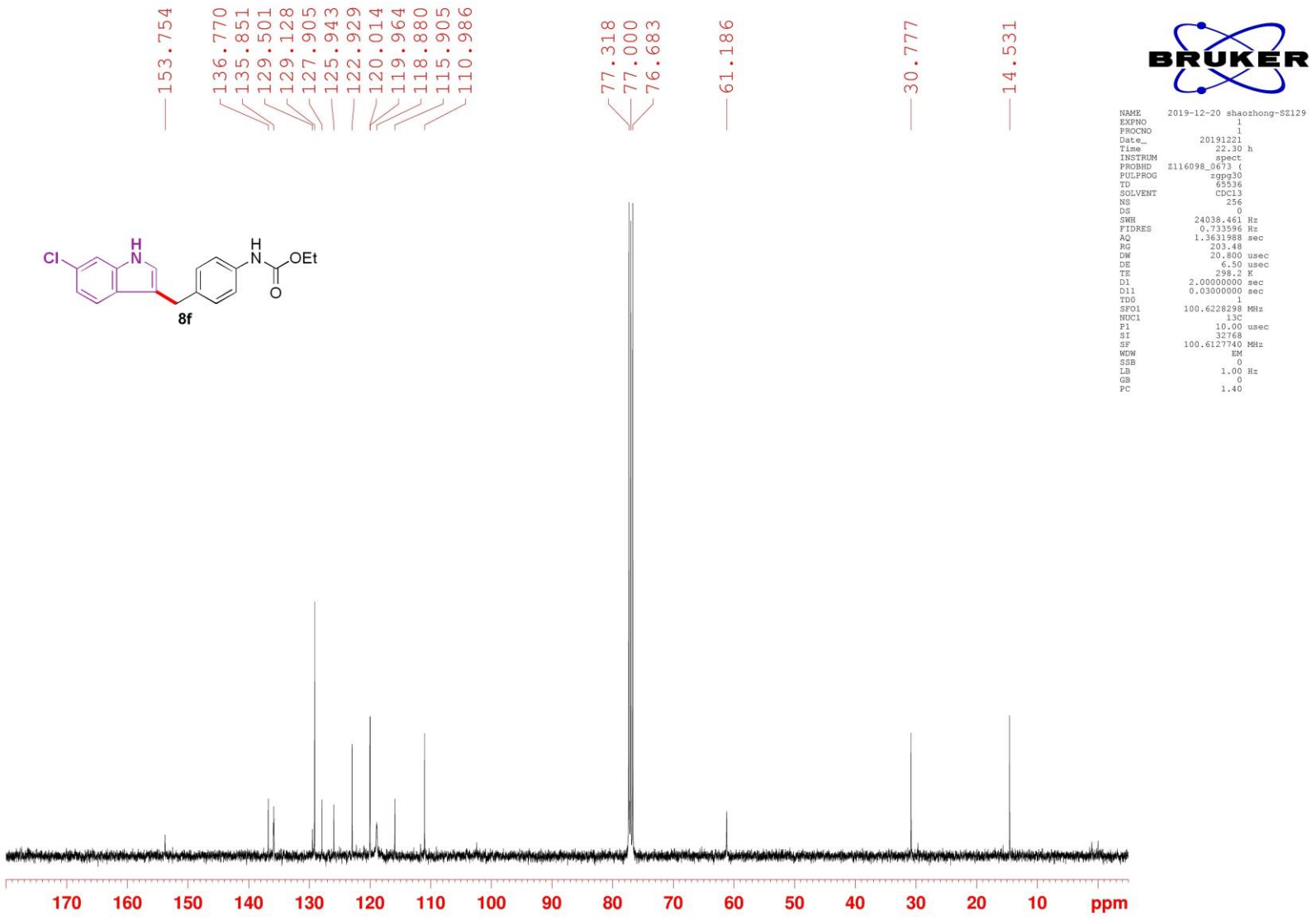
NAME	CLJ-WL-SZ128
EXPNO	1
PROCNO	1
Date_	20191213
Time	17.24
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	70.36
DW	62.400 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300175 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

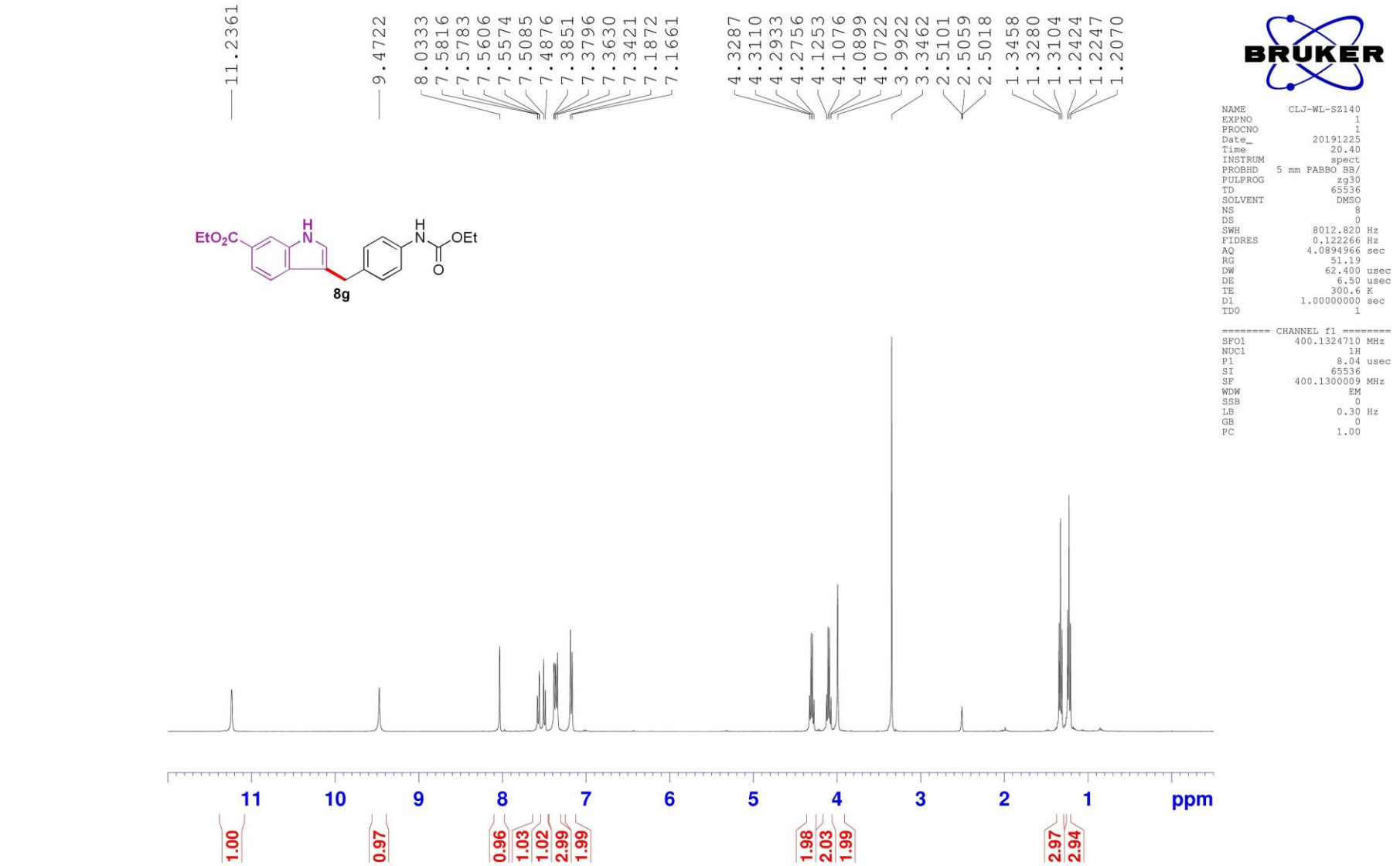

161.147
158.786
153.768
136.408
136.284
136.024
135.827
129.146
123.931
122.540
122.505
119.829
119.727
118.902
115.830
108.130
107.886
102.325
97.474
97.214
77.318
77.000
76.682
61.175
30.868
14.525
BRUKER
NAME 2019-12-20 shaozhong-128
EXPNO 1
PROCNO 1
Date_ 20191220
Time 14.46 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127744 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
F
H
N
H
N
OEt
O
8e
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm



BRUKER

NAME	CLJ-WL-SZ129
EXPNO	1
PROCNO	1
Date_	20191216
Time	17.05
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	70.36
DW	62.400 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300160 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00


153.754
136.770
135.851
129.501
129.128
127.905
125.943
122.929
120.014
119.964
118.880
115.905
110.986
77.318
77.000
76.683
61.186
30.777
14.531
BRUKER
NAME 2019-12-20 shaozhong-SZ129
EXPNO 1
PROCNO 1
Date_ 20191221
Time 22.30 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 0
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127740 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
Cl
H
N
H
N
OEt
O
8f
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

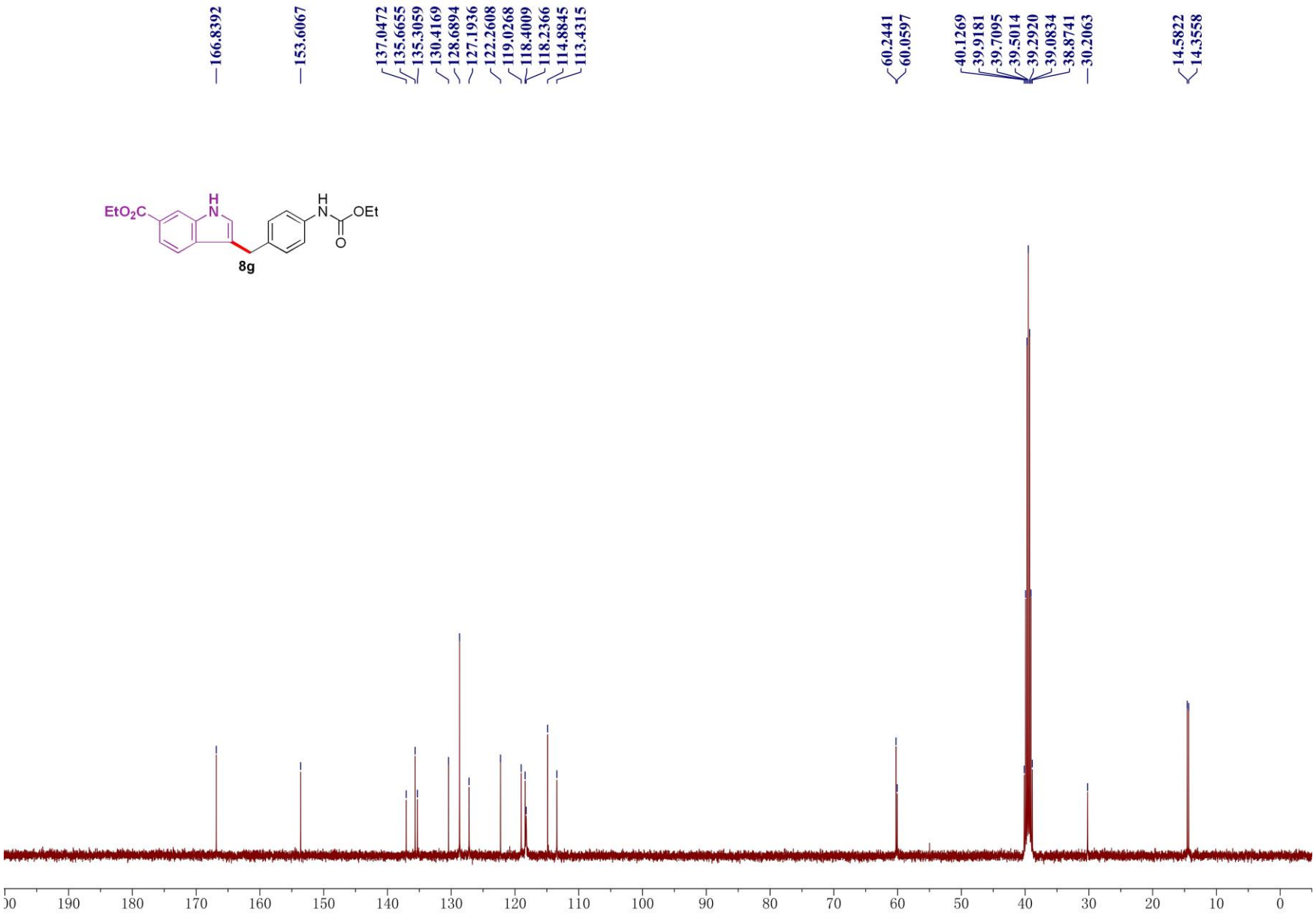


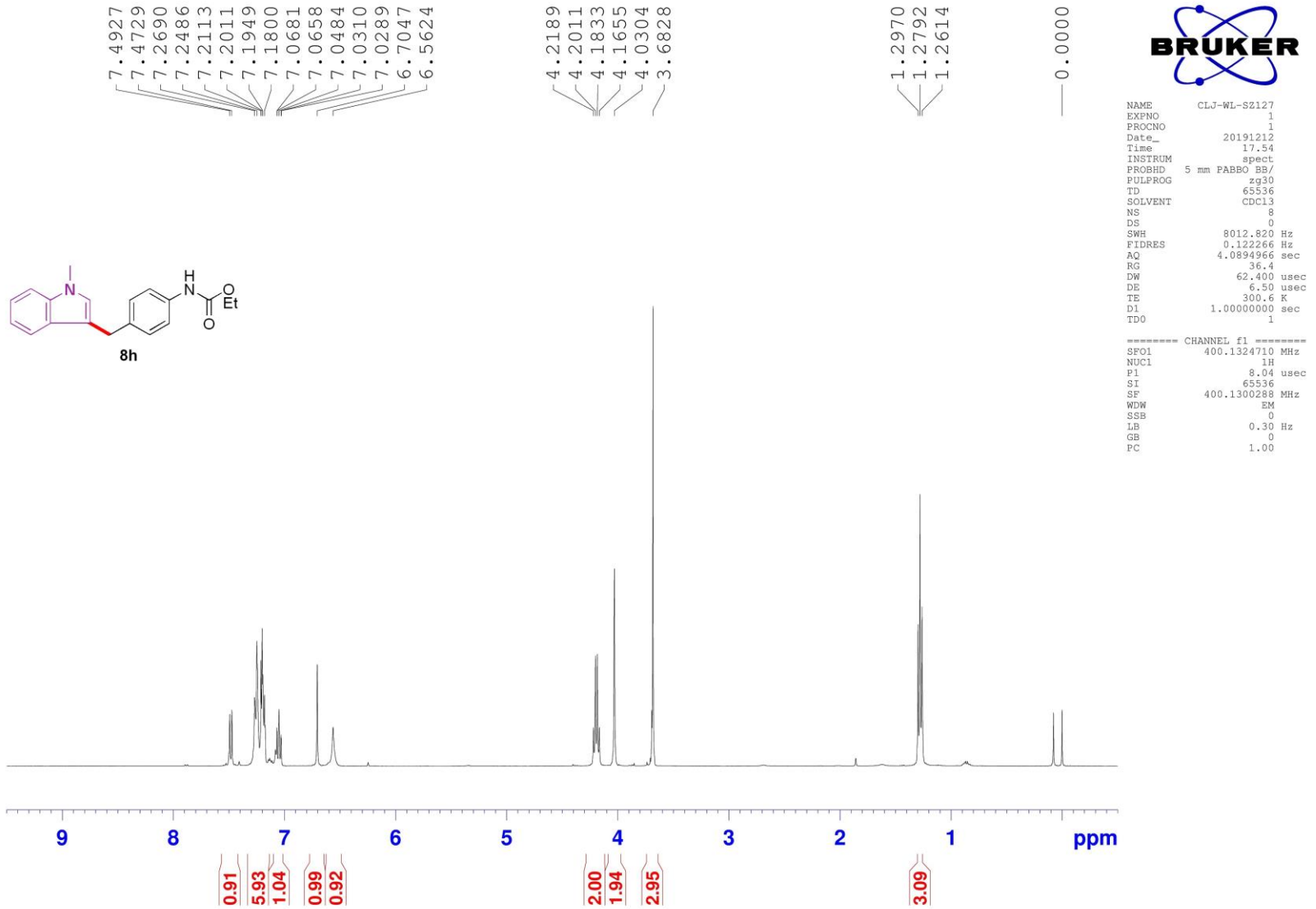
BRUKER

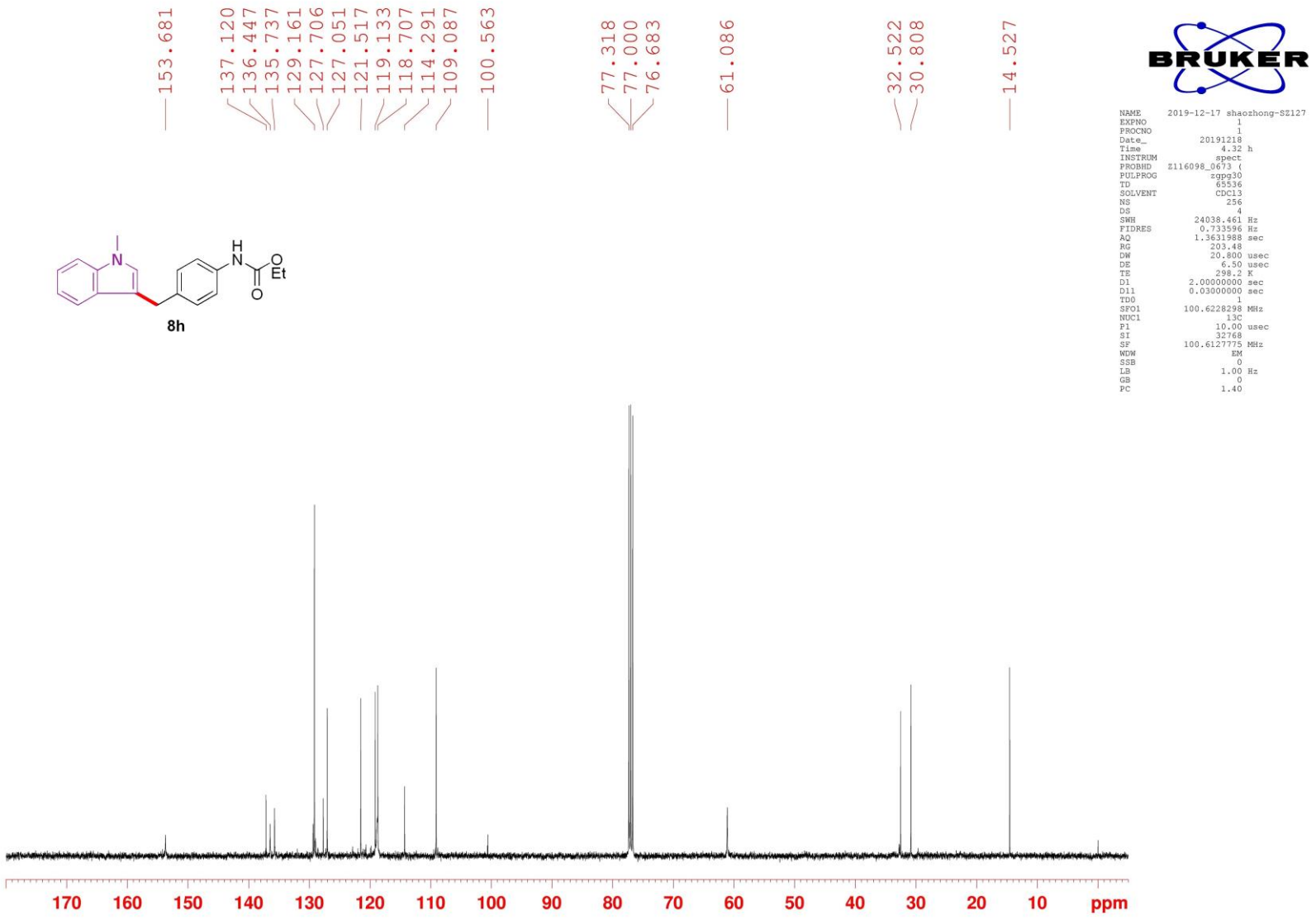
NAME	CLJ-WL-SZ140
EXPNO	1
PROCNO	1
Date_	20191225
Time	20.40
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	51.19
DW	62.400 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1

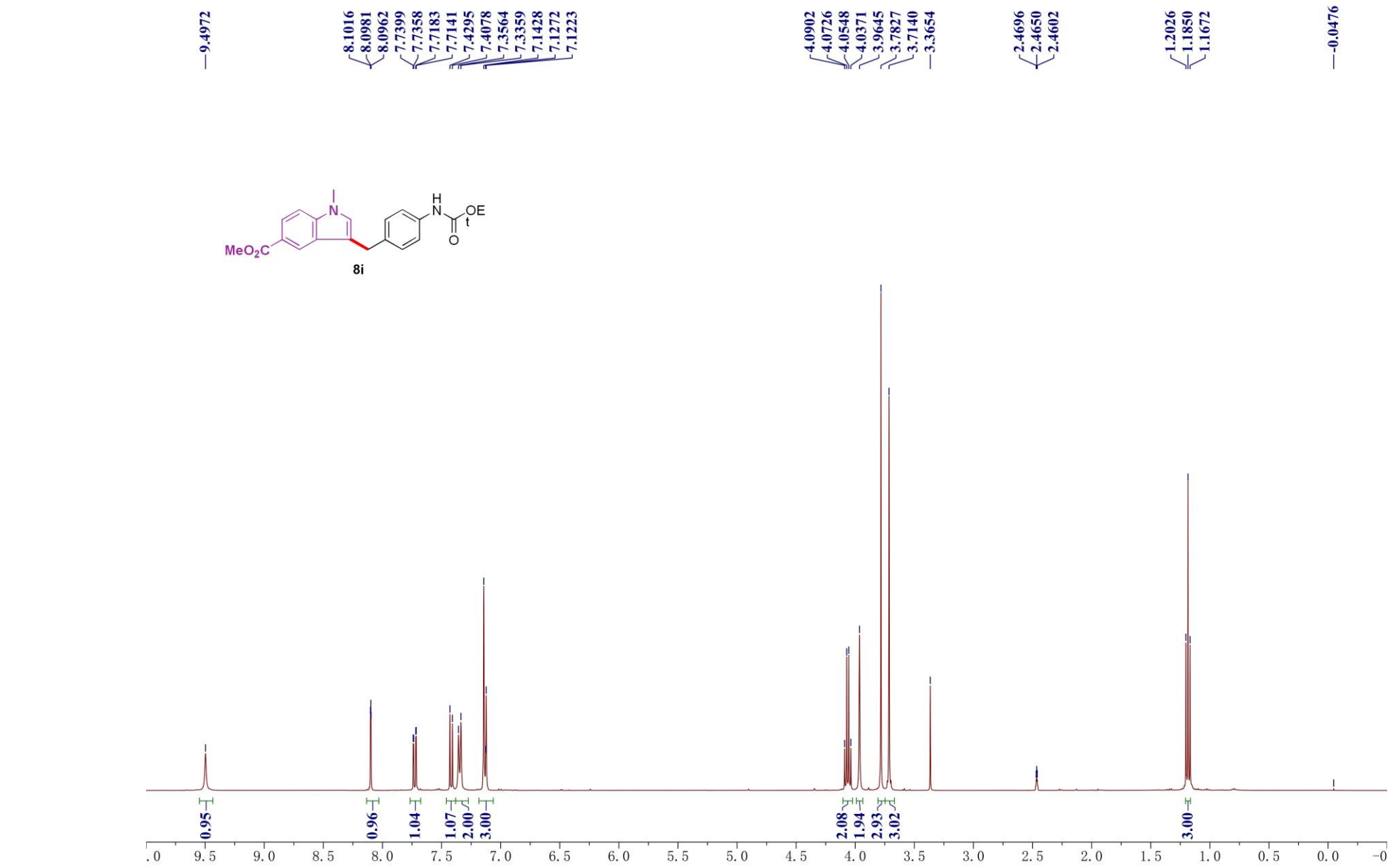
======== CHANNEL f1 ========

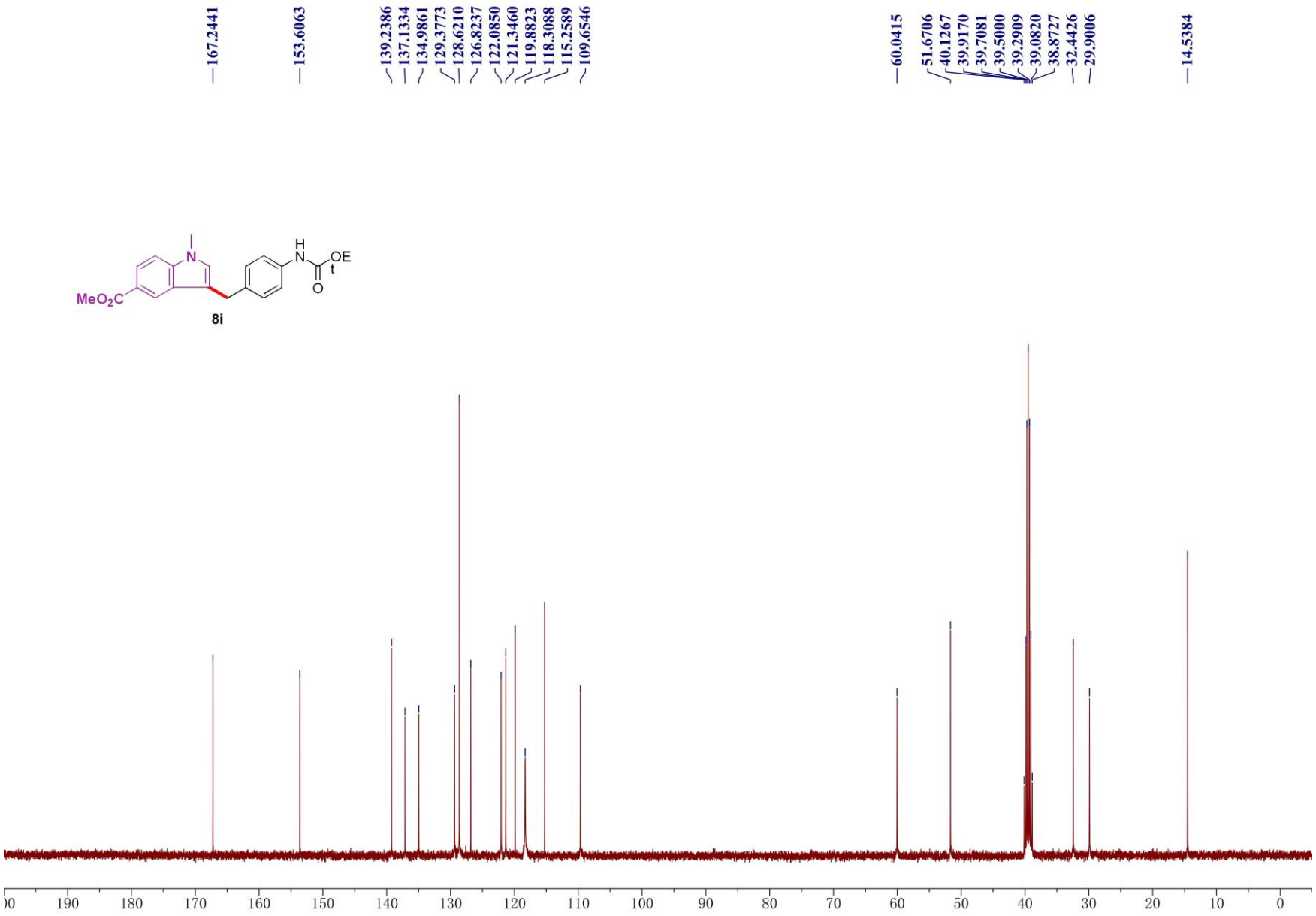
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300009 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

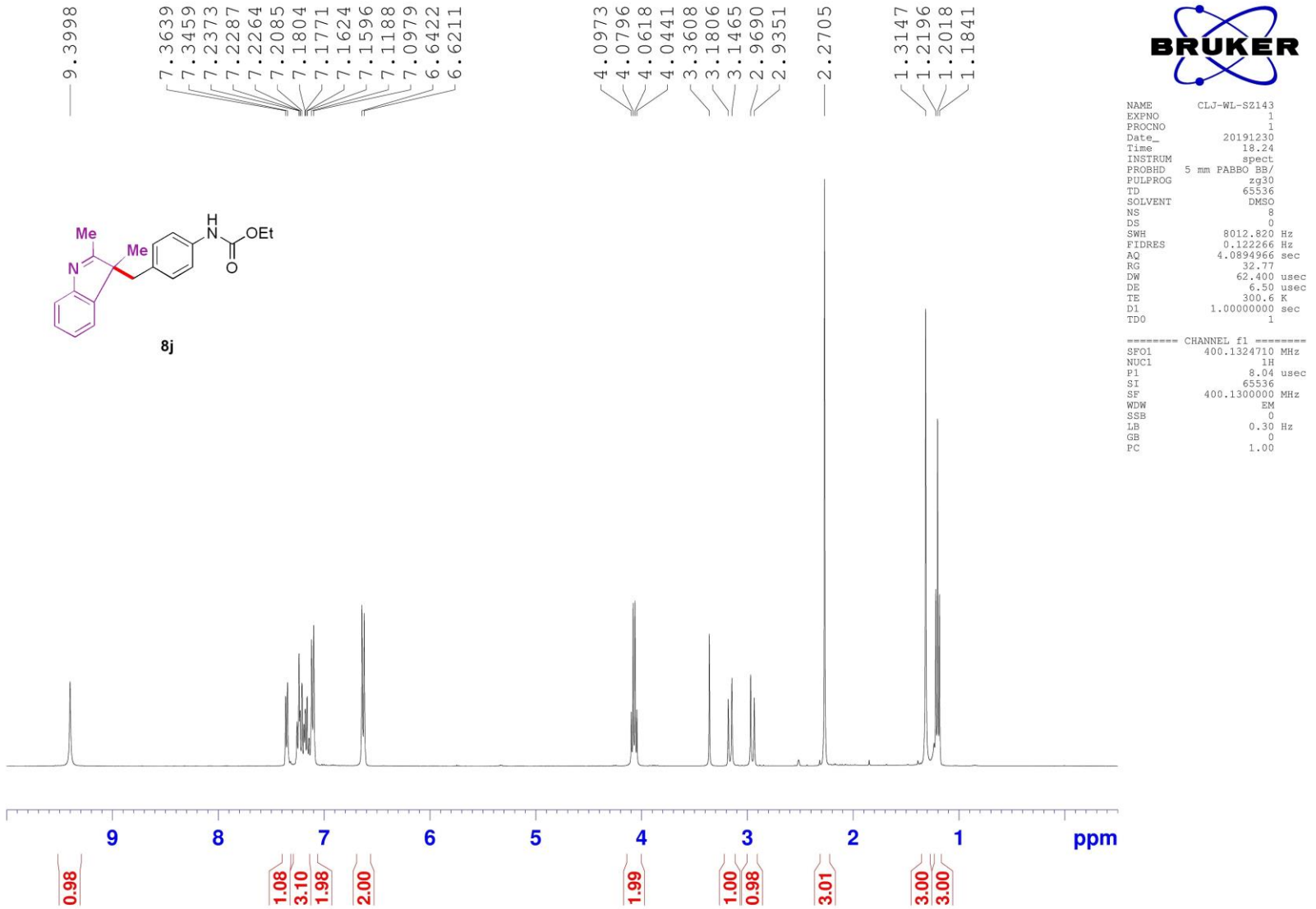

166.8392
153.6067
137.0472
135.6655
135.3059
130.4169
128.6894
127.1936
122.2608
119.0268
118.4009
118.2366
114.8845
113.4315
60.2441
60.0597
40.1269
39.9181
39.7095
39.5014
39.2920
39.0834
38.8741
30.2063
14.5822
14.3558
EtO2C
H
N
H
N
OEt
O
8g
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0


7.4927
7.4729
7.2690
7.2486
7.2113
7.2011
7.1949
7.1800
7.0681
7.0658
7.0484
7.0310
7.0289
6.7047
6.5624
4.2189
4.2011
4.1833
4.1655
4.0304
3.6828
1.2970
1.2792
1.2614
0.0000
BRUKER
NAME CLJ-WL-SZ127
EXPNO 1
PROCNO 1
Date_ 20191212
Time 17.54
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 36.4
DW 62.400 usec
DE 6.50 usec
TE 300.6 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300288 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8h
9
8
7
6
5
4
3
2
1
ppm
0.91
5.93
1.04
0.99
0.92
2.00
1.94
2.95
3.09


153.681
137.120
136.447
135.737
129.161
127.706
127.051
121.517
119.133
118.707
114.291
109.087
100.563
77.318
77.000
76.683
61.086
32.522
30.808
14.527
BRUKER
NAME 2019-12-17 shaozhong-SZ127
EXPNO 1
PROCNO 1
Date_ 20191218
Time 4.32 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127775 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
N
H
N
O
Et
O
8h
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

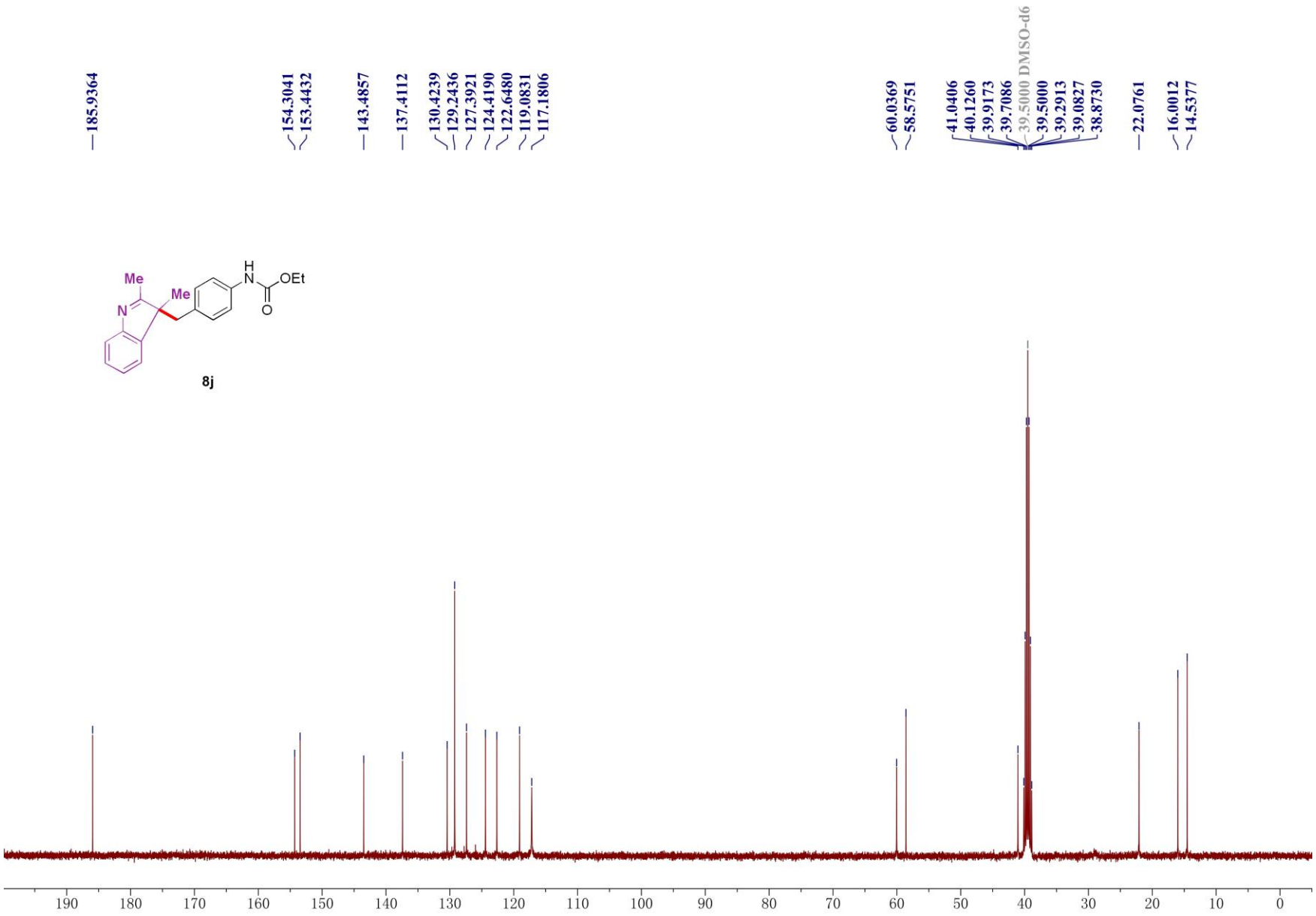

9.4972
8.1016
8.0981
8.0962
7.7399
7.7358
7.7183
7.7141
7.4295
7.4078
7.3564
7.3359
7.1428
7.1272
7.1223
4.0902
4.0726
4.0548
4.0371
3.9645
3.7827
3.7140
3.3654
2.4696
2.4650
2.4602
1.2026
1.1850
1.1672
-0.0476
MeO2C
N
H
N
OE
t
O
8i
0.95
0.96
1.04
1.07
2.00
3.00
2.08
1.94
2.93
3.02
3.00

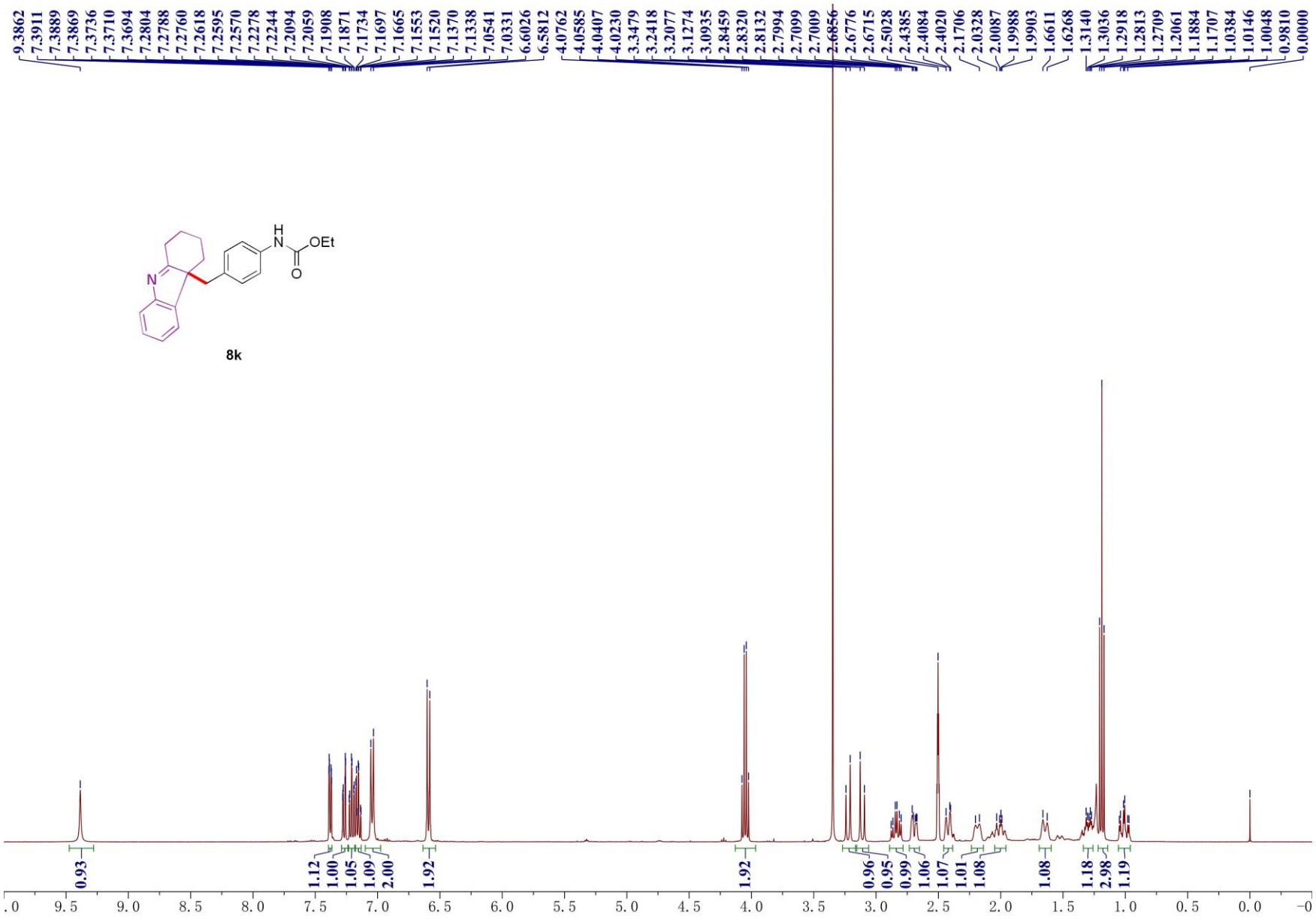

167.2441
153.6063
139.2386
137.1334
134.9861
129.3773
128.6210
126.8237
122.0850
121.3460
119.8823
118.3088
115.2589
109.6546
60.0415
51.6706
40.1267
39.9170
39.7081
39.5000
39.2909
39.0820
38.8727
32.4426
29.9006
14.5384
MeO2C
N
H
N
OE
t
O
8i
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

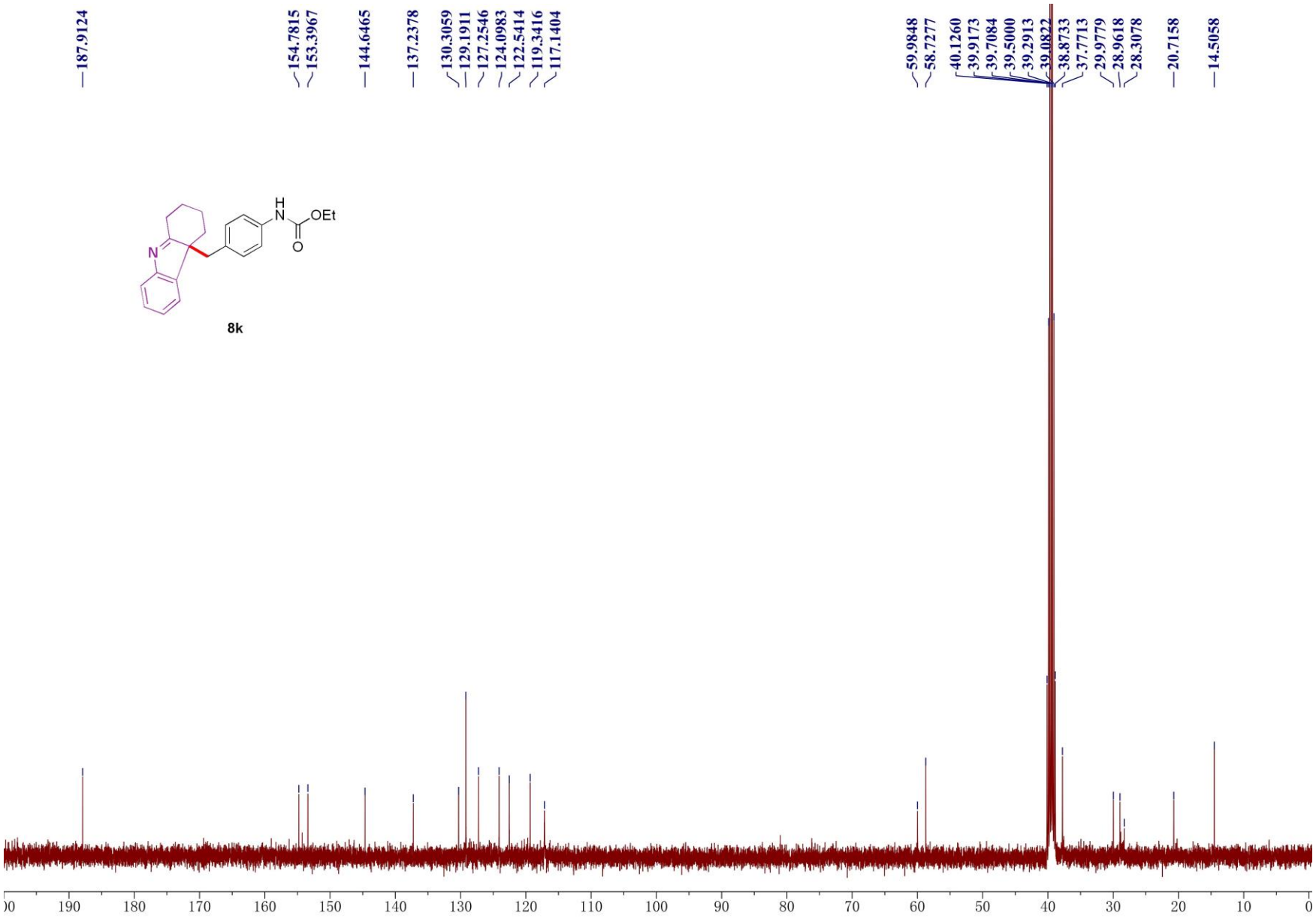


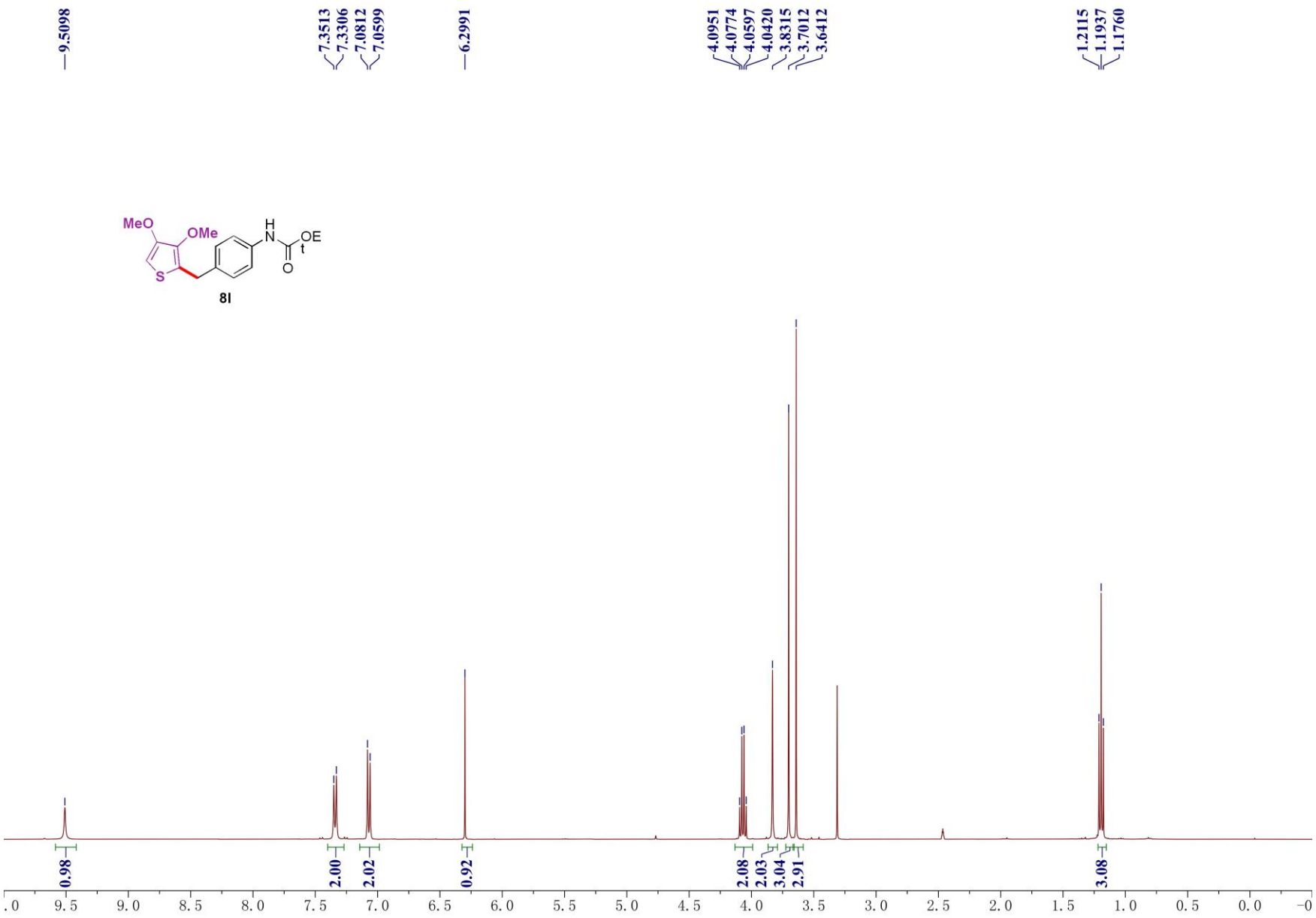
BRUKER

NAME	CLJ-WL-SZ143
EXPNO	1
PROCNO	1
Date_	20191230
Time	18.24
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	DMSO
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	32.77
DW	62.400 usec
DE	6.50 usec
TE	300.6 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300000 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00


185.9364
154.3041
153.4432
143.4857
137.4112
130.4239
129.2436
127.3921
124.4190
122.6480
119.0831
117.1806
60.0369
58.5751
41.0406
40.1260
39.9173
39.7086
39.5000 DMSO-d6
39.5000
39.2913
39.0827
38.8730
22.0761
16.0012
14.5377
Me
Me
N
H
N
OEt
O
8j
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

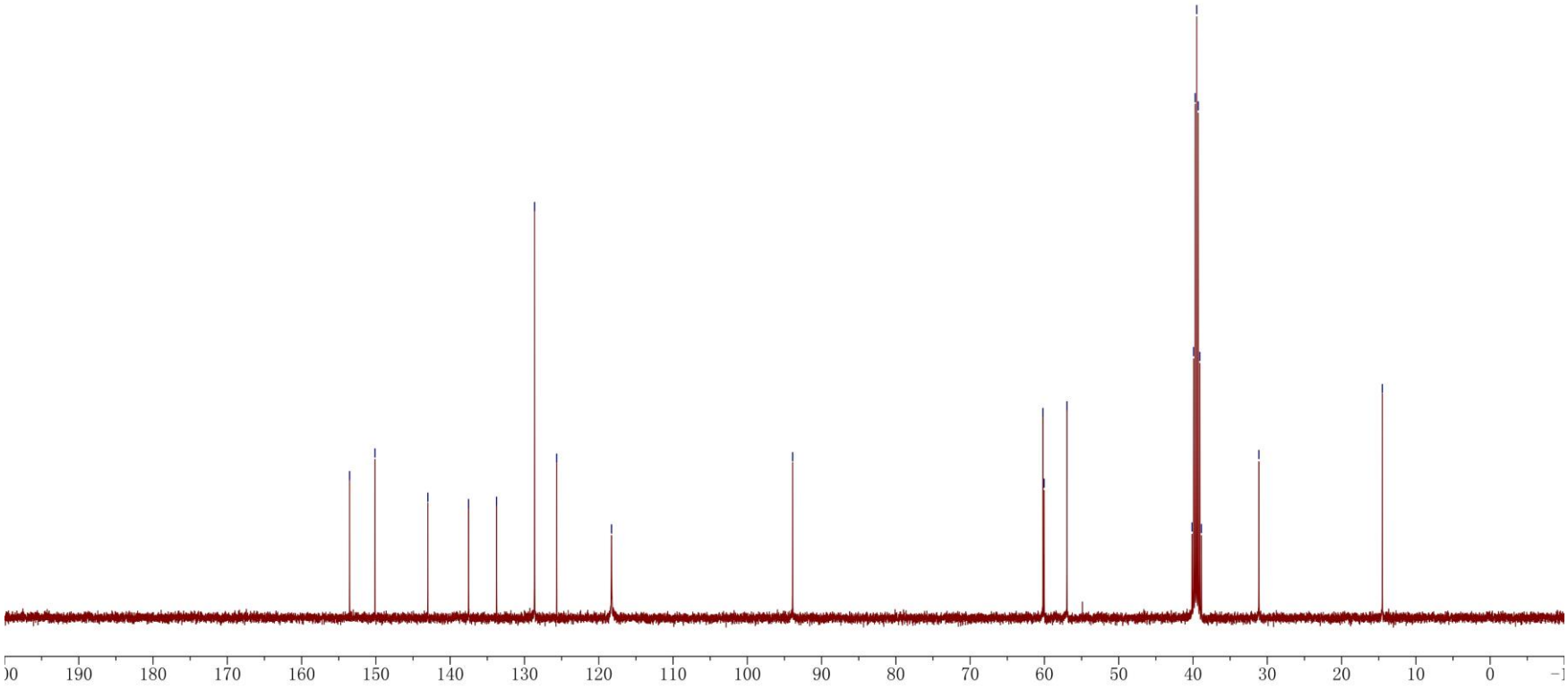

9.3862
7.3911
7.3889
7.3869
7.3736
7.3710
7.3694
7.2804
7.2788
7.2760
7.2618
7.2595
7.2570
7.2278
7.2244
7.2094
7.2059
7.1908
7.1871
7.1734
7.1697
7.1665
7.1553
7.1520
7.1370
7.1338
7.0541
7.0331
6.6026
6.5812
4.0762
4.0585
4.0407
4.0230
3.3479
3.2418
3.2077
3.1274
3.0935
2.8459
2.8320
2.8132
2.7994
2.7099
2.7009
2.6856
2.6776
2.6715
2.5028
2.4385
2.4084
2.4020
2.1706
2.0328
2.0087
1.9988
1.9903
1.6611
1.6268
1.3140
1.3036
1.2918
1.2813
1.2709
1.2061
1.1884
1.1707
1.0384
1.0146
1.0048
0.9810
0.0000
H
N
OEt
O
N
8k
0.93
1.12
1.00
1.05
1.09
2.00
1.92
1.92
0.96
0.95
0.99
1.06
1.07
1.01
1.08
1.08
1.18
2.98
1.19
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0

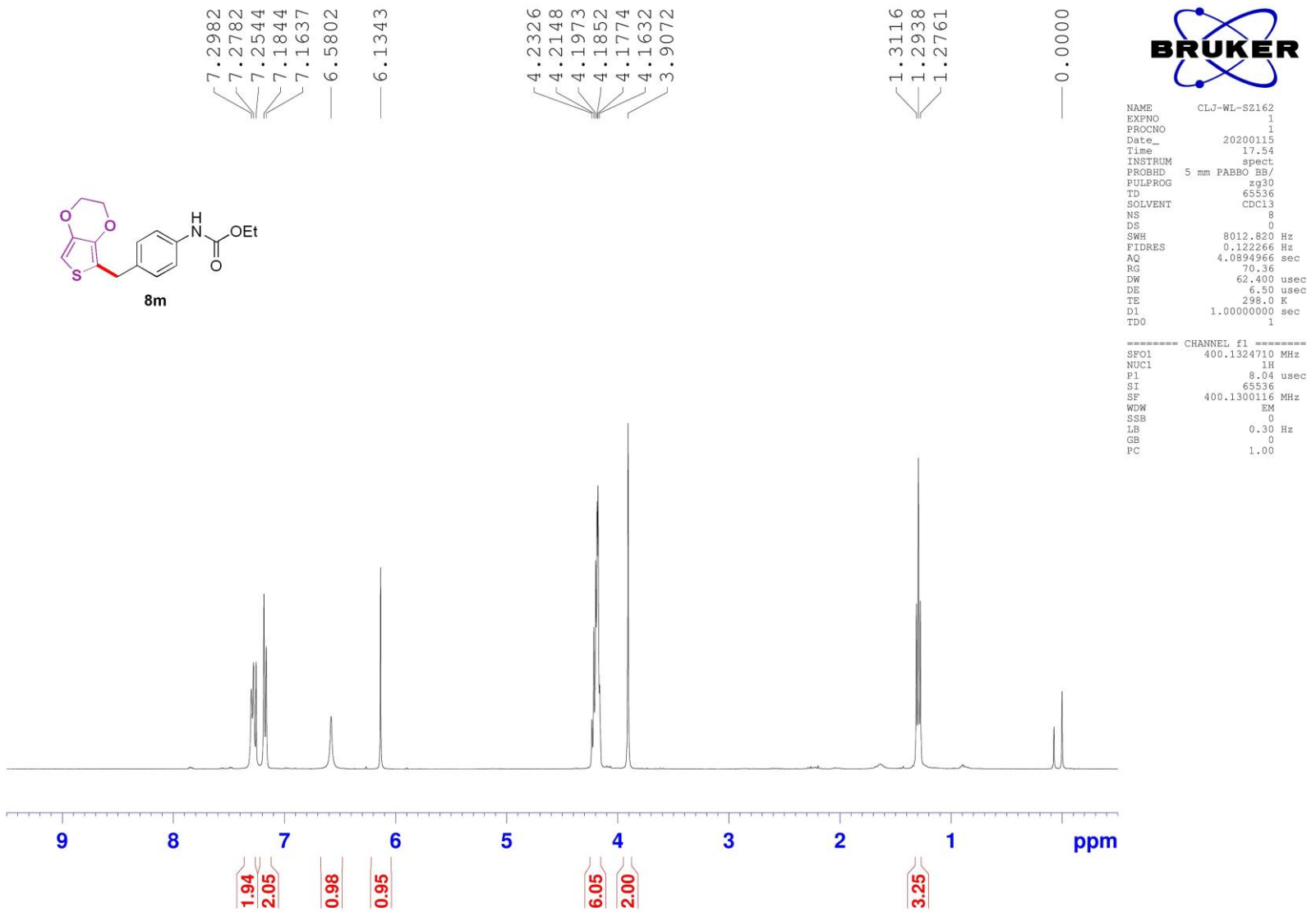

187.9124
154.7815
153.3967
144.6465
137.2378
130.3059
129.1911
127.2546
124.0983
122.5414
119.3416
117.1404
59.9848
58.7277
40.1260
39.9173
39.7084
39.5000
39.2913
39.0822
38.8733
37.7713
29.9779
28.9618
28.3078
20.7158
14.5058
H
N
OEt
O
N
8k
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0


9.5098
7.3513
7.3306
7.0812
7.0599
6.2991
4.0951
4.0774
4.0597
4.0420
3.8315
3.7012
3.6412
1.2115
1.1937
1.1760
MeO
OMe
H
N
OE
t
O
S
8l
0.98
2.00
2.02
0.92
2.08
2.03
3.04
2.91
3.08

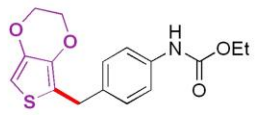
153.5419
150.1126
143.0031
137.5228
133.7556
128.6407
125.6641
118.2814
93.8994
60.1941
60.0429
56.9670
40.1260
39.9173
39.7088
39.5000
39.2914
39.0828
38.8735
31.1311
14.5108

8l

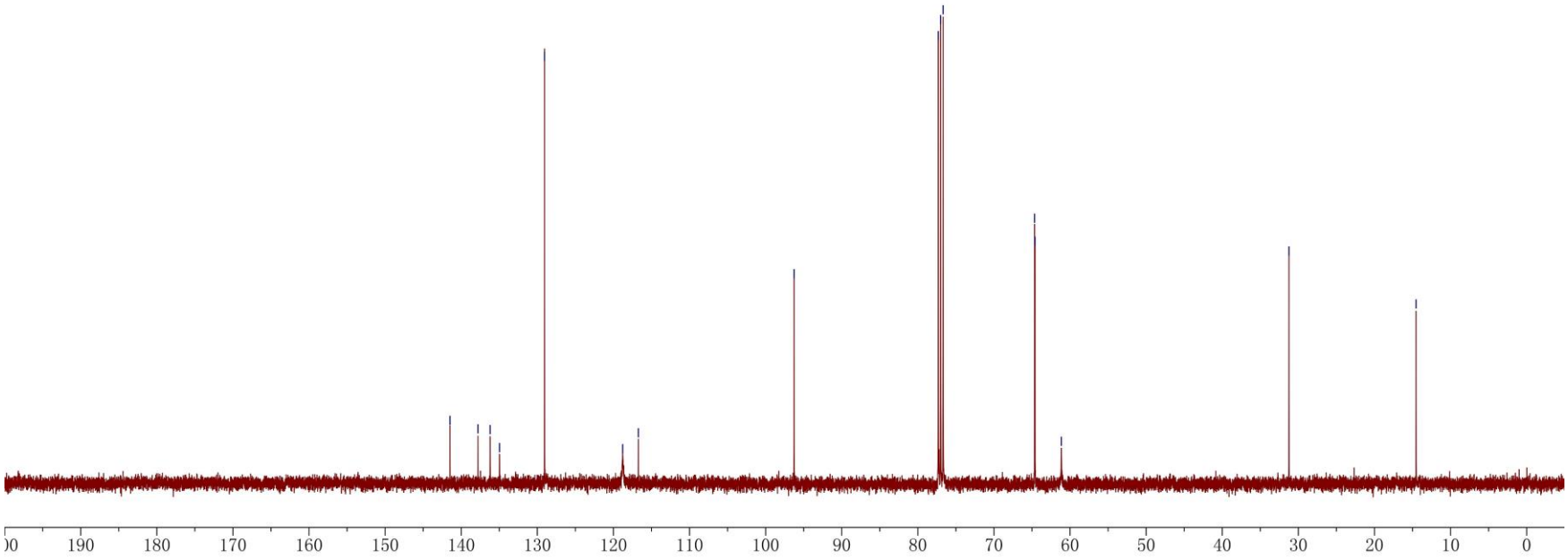


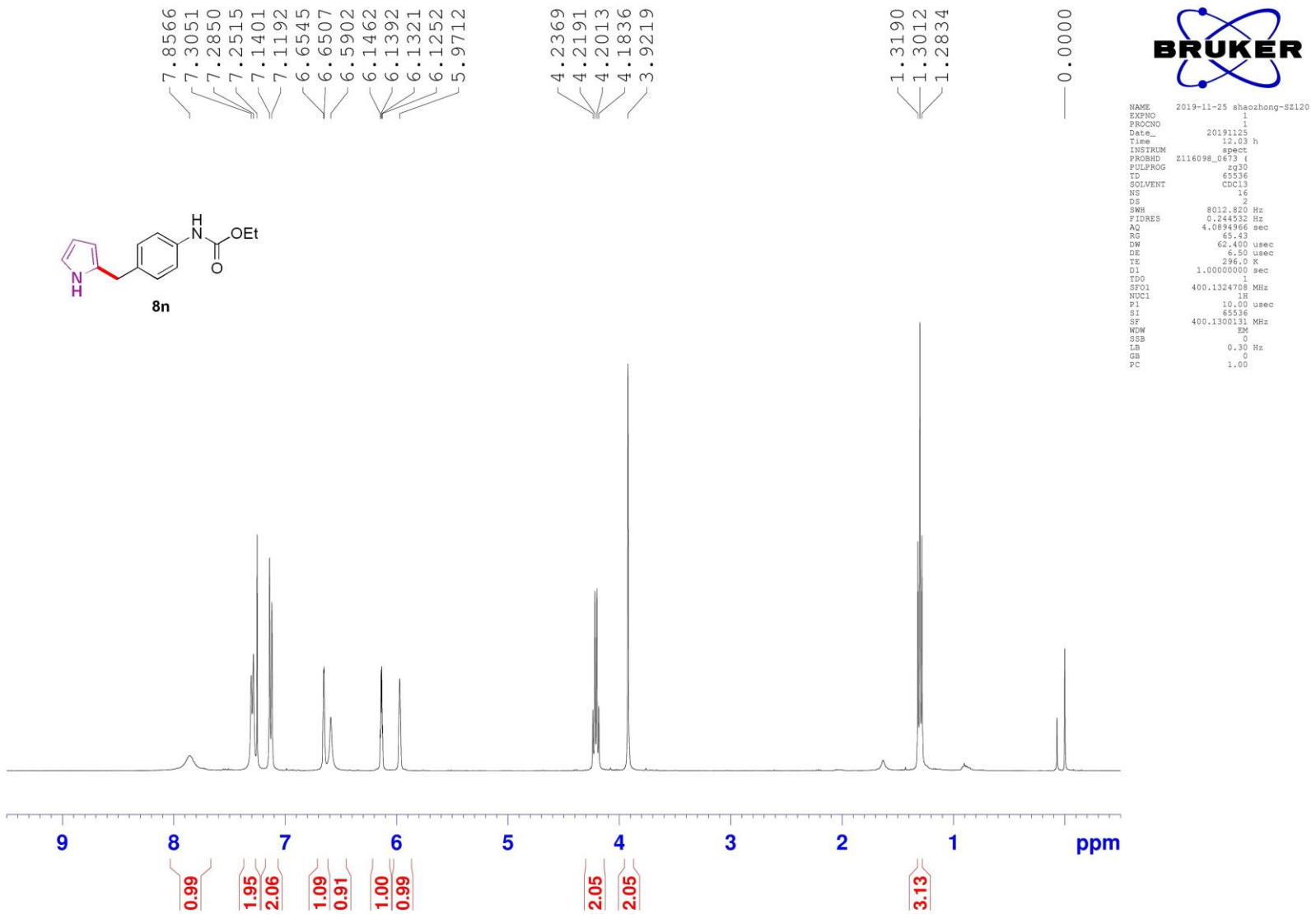

7.2982
7.2782
7.2544
7.1844
7.1637
6.5802
6.1343
4.2326
4.2148
4.1973
4.1852
4.1774
4.1632
3.9072
1.3116
1.2938
1.2761
0.0000
BRUKER
NAME CLJ-WL-SZ162
EXPNO 1
PROCNO 1
Date_ 20200115
Time 17.54
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 8
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 70.36
DW 62.400 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300116 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
S
H
N
OEt
O
8m
9
8
7
6
5
4
3
2
1
ppm
1.94
2.05
0.98
0.95
6.05
2.00
3.25

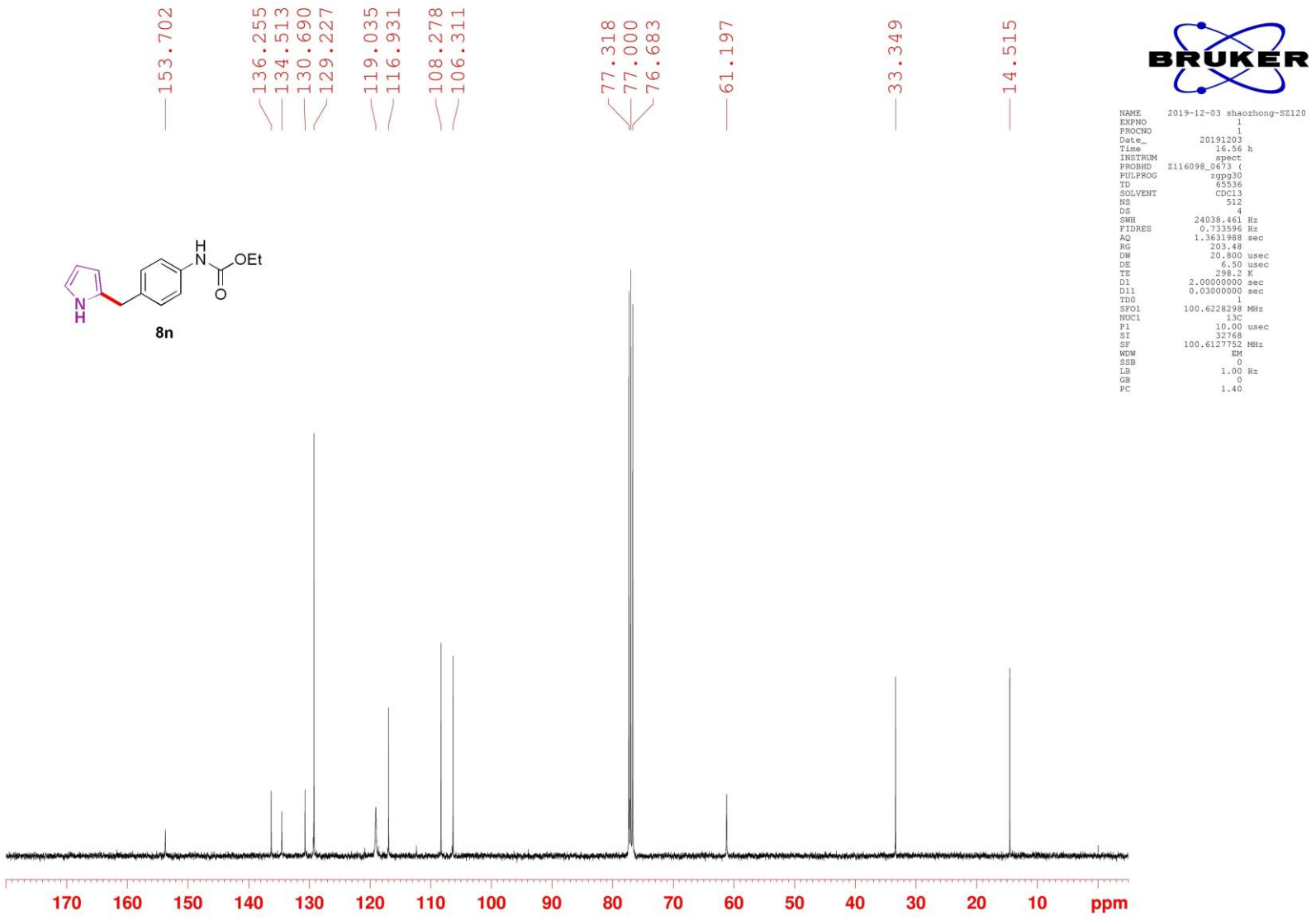
141.4711
137.7980
136.2010
134.9733
129.0545
118.7809
116.7196
96.2563
77.3172
76.9994
76.6813
64.6590
64.6016
61.1459
31.2360
14.5327

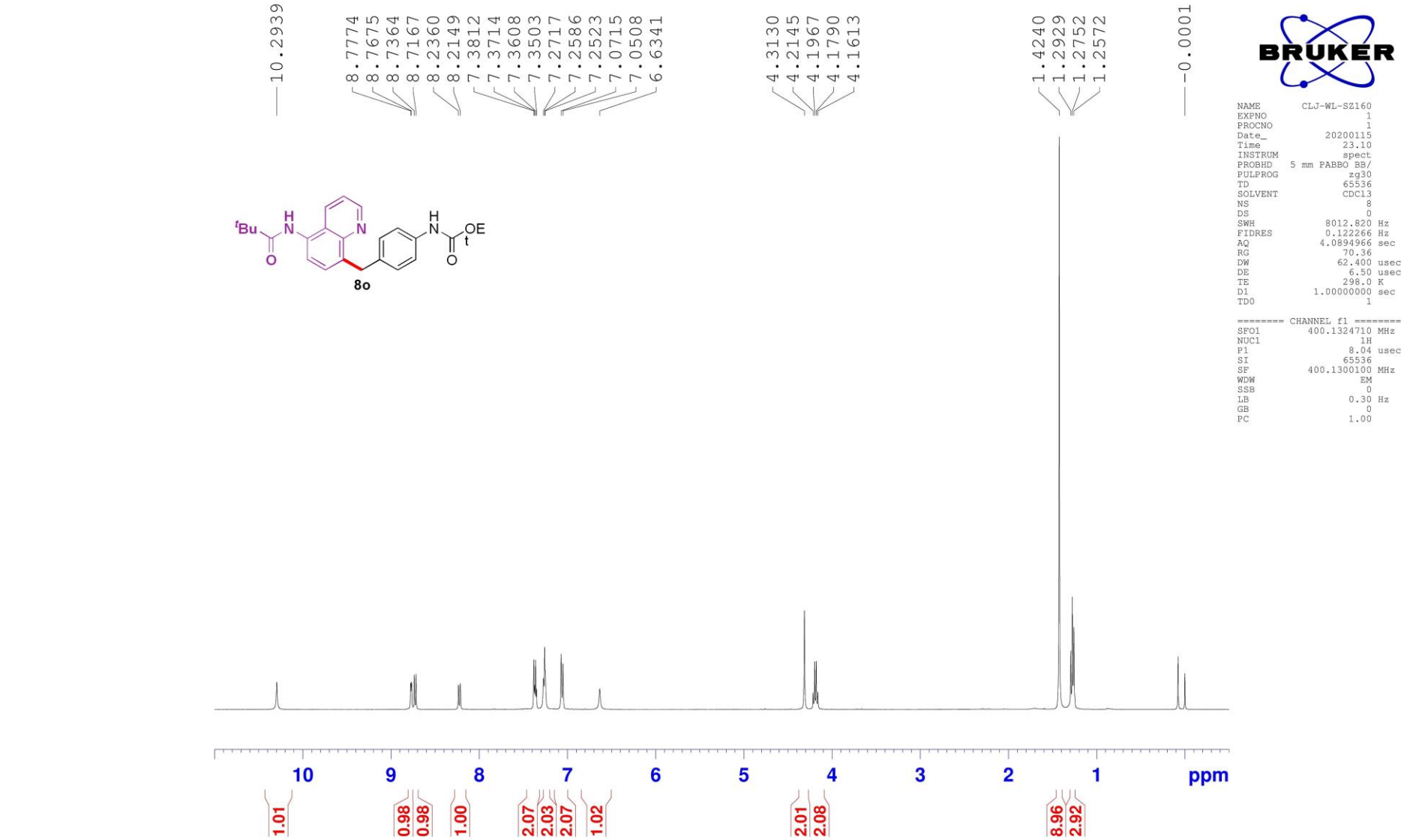


8m



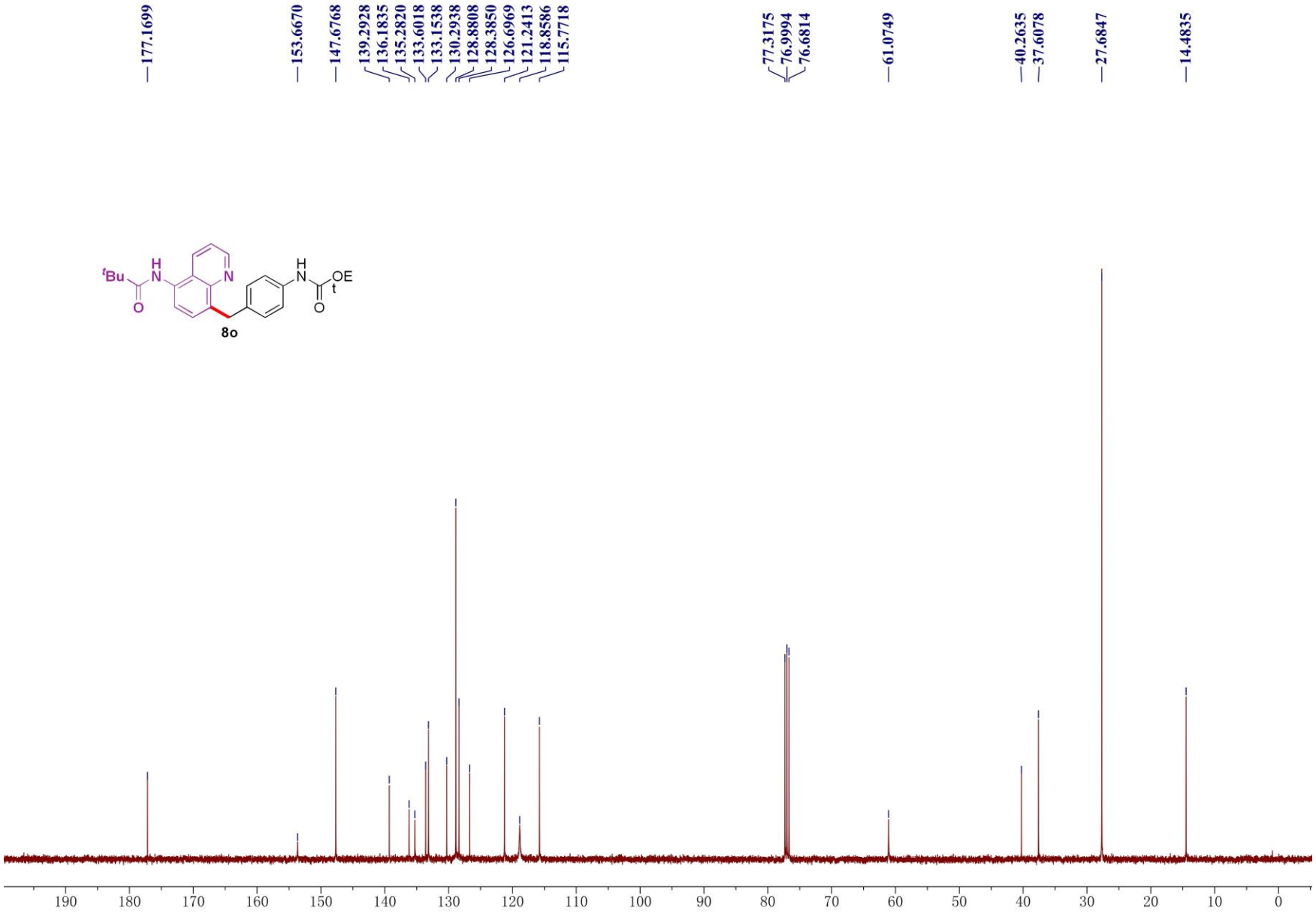

7.8566
7.3051
7.2850
7.2515
7.1401
7.1192
6.6545
6.6507
6.5902
6.1462
6.1392
6.1321
6.1252
5.9712
4.2369
4.2191
4.2013
4.1836
3.9219
1.3190
1.3012
1.2834
0.0000
BRUKER
NAME 2019-11-25 shaozhong-SZ120
EXPNO 1
PROCNO 1
Date_ 20191125
Time 12.03 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894966 sec
RG 65.43
DW 62.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P1 10.00 usec
SI 65536
SF 400.1300131 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
H
N
OEt
O
N
H
8n
9
8
7
6
5
4
3
2
1
ppm
0.99
1.95
2.06
1.09
0.91
1.00
0.99
2.05
2.05
3.13


153.702
136.255
134.513
130.690
129.227
119.035
116.931
108.278
106.311
77.318
77.000
76.683
61.197
33.349
14.515
BRUKER
NAME 2019-12-03 shaozhong-SZ120
EXPNO 1
PROCNO 1
Date_ 20191203
Time 16.56 h
INSTRUM spect
PROBHD Z116098_0673 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631988 sec
RG 203.48
DW 20.800 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127752 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
H
N
OEt
O
N
H
8n
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm



BRUKER

NAME	CLJ-WL-SZ160
EXPNO	1
PROCNO	1
Date_	20200115
Time	23.10
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	70.36
DW	62.400 usec
DE	6.50 usec
TE	298.0 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300100 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00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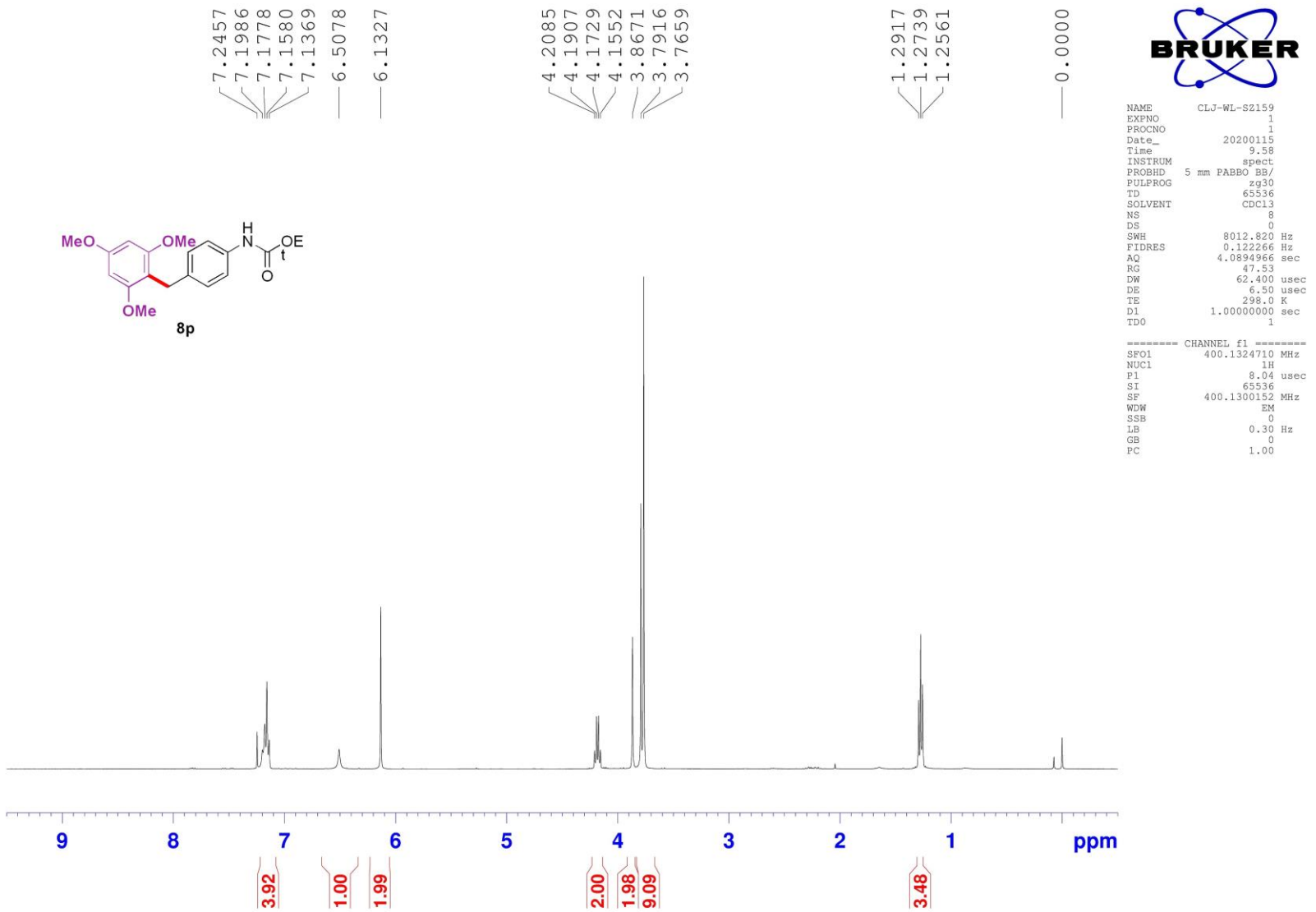
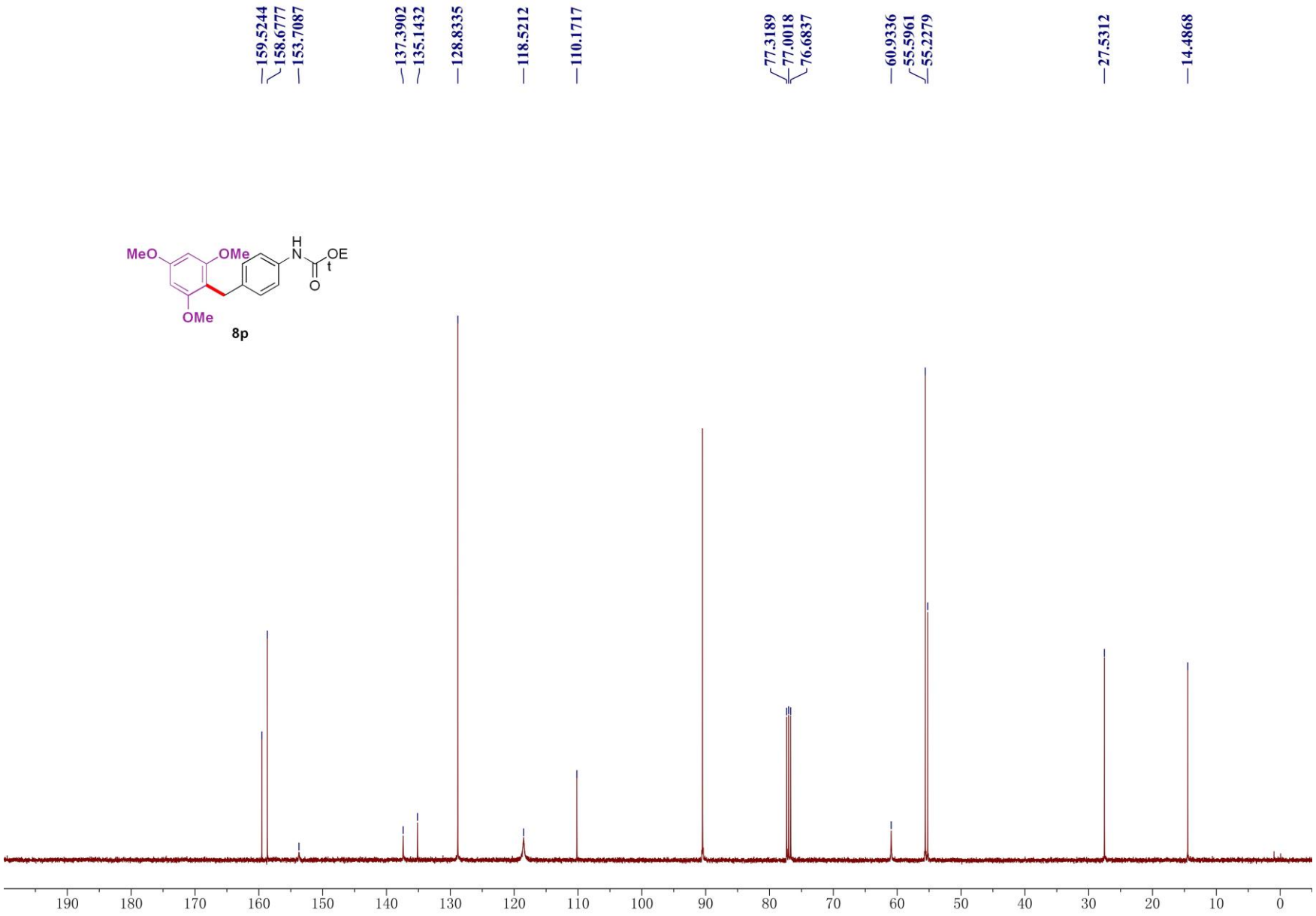
139.2928
136.1835
135.2820
133.6018
133.1538
130.2938
128.8808
128.3850
126.6969
121.2413
118.8586
115.7718
77.3175
76.9994
76.6814
61.0749
40.2635
37.6078
27.6847
14.4835
8o
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0



BRUKER

NAME	CLJ-WL-SZ159
EXPNO	1
PROCNO	1
Date_	20200115
Time	9.58
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	8
DS	0
SWH	8012.820 Hz
FIDRES	0.122266 Hz
AQ	4.0894966 sec
RG	47.53
DW	62.400 usec
DE	6.50 usec
TE	298.0 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
SFO1	400.1324710 MHz
NUC1	1H
P1	8.04 usec
SI	65536
SF	400.1300152 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00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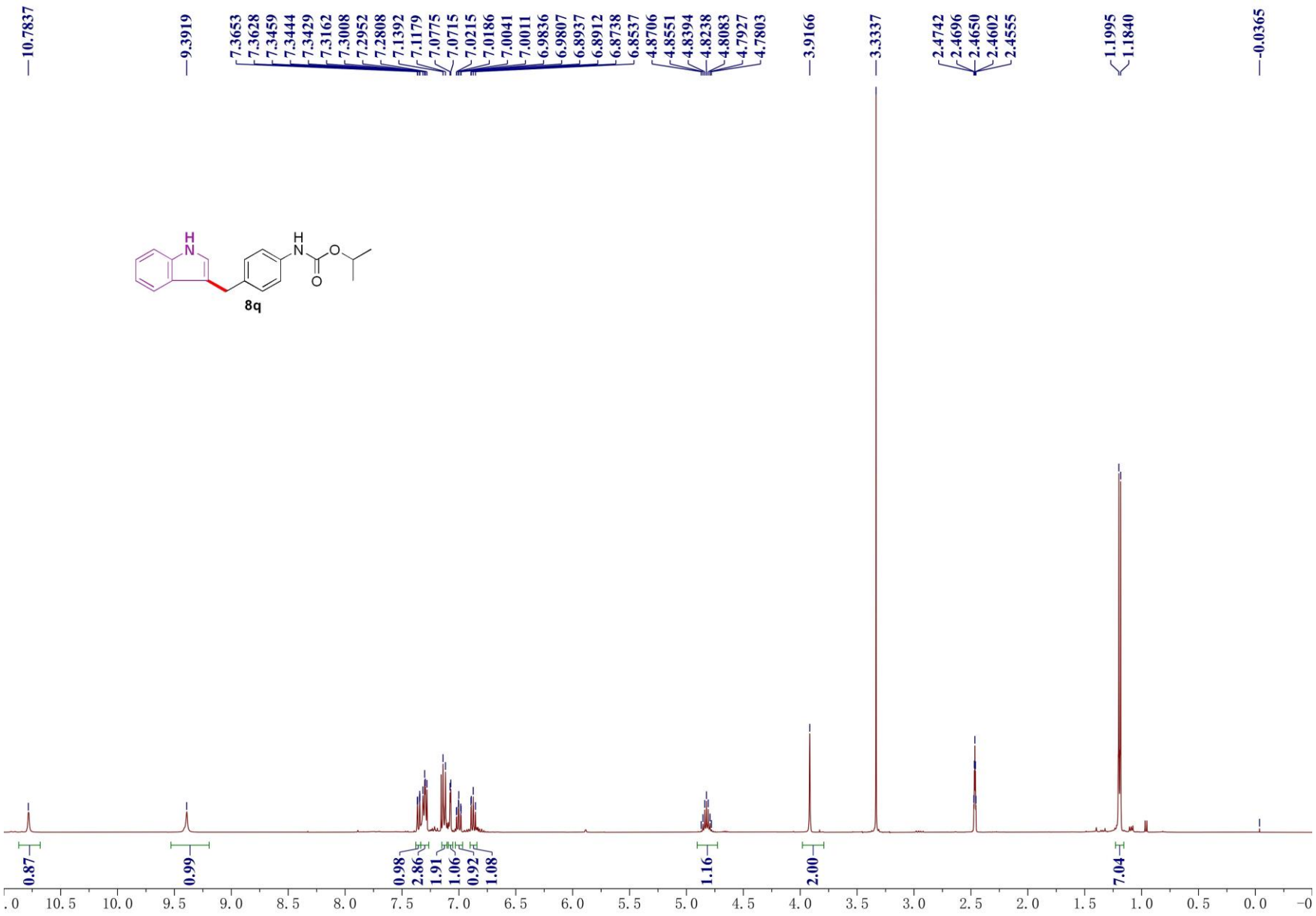
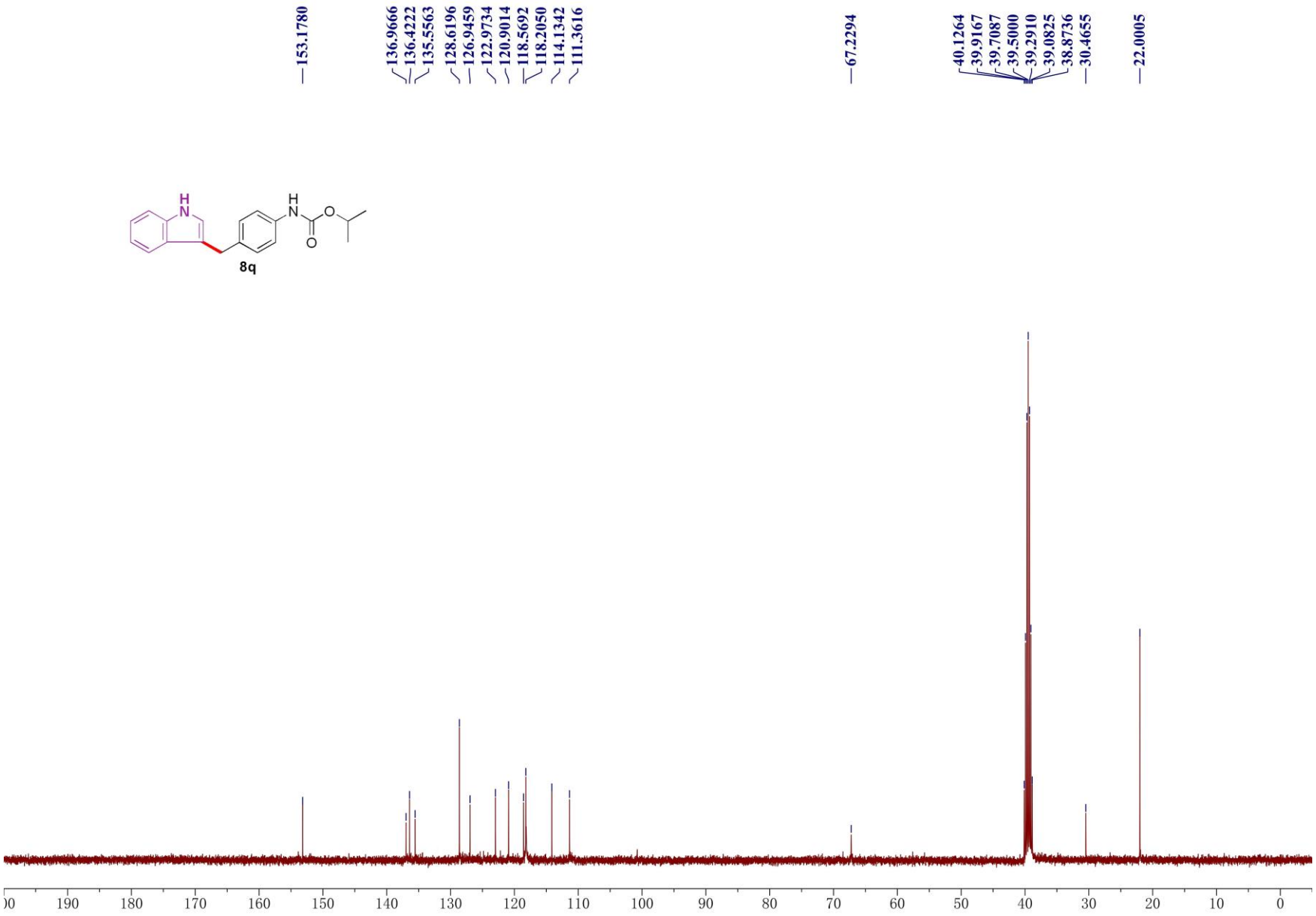
153.7087
137.3902
135.1432
128.8335
118.5212
110.1717
77.3189
77.0018
76.6837
60.9336
55.5961
55.2279
27.5312
14.4868
MeO
OMe
OMe
H
N
OE
t
O
8p
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0


10.7837
9.3919
7.3653
7.3628
7.3459
7.3444
7.3429
7.3162
7.3008
7.2952
7.2808
7.1392
7.1179
7.0775
7.0715
7.0215
7.0186
7.0041
7.0011
6.9836
6.9807
6.8937
6.8912
6.8738
6.8537
4.8706
4.8551
4.8394
4.8238
4.8083
4.7927
4.7803
3.9166
3.3337
2.4742
2.4696
2.4650
2.4602
2.4555
1.1995
1.1840
-0.0365
8q
0.87
0.99
0.98
2.86
1.91
1.06
0.92
1.08
1.16
2.00
7.04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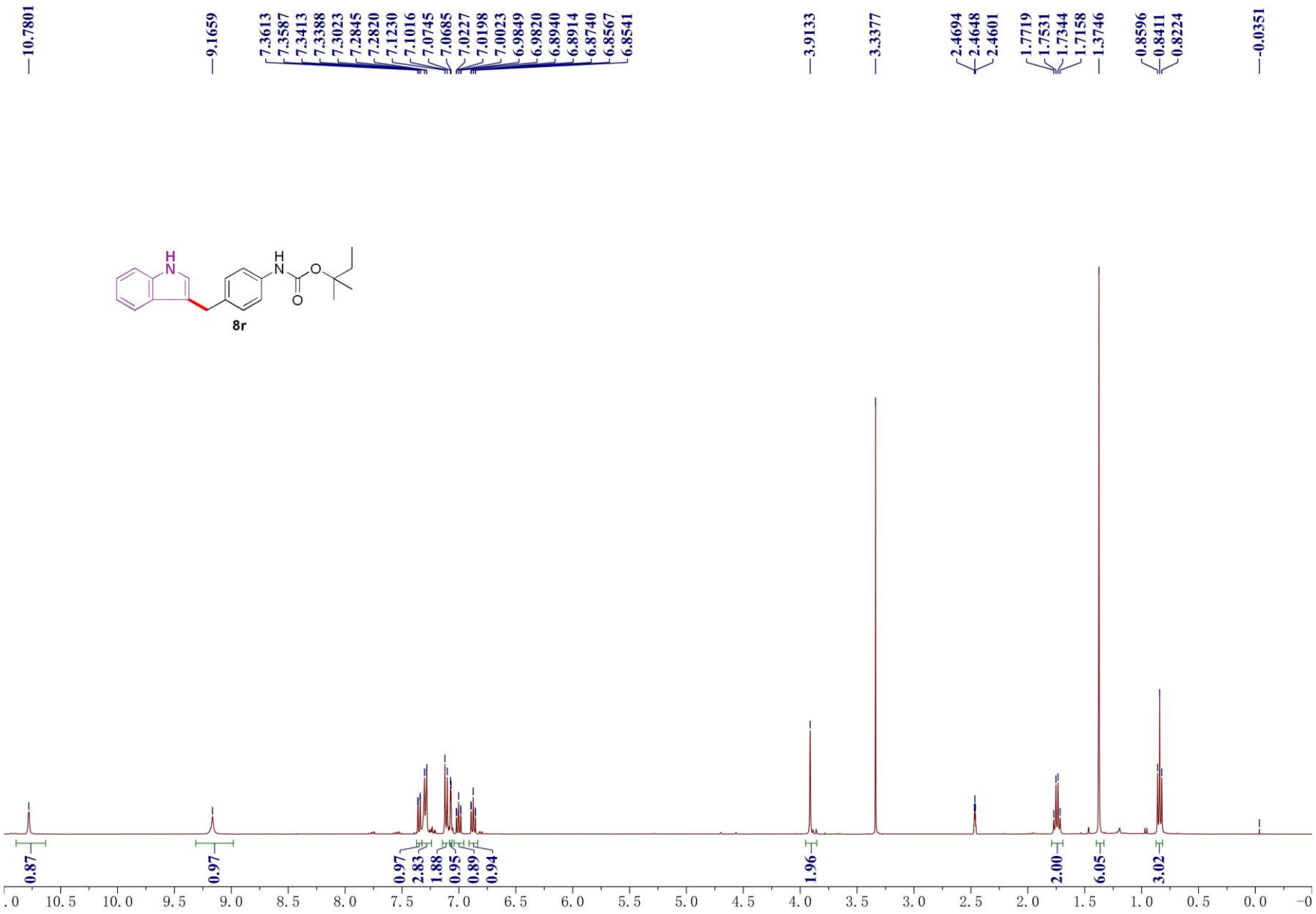
128.6196
126.9459
122.9734
120.9014
118.5692
118.2050
114.1342
111.3616
67.2294
40.1264
39.9167
39.7087
39.5000
39.2910
39.0825
38.8736
30.4655
22.0005
8q
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0


10.7801
9.1659
7.3613
7.3587
7.3413
7.3388
7.3023
7.2845
7.2820
7.1230
7.1016
7.0745
7.0685
7.0227
7.0198
7.0023
6.9849
6.9820
6.8940
6.8914
6.8740
6.8567
6.8541
3.9133
3.3377
2.4694
2.4648
2.4601
1.7719
1.7531
1.7344
1.7158
1.3746
0.8596
0.8411
0.8224
-0.0351
8r
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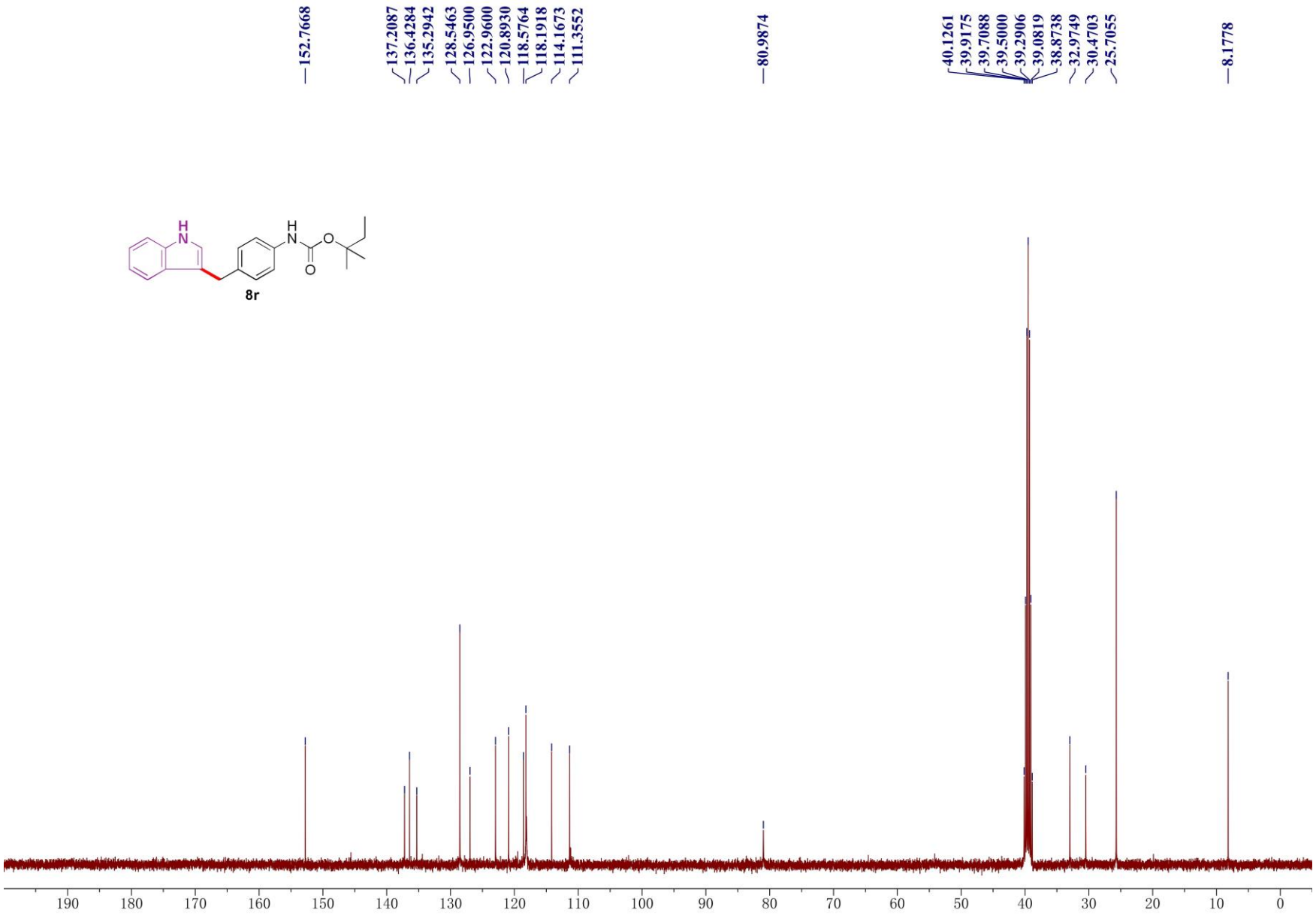
0.97
2.83
1.88
0.95
0.89
0.94
1.96
2.00
6.05
3.02


152.7668
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135.2942
128.5463
126.9500
122.9600
120.8930
118.5764
118.1918
114.1673
111.3552
80.9874
40.1261
39.9175
39.7088
39.5000
39.2906
39.0819
38.8738
32.9749
30.4703
25.7055
8.1778
8r
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180
170
160
150
140
130
120
110
100
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70
60
50
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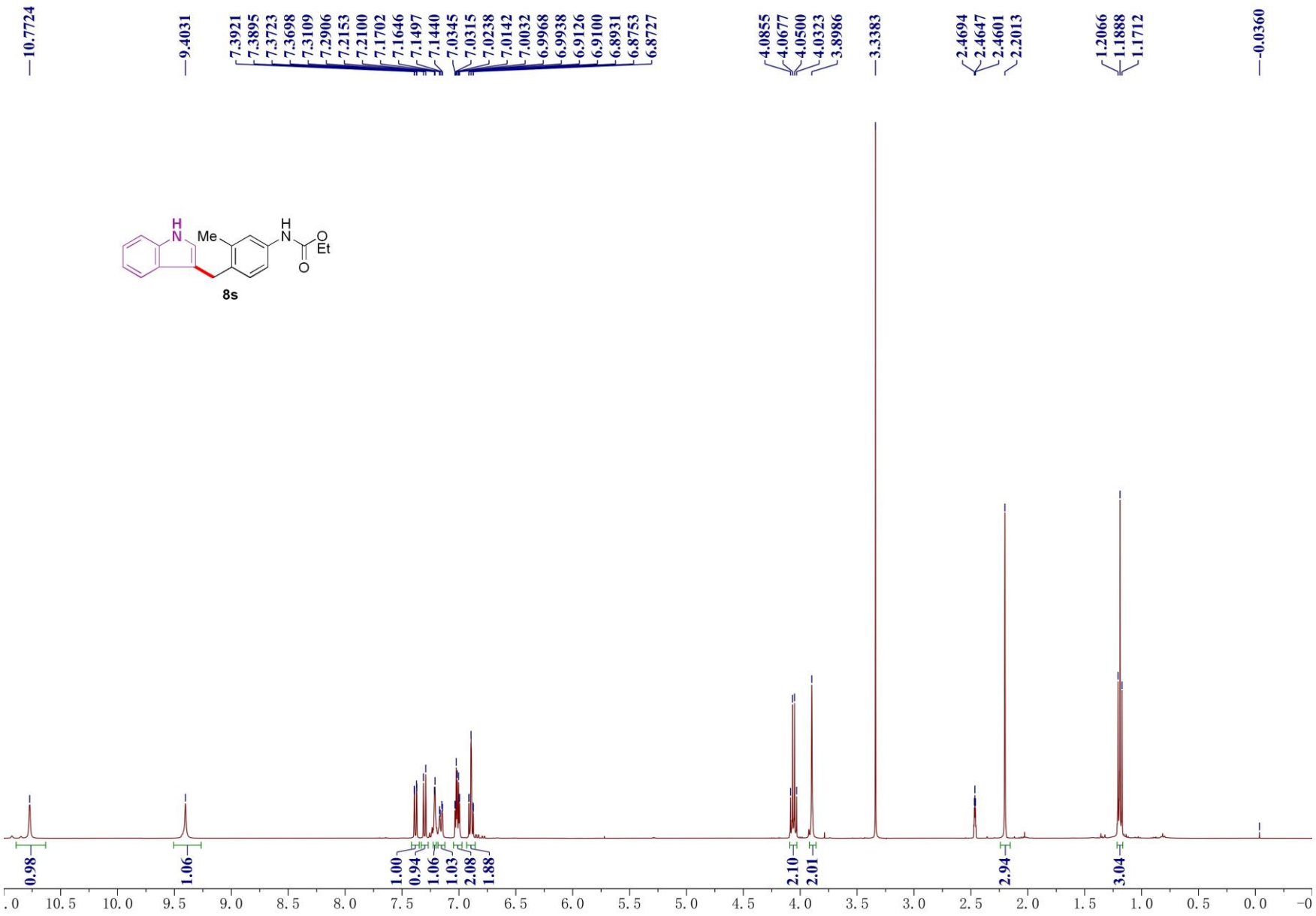
30
20
10
0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9.4031
7.3921
7.3895
7.3723
7.3698
7.3109
7.2906
7.2153
7.2100
7.1702
7.1646
7.1497
7.1440
7.0345
7.0315
7.0238
7.0142
7.0032
6.9968
6.9938
6.9126
6.9100
6.8931
6.8753
6.8727
4.0855
4.0677
4.0500
4.0323
3.8986
3.3383
2.4694
2.4647
2.4601
2.2013
1.2066
1.1888
1.1712
-0.0360
H
N
Me
H
N
O
Et
O
8s
0.98
1.06
1.00
0.94
1.06
1.03
2.08
1.88
2.10
2.01
2.94
3.04
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
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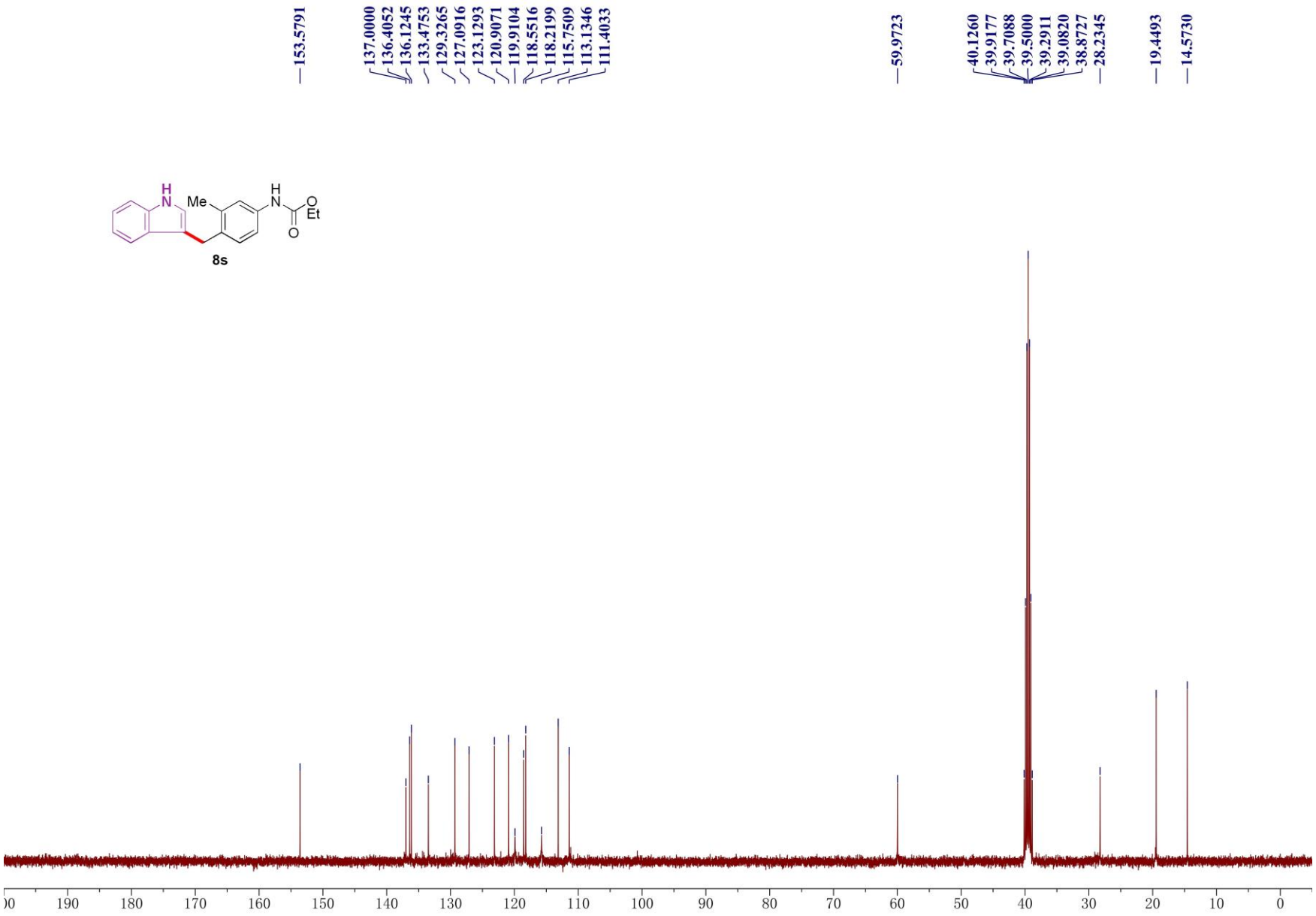
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111.4033
59.9723
40.1260
39.9177
39.7088
39.5000
39.2911
39.0820
38.8727
28.2345
19.4493
14.5730
H
N
Me
H
N
O
Et
O
8s
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150
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110
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70
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30
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10
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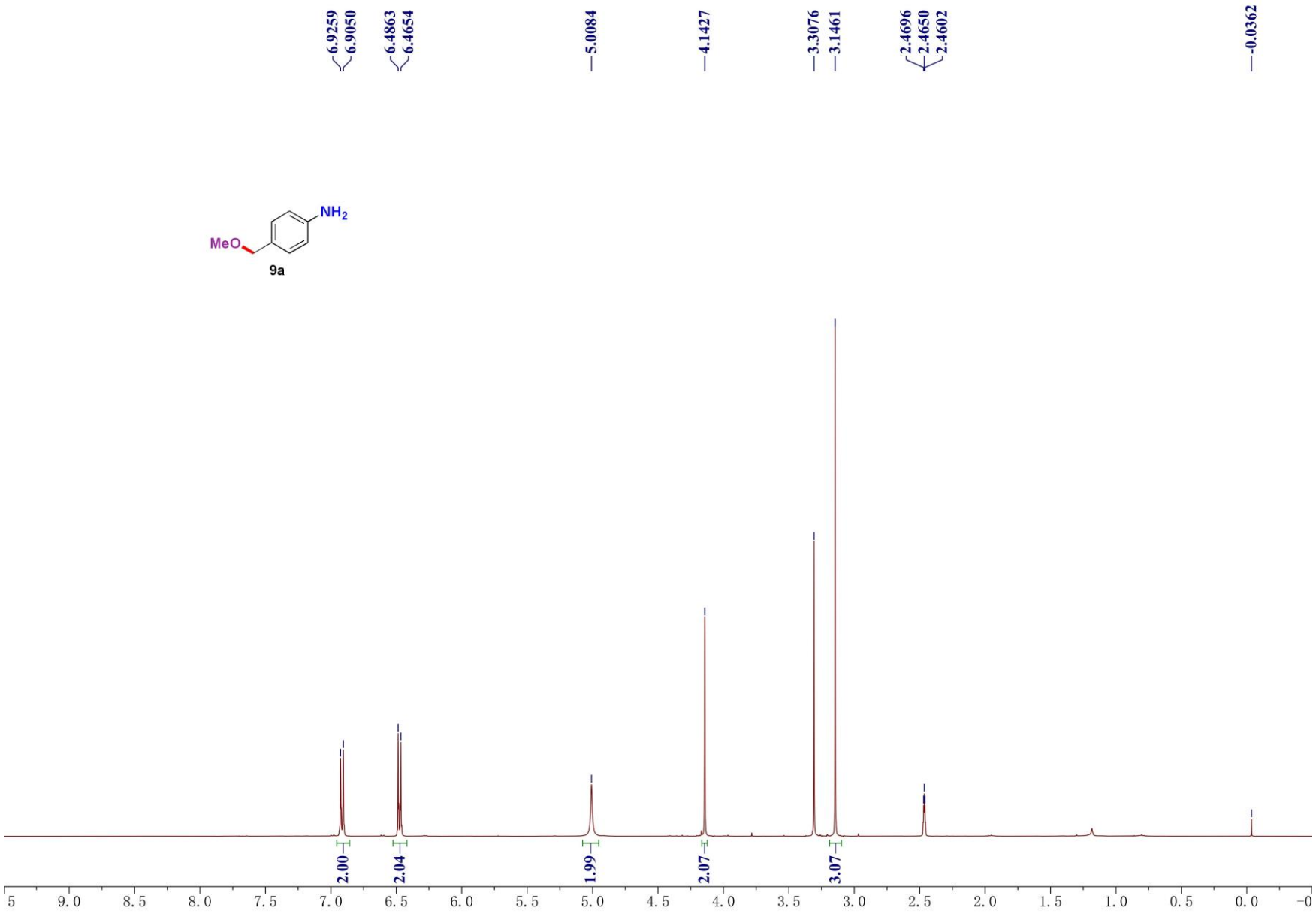
6.9259
6.9050
6.4863
6.4654
5.0084
4.1427
3.3076
3.1461
2.4696
2.4650
2.4602
-0.0362
NH2
MeO
9a
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2.04
1.99
2.07
3.07
5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
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3.5
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1.5
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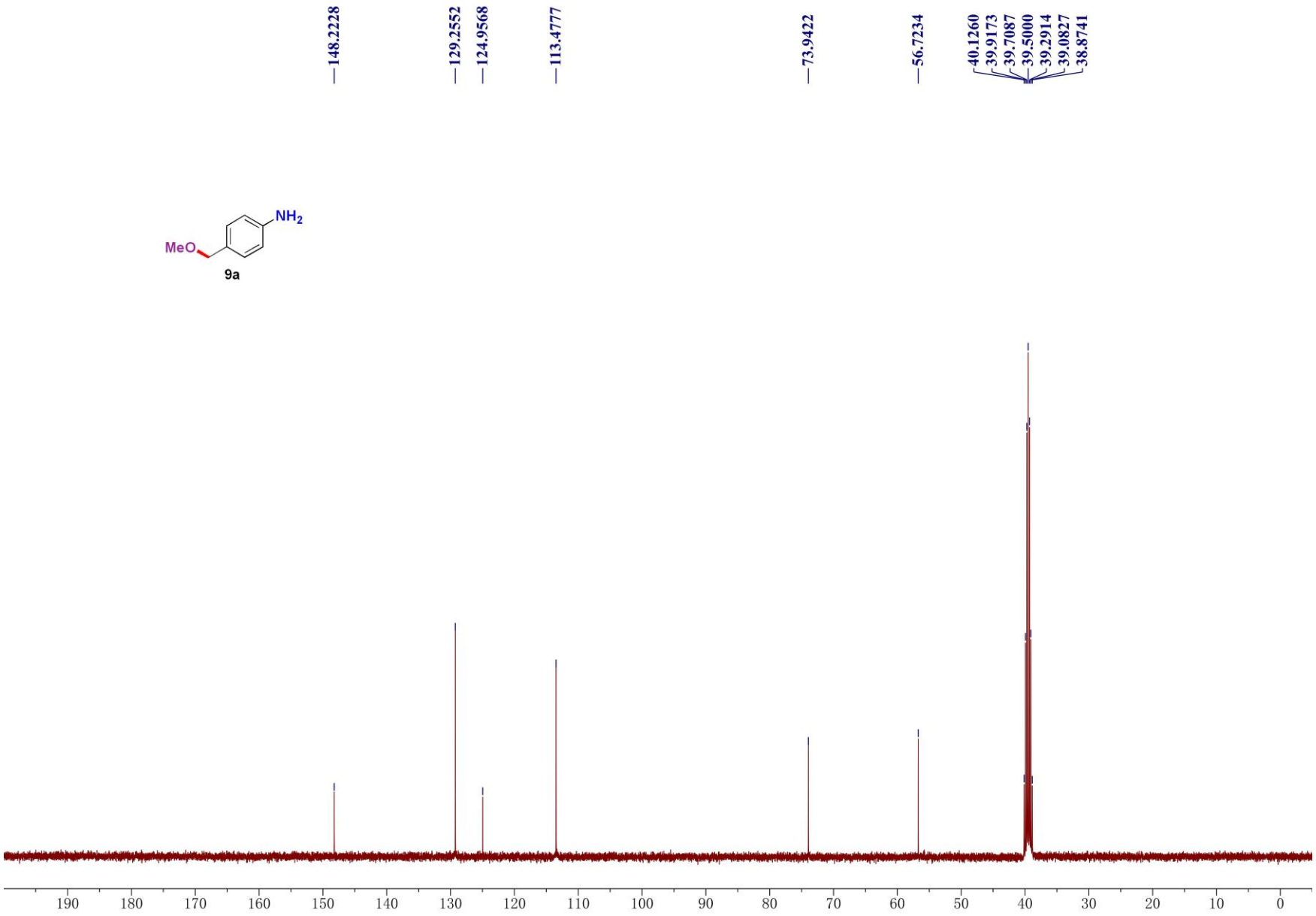
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39.0827
38.8741
NH2
MeO
9a
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150
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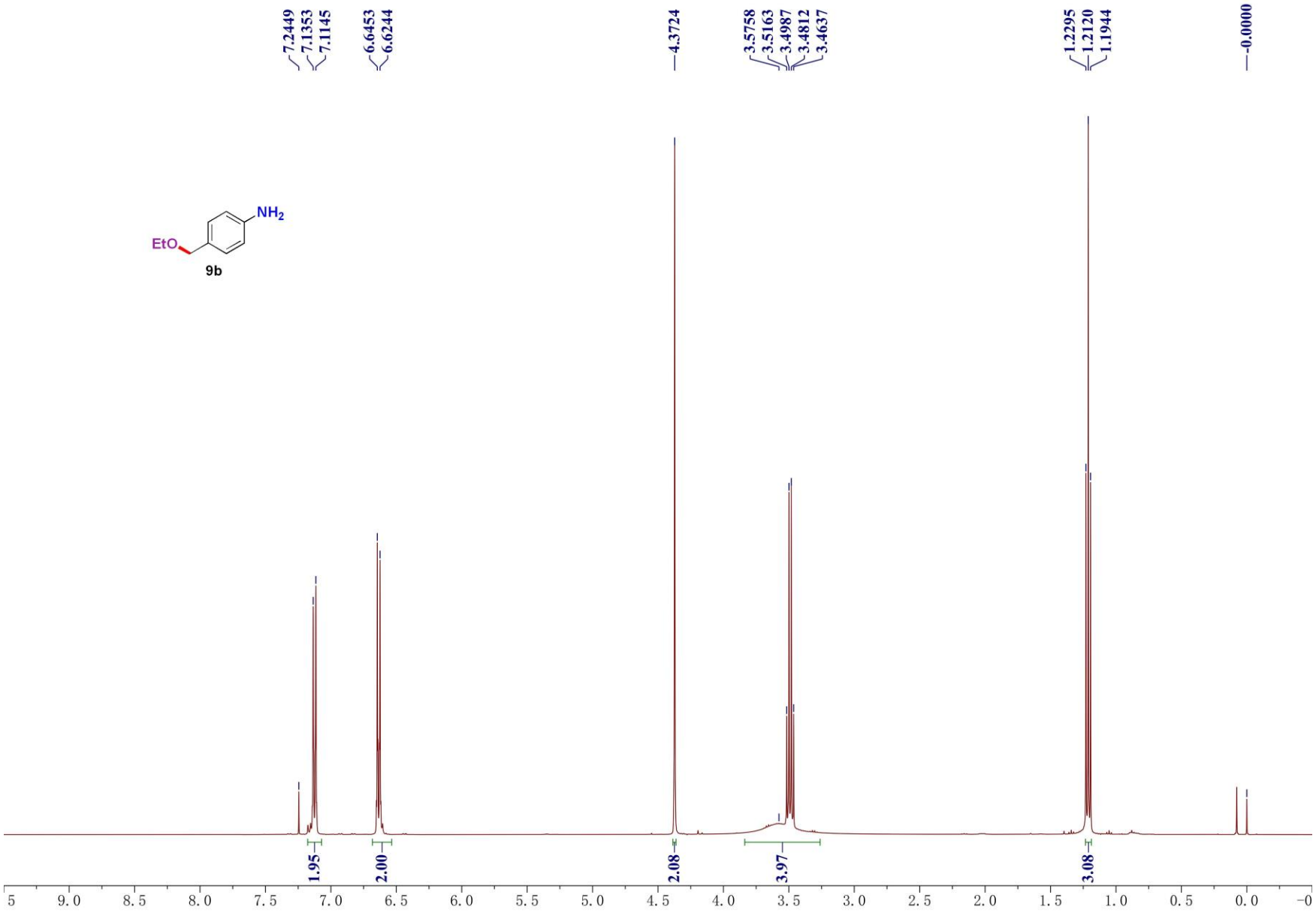
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0.0000
NH2
EtO
9b
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2.00
2.08
3.97
3.08
5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
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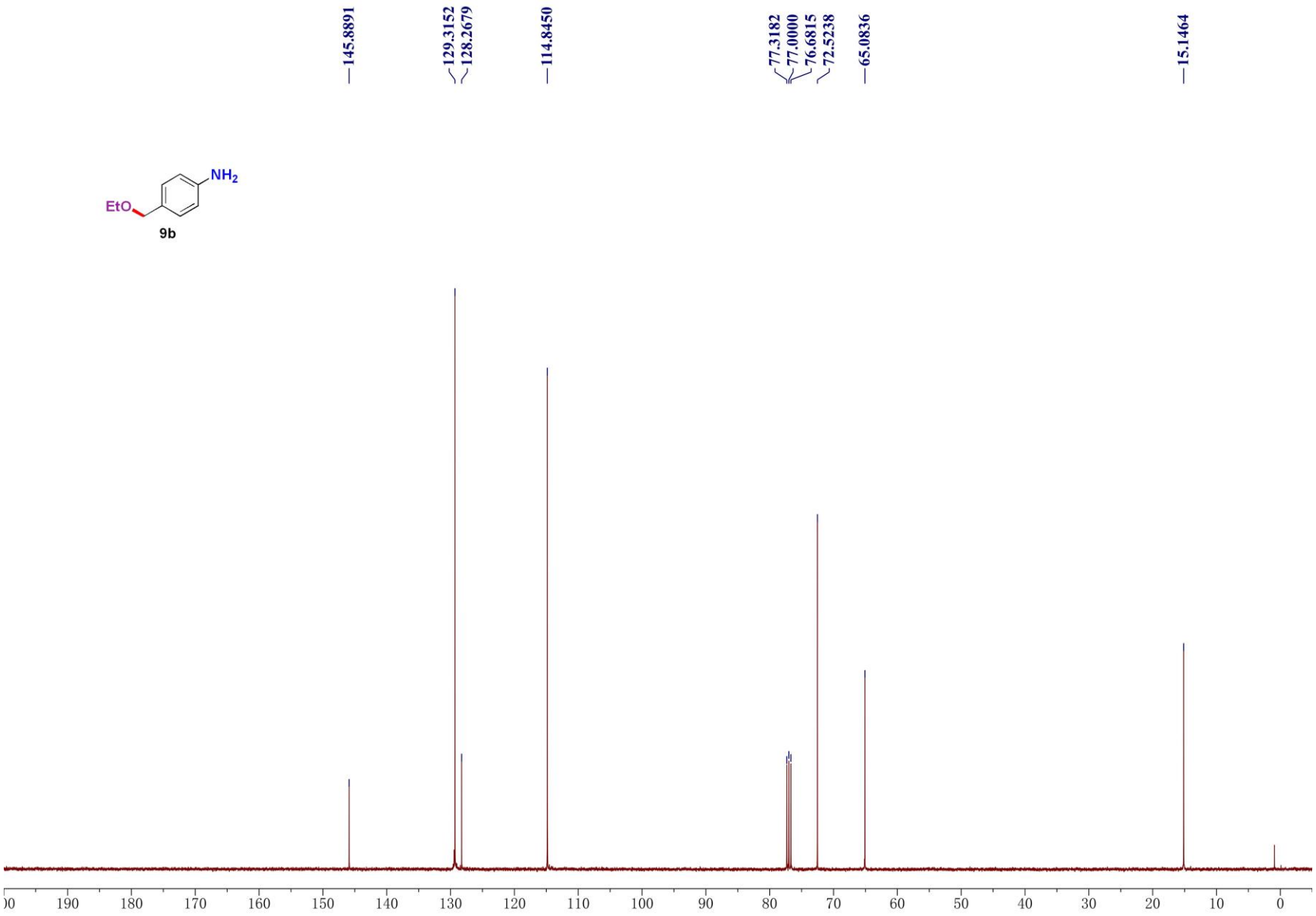
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76.6815
72.5238
65.0836
15.1464
NH2
EtO
9b
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150
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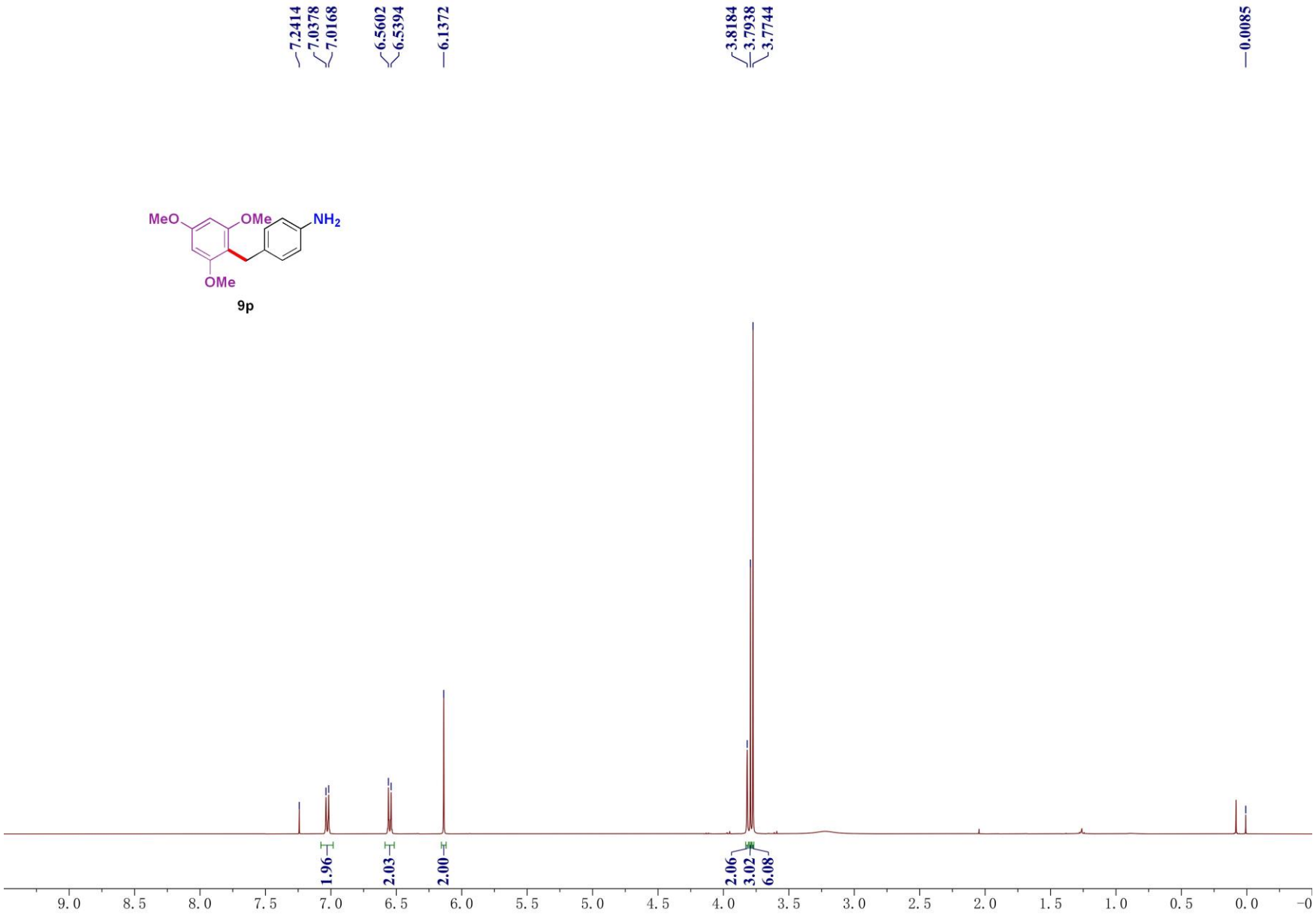
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OMe
NH2
OMe
9p
1.96
2.03
2.00
2.06
3.02
6.08
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
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4.0
3.5
3.0
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1.5
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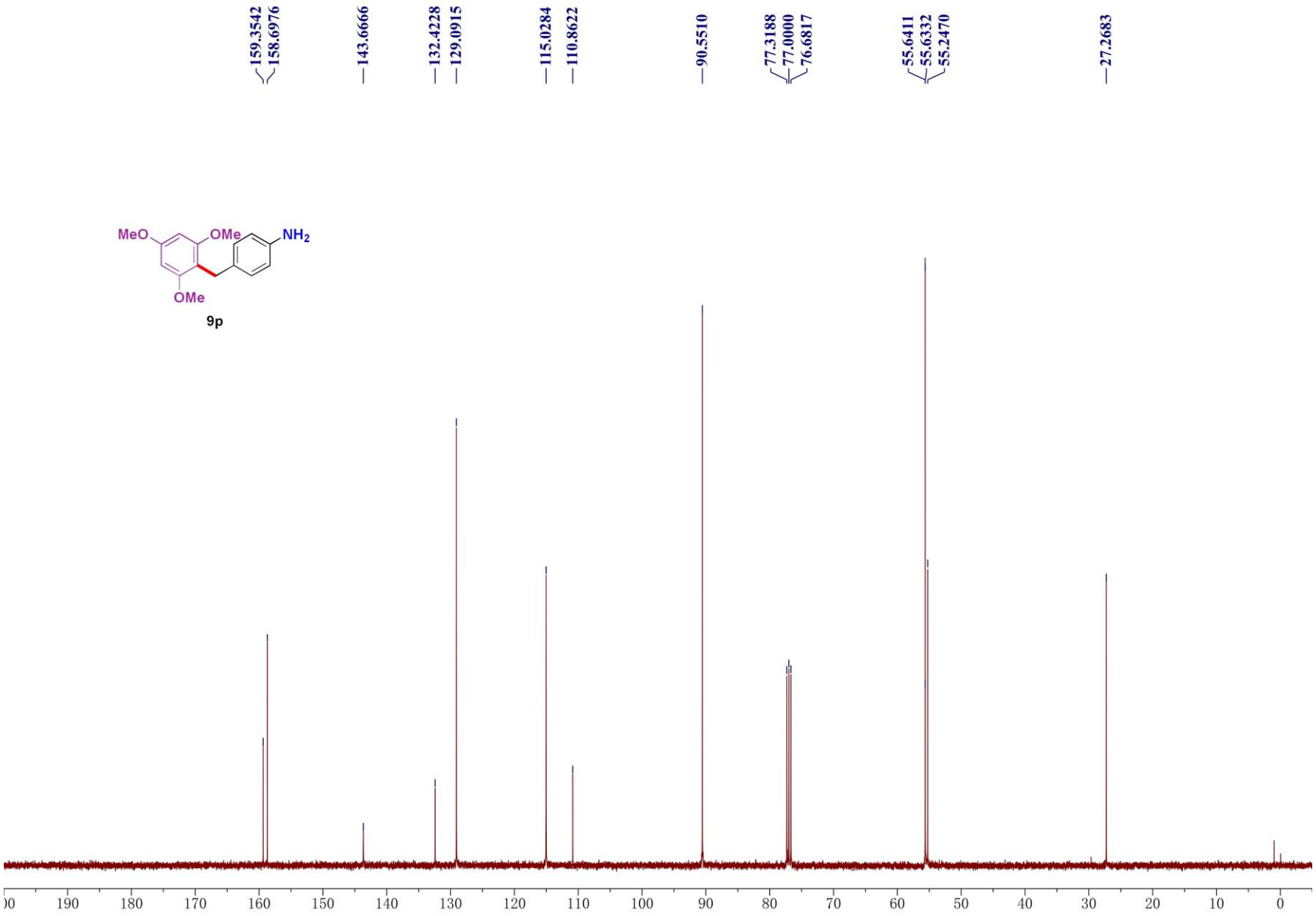
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77.0000
76.6817
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55.6332
55.2470
27.2683
MeO
OMe
NH2
OMe
9p
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150
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70
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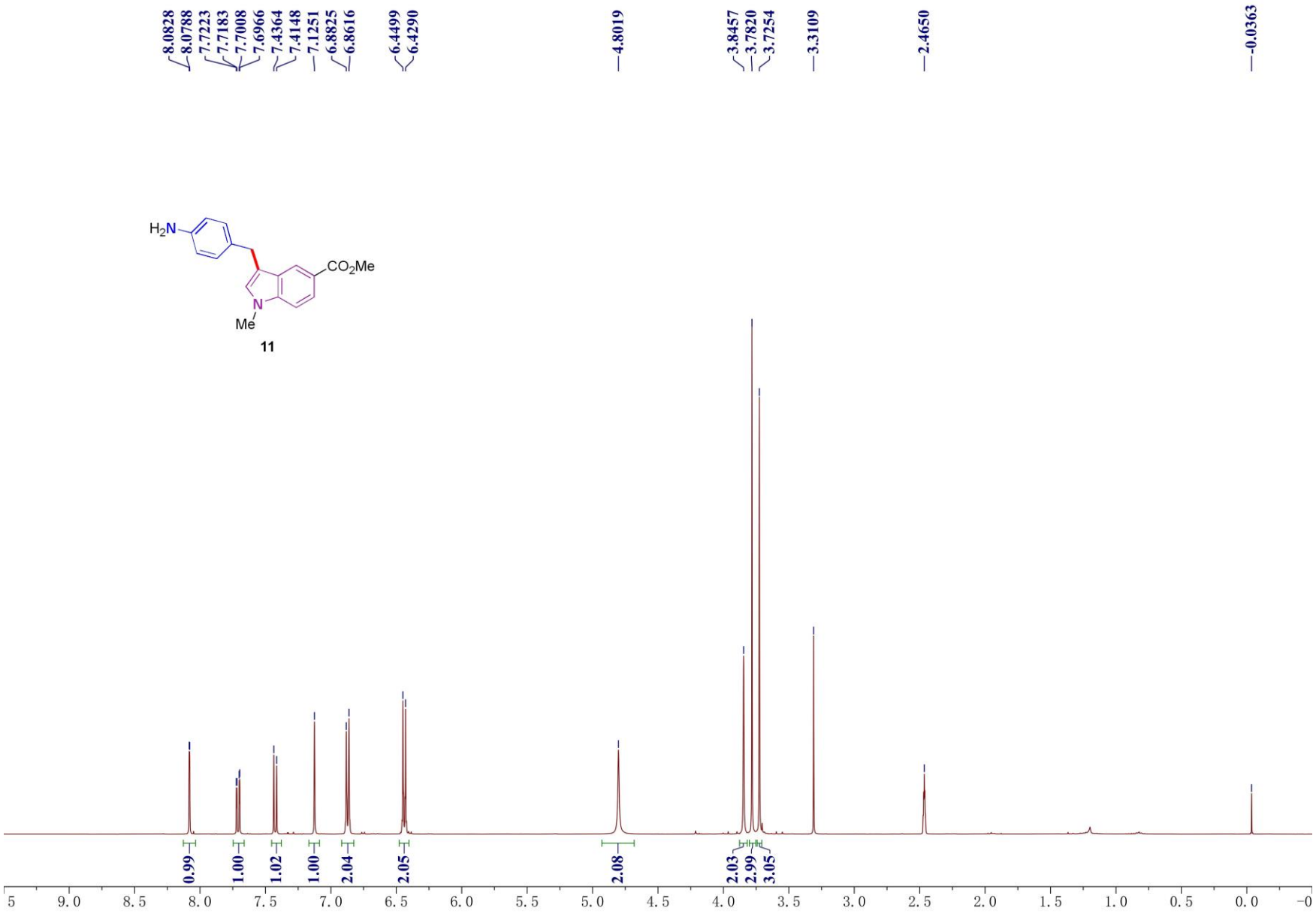
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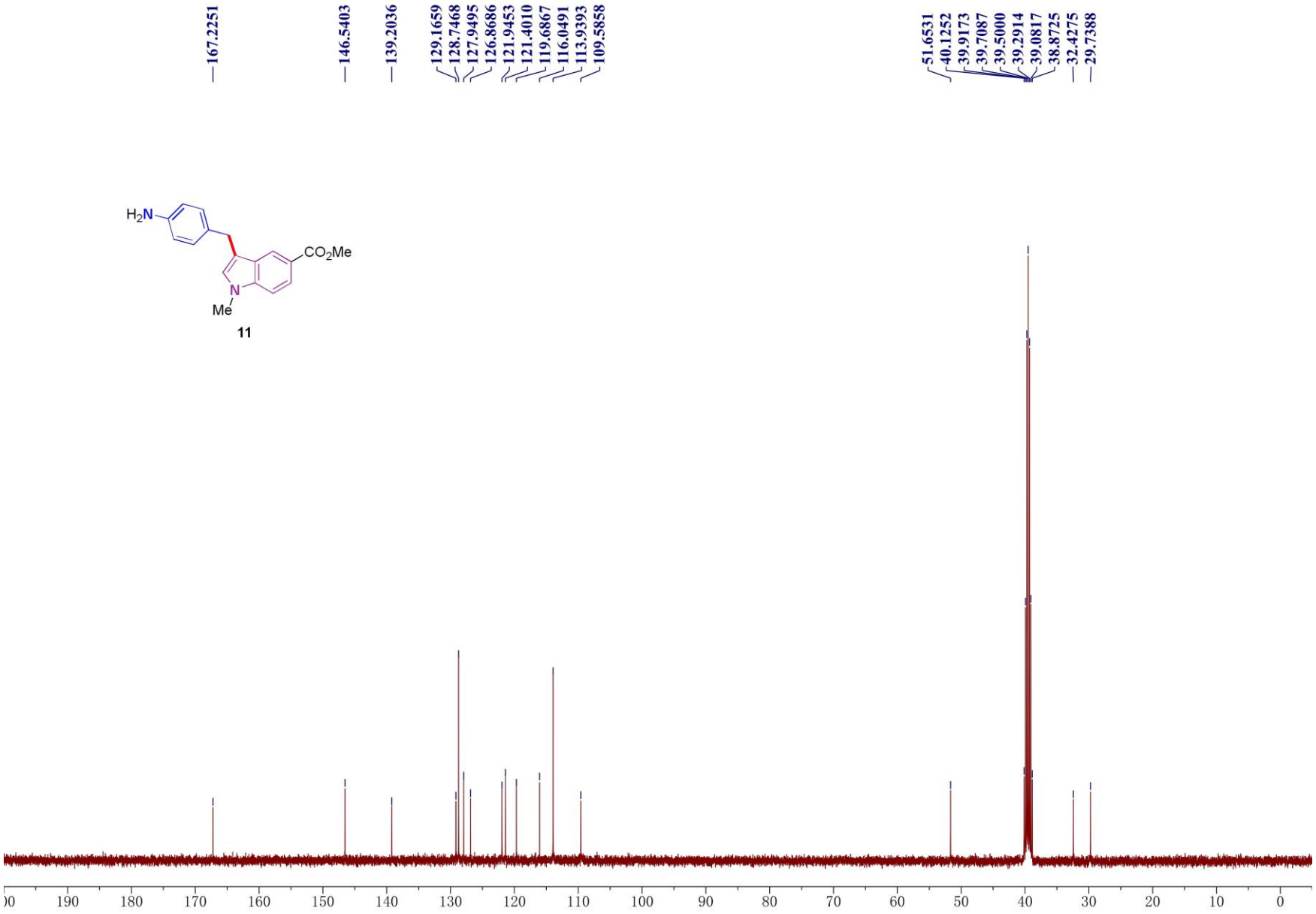
2.05
2.08
2.03
2.99
3.05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39.5000
39.2914
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38.8725
32.4275
29.7388
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CO2Me
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Me
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150
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