Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

Supporting Information

Transition Metal-Free Synthesis of Quinazolinones Using Dimethyl Sulfoxide as a Synthon

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1. General Information:

^{1}H NMR spectra were recorded on a Jeol RESONANCE ECZ 400 S (400 MHz). Chemical shifts are reported in ppm from tetramethylsilane (TMS) with the solvent resonance resulting from incomplete deuteration as the internal reference ($CDCl_3$): 7.26 ppm) or relative to TMS (δ 0.0). Data are reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, br = broad, m = multiplet, dd = doublet of doublet, td = triplet of doublet), coupling constants (Hz), number of protons. ^{13}C NMR spectra were recorded on a Jeol RESONANCE ECZ 400 S (100 MHz) with complete proton decoupling. Chemical shifts are reported in ppm from tetramethylsilane with the solvent as the internal reference ($CDCl_3$: 77.16 ppm). High-resolution mass spectrometry was performed with on LCQ Fleet-Thermo Scientifics. All reactant or reagent was purchased from Sigma Aldrich Co. or Tokyo Chemical Industry and used without purification. Silica gel column chromatography was performed with Silica Gel of Kieselgel 60 F254 plate (Merck). All the physical and spectroscopic data of products (**2a-2v**) were in complete agreement with the reported literature cited in reference.

2. General procedure for the synthesis of quinazolinones(2a-v):

A mixture of 2-aminobenzamide (1, 0.73 mmol 1.0 equiv.), $K_2S_2O_8$ (1.47 mmol, 2.0 equiv), DABCO (1.47 mmol, 2.0 equiv) and DMSO (2.0 mL) were taken in a 2-5 mL reaction vial and the reaction was carried out in a microwave reactor for 2 h at 160 °C. After the completion of the reaction (based on TLC), the reaction mixture was dissolved in 5 mL of ether and filtered to remove inorganic salts. The filtrate was evaporated to give crude reaction mixture. Further, it was purified by silica gel flash column chromatography using EtOAc/hexanes (1:3) as eluent to afford the final product.

3. Characterization Data of Compounds (2a-2v):

Quinazolin-4(3H)-one (2a)[1]; Yellow solid, Yield 68%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.31 (d, *J* = 8.1 Hz, 1H), 8.15 (s, 1H), 7.86 – 7.73 (m, 2H), 7.54 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 163.27, 149.06, 143.76, 135.06, 127.89, 127.57, 126.50, 122.64.

3-methylquinazolin-4(3H)-one (2b)[2]; Yellow solid, Yield 61%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.37 (s, 1H), 8.16 (d, *J* = 6.5 Hz, 1H), 7.81 (d, *J* = 6.9 Hz, 1H), 7.67 (d, *J* = 7.9 Hz, 1H), 7.55 (d, *J* = 8.1 Hz, 1H), 3.50 (s, 3H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 161.24, 148.96, 148.59, 134.72, 127.64, 127.53, 126.38, 121.92, 34.07

3-(tert-butyl)quinazolin-4(3H)-one (2c)[3]; White solid, Yield 59%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.33 (s, 1H), 8.29 (d, *J* = 7.8 Hz, 1H), 7.73 (dd, *J* = 11.0, 4.0 Hz, 1H), 7.68 (d, *J* = 7.6 Hz, 1H), 7.48 (t, *J* = 7.5 Hz, 1H), 1.76 (s, 9H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 161.99, 146.90, 144.28, 134.23, 127.25, 126.93, 126.60, 123.13, 61.20, 28.84.

3-cyclohexylquinazolin-4(3H)-one (2d)[2]; Yellow solid, Yield 52%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.47 (s, 1H), 8.16 (dd, *J* = 8.0, 1.4 Hz, 1H), 7.85 – 7.79 (m, 1H), 7.67 (d, *J* = 7.7 Hz, 1H), 7.58 – 7.50 (m, 1H), 4.69 – 4.57 (m, 1H), 1.89 – 1.79 (m, 6H), 1.68 (dd, *J* = 12.8, 2.6 Hz, 1H), 1.48 – 1.36 (m, 2H), 1.31 – 1.18 (m, 1H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 159.43, 146.94, 145.25, 134.01, 126.04, 126.73, 126.04, 121.05, 53.04, 31.98, 25.31, 24.41.

3-(2-(cyclohex-1-en-1-yl)ethyl)quinazolin-4(3H)-one (2e); White solid, Yield 61%; %; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.32 (d, *J* = 7.8 Hz, 1H), 8.09 (s, 1H), 7.77 (dd, *J* = 4.2, 2.0 Hz, 2H), 7.52 (ddd, *J* = 8.2, 5.5, 2.9 Hz, 1H), 5.37 (s, 1H), 4.10 (t, *J* = 7.0 Hz, 2H), 2.40 (t, *J* = 6.9 Hz, 2H), 2.01 (dd, *J* = 5.8, 1.8 Hz, 2H), 1.92 (d, *J* = 3.6 Hz, 2H), 1.64 (ddd, *J* = 8.4, 7.7, 4.1 Hz, 2H), 1.54 (ddd, *J* = 15.1, 7.6, 4.1 Hz, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ159.88, 147.87, 143.90, 135.24, 132.95, 128.41, 127.33, 126.10, 125.00, 121.26, 46.26, 37.48, 28.31, 25.37, 22.88, 22.23.

3-benzylquinazolin-4(3H)-one (2f)[2]; Yellow solid, Yield 53%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.58 (s, 1H), 8.16 (d, *J* = 8.1 Hz, 1H), 7.88 – 7.80 (m, 1H), 7.70 (d, *J* = 8.1 Hz, 1H), 7.56 (t, *J* = 7.5 Hz, 1H), 7.41 – 7.25 (m, 5H), 5.21 (s, 2H); ^{13}C NMR

(DMSO-d_6, 100 MHz): δ 159.87, 147.78, 147.65, 136.60, 134.22, 128.41, 127.44, 127.41, 127.01, 126.99, 125.88, 121.39, 48.62.

3-phenethylquinazolin-4(3H)-one (2g)[4]; White solid, Yield 63%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.18 (dd, *J* = 7.9, 1.3 Hz, 1H), 8.16 (s, 1H), 7.84 – 7.79 (m, 1H), 7.64 (d, *J* = 8.0 Hz, 1H), 7.55 (t, *J* = 7.5 Hz, 1H), 7.32 – 7.19 (m, 5H), 4.27 – 4.16 (m, 2H), 3.02 (t, *J* = 7.4 Hz, 2H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 159.24, 146.98, 137.03, 133.40, 127.95, 127.64, 126.25, 126.15, 125.69, 125.16, 120.63, 46.48, 33.39.

3-(2,2,2-trifluoroethyl)quinazolin-4(3H)-one (2h)[5]; White solid, Yield 47%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.33(m, 1H), 8.11 (s, 1H), 7.82(m, 1H), 7.76 (d, *J* = 7.4 Hz, 1H), 7.60 – 7.53 (m, 1H), 4.70 (q, *J* = 8.5 Hz, 2H) ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.74, 147.54, 145.96, 135.61, 128.62, 127.98, 127.71, 123.32 (q, *J* = 280.32 Hz) 122.00. 45.681(q, *J* = 35.64 Hz).

3-phenylquinazolin-4(3H)-one (2i)[2]; Yellow solid, Yield 72%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.36 (s, 1H), 8.21 (dd, *J* = 8.0, 1.4 Hz, 1H), 7.93 – 7.86 (m, 1H), 7.75 (d, *J* = 7.9 Hz, 1H), 7.64 – 7.49 (m, 6H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 160.53, 148.28, 147.71, 138.14, 135.22, 129.77, 129.31, 128.04, 127.97, 127.86, 126.98, 122.46.

3-(p-tolyl)quinazolin-4(3H)-one (2j)[2]; White solid, Yield 65%; ^{1}H NMR (400 MHz, DMSO-d_{63}): δ 8.31 (s, 1H), 8.20 (d, *J* = 9.5 Hz, 1H), 7.88 (dd, *J* = 11.1, 4.2 Hz, 1H), 7.74 (d, *J* = 7.5 Hz, 1H), 7.60 (t, *J* = 7.5 Hz, 1H), 7.39 (dd, *J* = 20.8, 8.2 Hz, 4H), 2.40 (s, 3H).

3-(o-tolyl)quinazolin-4(3H)-one (2k)[6]; Yellow solid, Yield 61%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.27 (s, 1H), 8.22 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.90 (m, 1H), 7.77 (d, *J* = 7.9 Hz, 1H), 7.62 (m, 1H), 7.42 (m, 4H), 2.10 (s, 3H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ161.48, 155.01, 146.93, 136.64, 135.47, 134.95, 131.76, 129.88, 128.01, 127.67, 127.36, 127.02, 126.45, 120.71, 23.66, 17.52.

3-(4-methoxyphenyl)quinazolin-4(3H)-one (2m)[2]; Yellow solid, Yield 64%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.37 (d, *J* = 7.8 Hz, 1H), 8.12 (s, 1H), 7.83 – 7.75 (m, 2H), 7.59 – 7.52 (m, 1H), 7.36 – 7.31 (m, 2H), 7.08 – 7.02 (m, 2H), 3.88 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 160.41, 159.36, 147.69, 147.48, 134.81, 130.24, 128.70, 127.59, 127.29, 126.50, 121.85, 114.48, 55.55.

***6-fluoroquinazolin-4(3H)-one (2n)*[8]; White solid, Yield 49%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 12.37 (s, 1H), 8.09 (s, 1H), 7.74 (dddd, *J* = 17.4, 11.8, 8.8, 2.9 Hz, 3H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 160.71, 160.56 (d, J_{C-F} = 246.2 Hz), 145.39, 145.36, 130.63 (d, J_{C-F} = 9.0 Hz), 124.39 (d, J_{C-F} = 8.0 Hz), 123.33 (d, J_{C-F} = 23.0 Hz), 110.99 (d, J_{C-F} = 23.0 Hz).

***6-chloroquinazolin-4(3H)-one (2o)*[8]; Yellow solid, Yield 53%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 12.43 (s, 1H), 8.12 (s, 1H), 8.05 (s, 1H), 7.83 (m, 1H), 7.69 (d, *J* = 8.7 Hz, 1H); ^{13}C NMR (DMSO-d_6, 100 MHz): 159.75, 147.50, 145.92, 134.44, 131.02, 129.54, 124.82, 123.88.

***6,7-dimethoxyquinazolin-4(3H)-one (2p)*[8]; Yellow solid, Yield 62%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.35 (s, 1H), 7.48 (d, *J* = 6.8 Hz, 1H), 7.17 (d, *J* = 11.0 Hz, 1H), 3.91 (s, 3H), 3.88 (s, 3H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 158.89, 154.37, 148.66, 145.47, 114.17, 107.79, 104.89, 55.76, 55.50.

***2-methylquinazolin-4(3H)-one (2q)*[9]; White solid, Yield 48%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.07 (dd, *J* = 7.9, 1.3 Hz, 1H), 7.78 (m, 1H), 7.57 (d, *J* = 8.1 Hz, 1H), 7.46 (t, *J* = 7.0 Hz, 1H), 2.35 (s, 3H); ^{13}C NMR (DMSO-d_6, 100 MHz): δ 161.43, 154.27, 148.31, 134.12, 126.02, 125.71, 125.47, 120.30, 21.09.

***2-propylquinazolin-4(3H)-one (2r)*[1]; White solid, Yield 57%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.28 (d, *J* = 7.9 Hz, 1H), 7.83 – 7.65 (m, 2H), 7.48 (t, *J* = 7.7 Hz, 1H), 2.77 (t, *J* = 7.5 Hz, 2H), 1.99 – 1.86 (m, 2H), 1.09 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 161.45, 157.68, 147.67, 134.27, 125.98 125.84, 125.57, 120.40, 35.88, 20.04, 13.25.

***2-phenylquinazolin-4(3H)-one (2s)*[10]; White solid, Yield 68%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.32 (dd, *J* = 8.0, 1.2 Hz, 1H), 8.21 (dd, *J* = 7.8, 1.7 Hz, 2H), 8.04 (d, *J* = 8.4 Hz, 1H), 7.85(m, 1H), 7.67 – 7.58 (m, 3H), 7.55 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 163.96, 152.08, 149.19, 135.10, 132.54, 131.90, 129.14, 127.86, 127.65, 126.99, 126.45, 120.81.

***2-heptylquinazolin-4(3H)-one (2t)*[11]; White solid, Yield 61%; ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.09 – 8.05 (m, 1H), 7.76 (ddd, *J* = 8.3, 7.1, 1.6 Hz, 1H), 7.58 (ddd, *J* = 8.2, 1.1, 0.5 Hz, 1H), 7.45 (ddd, *J* = 8.1, 7.2, 1.2 Hz, 1H), 2.62 – 2.55 (m, 2H), 1.77 – 1.66 (m, 2H), 1.27 (ddd, *J* = 8.7, 5.1, 3.0 Hz, 8H), 0.85 (t, *J* = 6.9 Hz, 3H);

^{13}C NMR (DMSO-d_6, 100 MHz): δ 161.54, 157.24, 148.69, 133.99, 126.51, 125.61, 125.39, 120.49, 34.21, 30.83, 28.15, 28.13, 26.49, 21.76, 13.65.

2-methyl-3-(o-tolyl)quinazolin-4(3H)-one (2u)[12]; White solid, Yield 57%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.29 (dd, *J* = 4.7, 4.0 Hz, 1H), 7.83 – 7.74 (m, 2H), 7.50 (ddd, *J* = 8.2, 6.6, 1.8 Hz, 1H), 7.44 – 7.35 (m, 3H), 7.16 (d, *J* = 7.3 Hz, 1H), 2.23 (s, 3H), 2.13 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 161.48, 155.01, 146.93, 136.64, 135.47, 134.95, 131.76, 129.88, 128.01, 127.67 127.36, 127.02, 126.45, 120.71, 23.66, 17.52.

Quinazolin-4(3D)-one (2v)[1]; Yellow solid, Yield 61%; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.08 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.84 – 7.71 (m, 1H), 7.63 (d, *J* = 7.6 Hz, 1H), 7.52 – 7.43 (m, 1H).

4. References:

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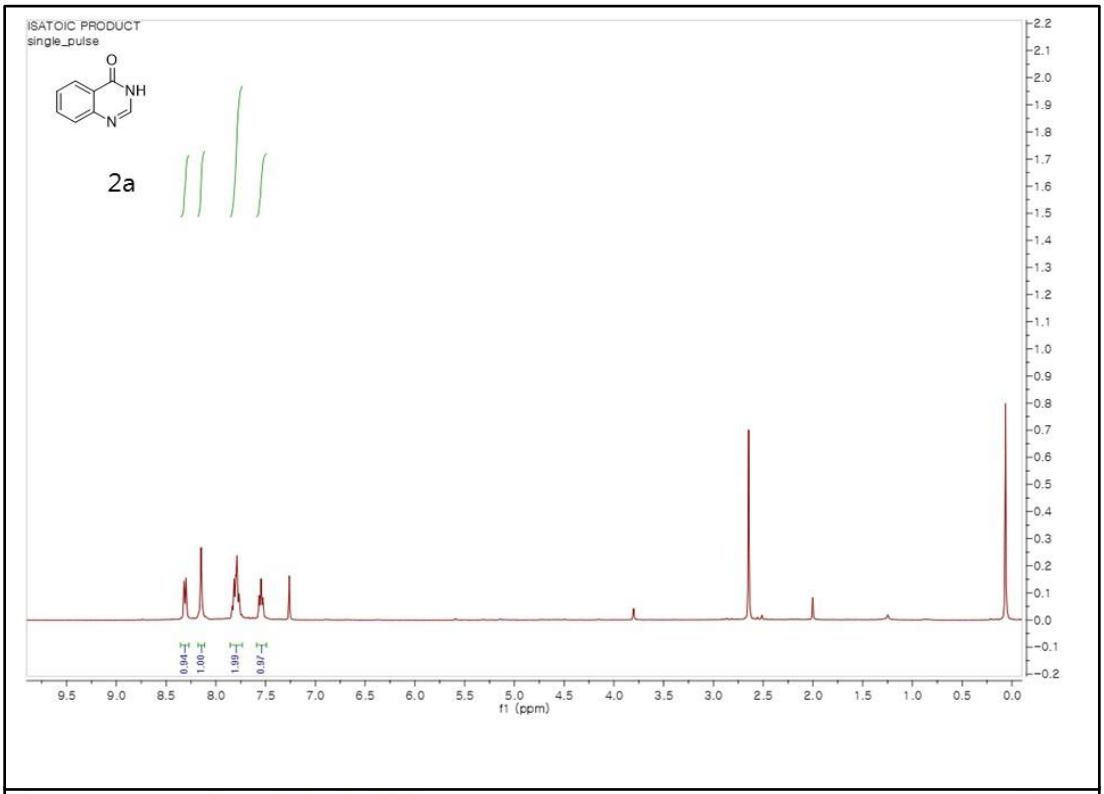
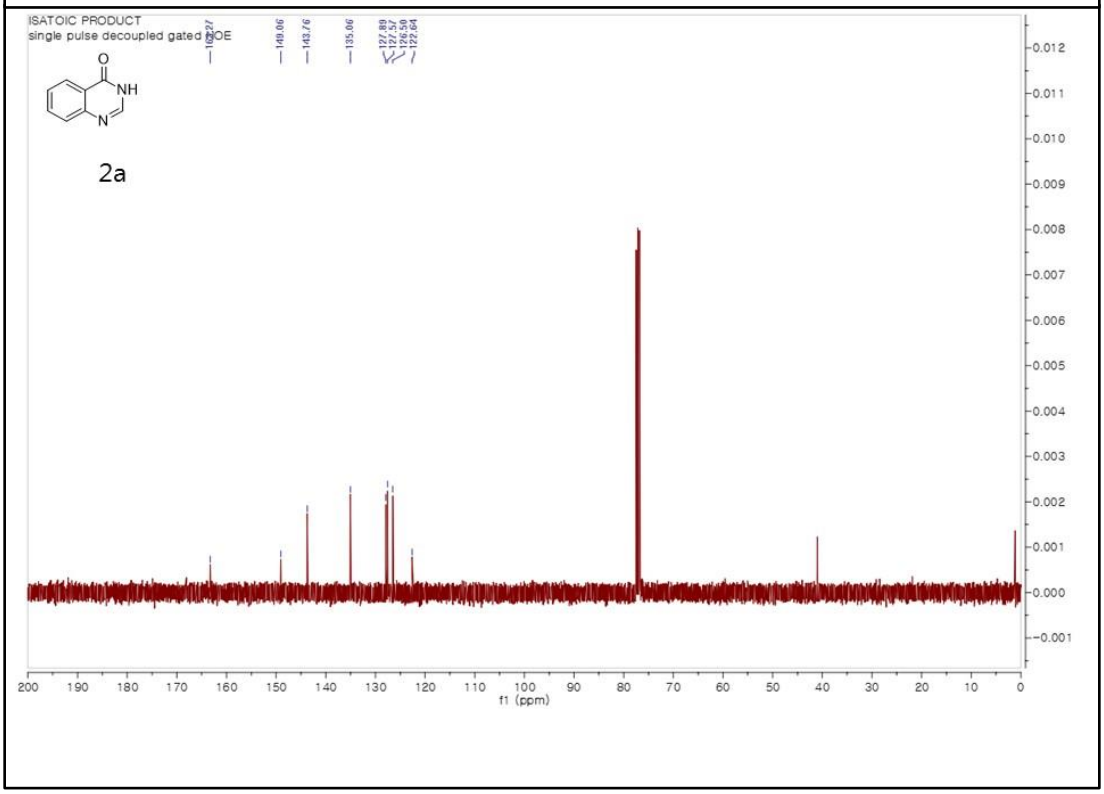
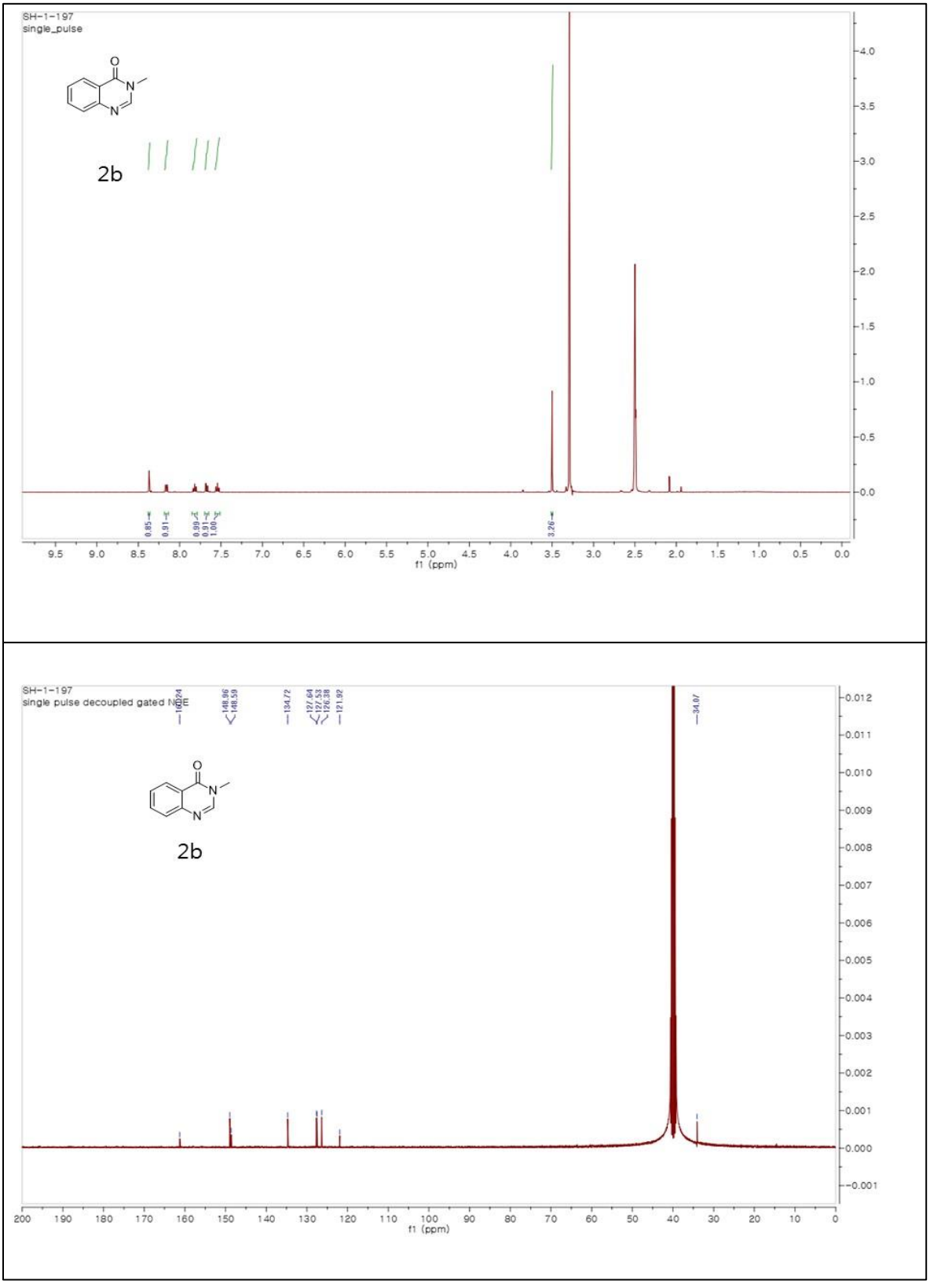
5. Copies of ^{1}H NMR, ^{13}C NMR Spectra of the quinazolinones (2a-2v):



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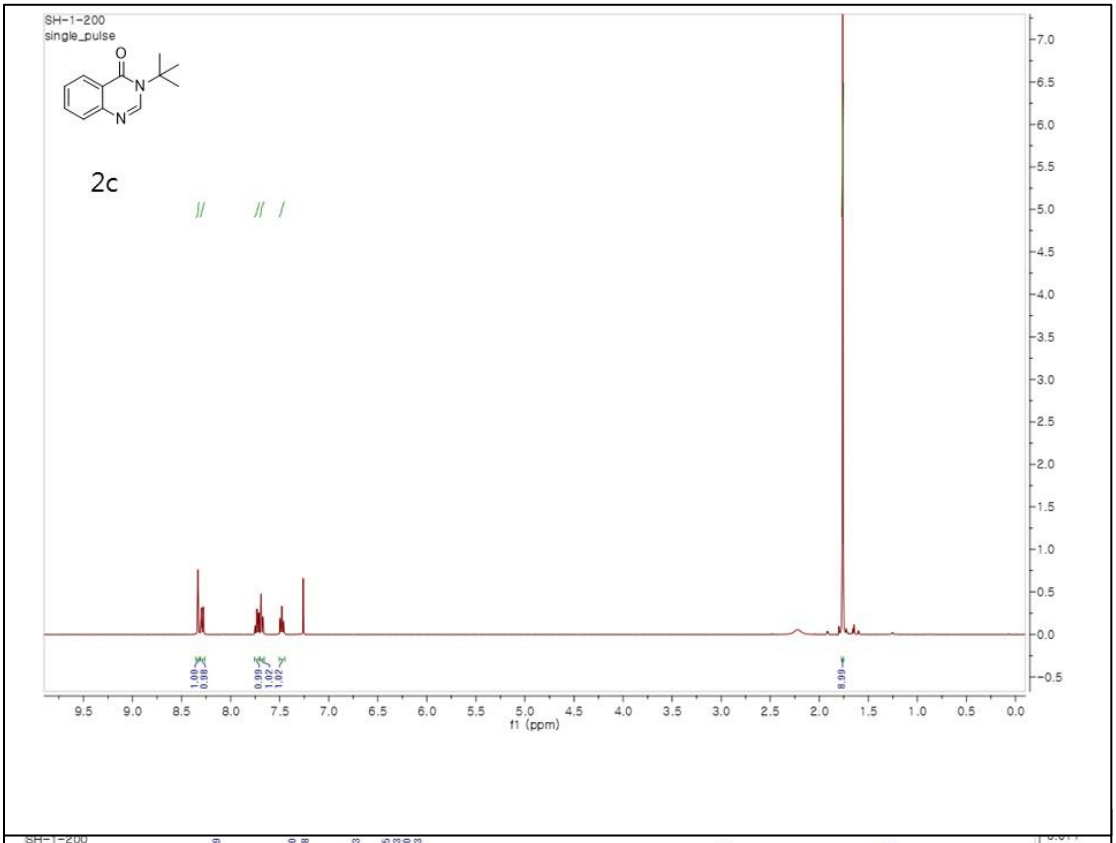
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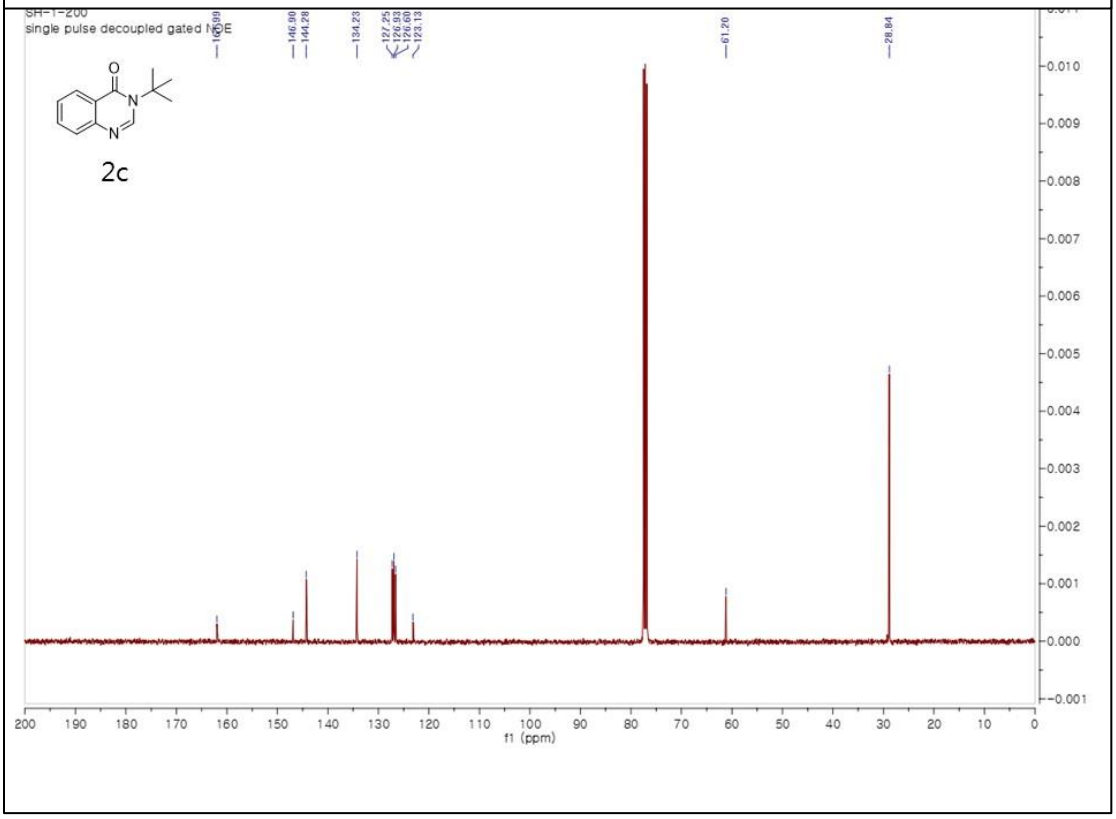
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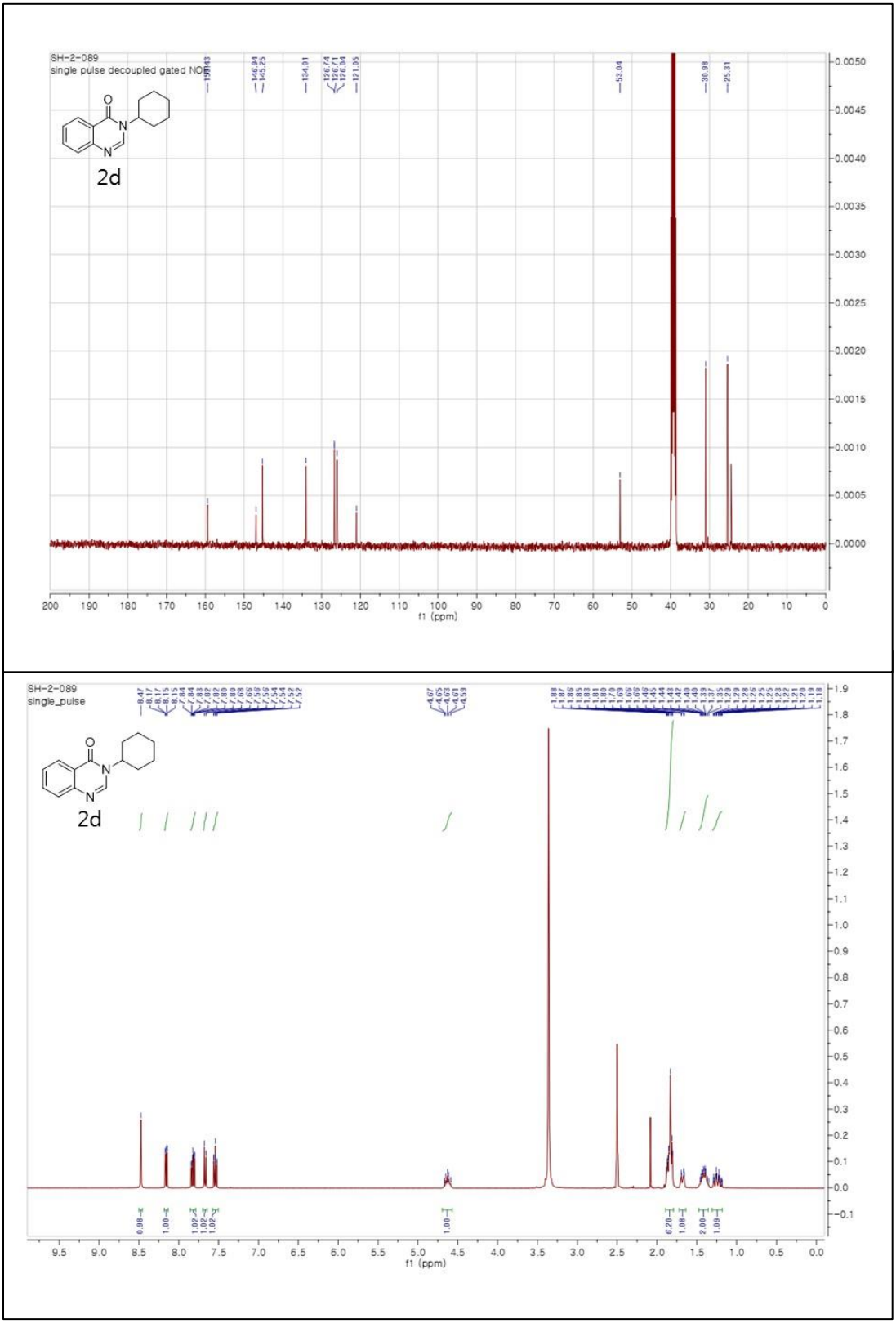
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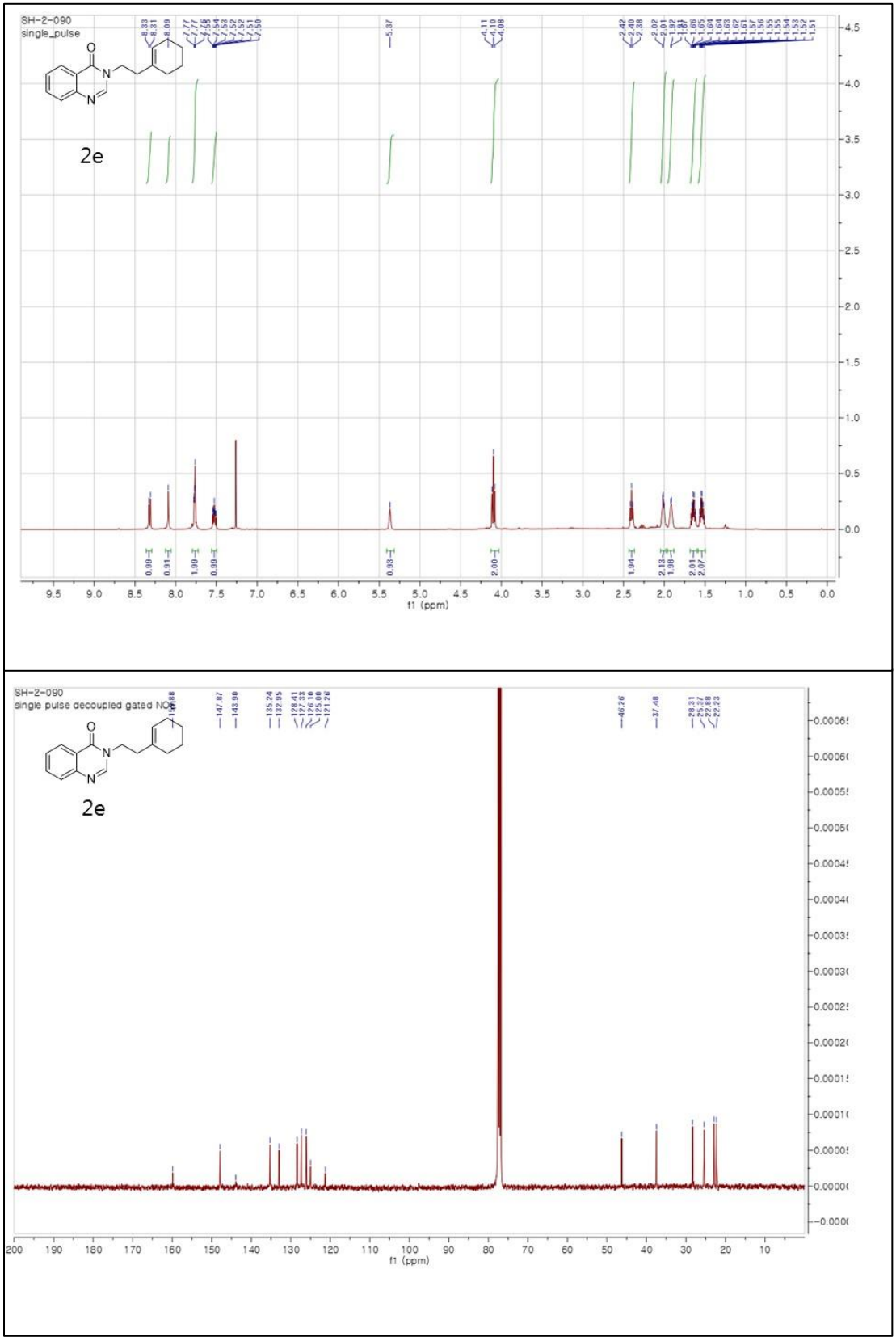
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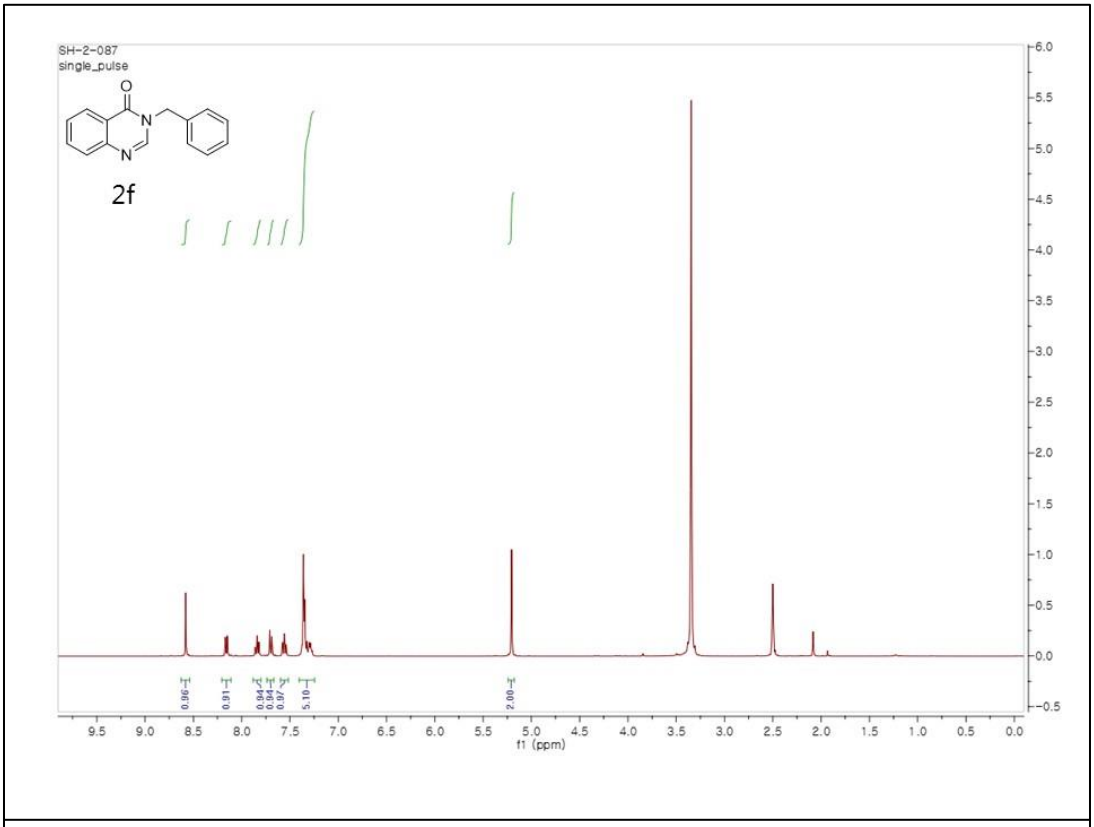
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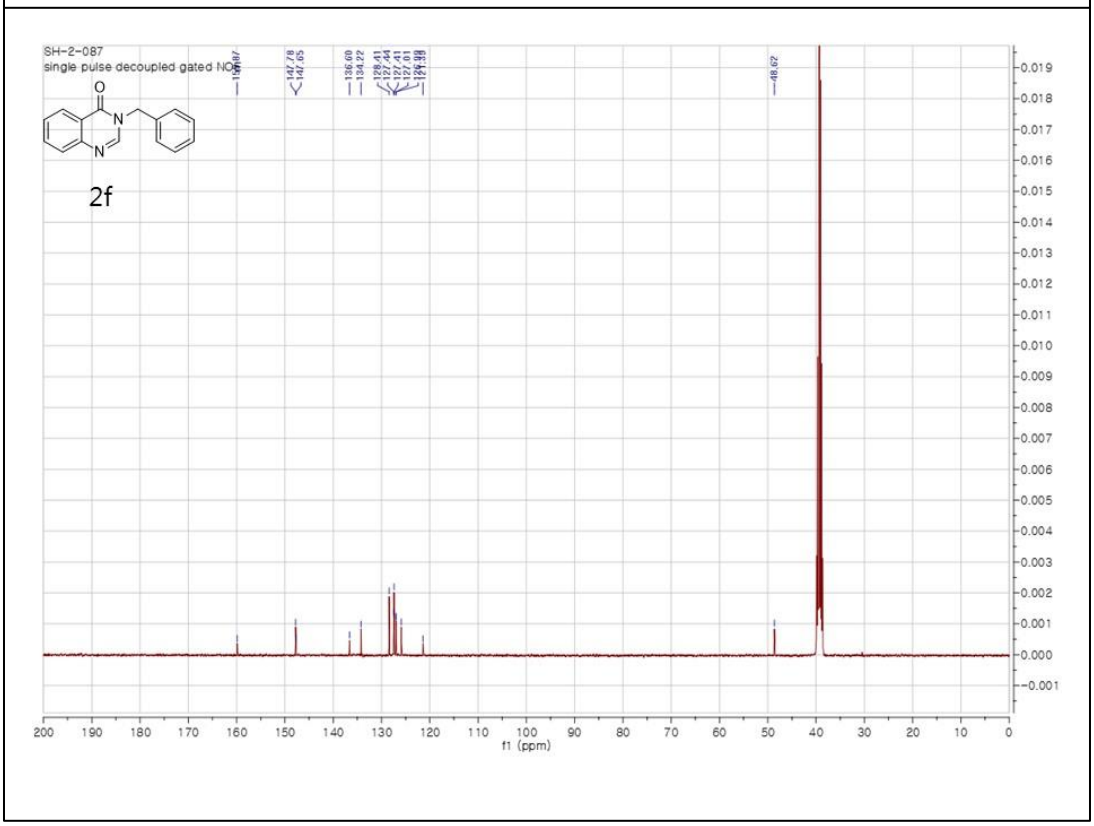
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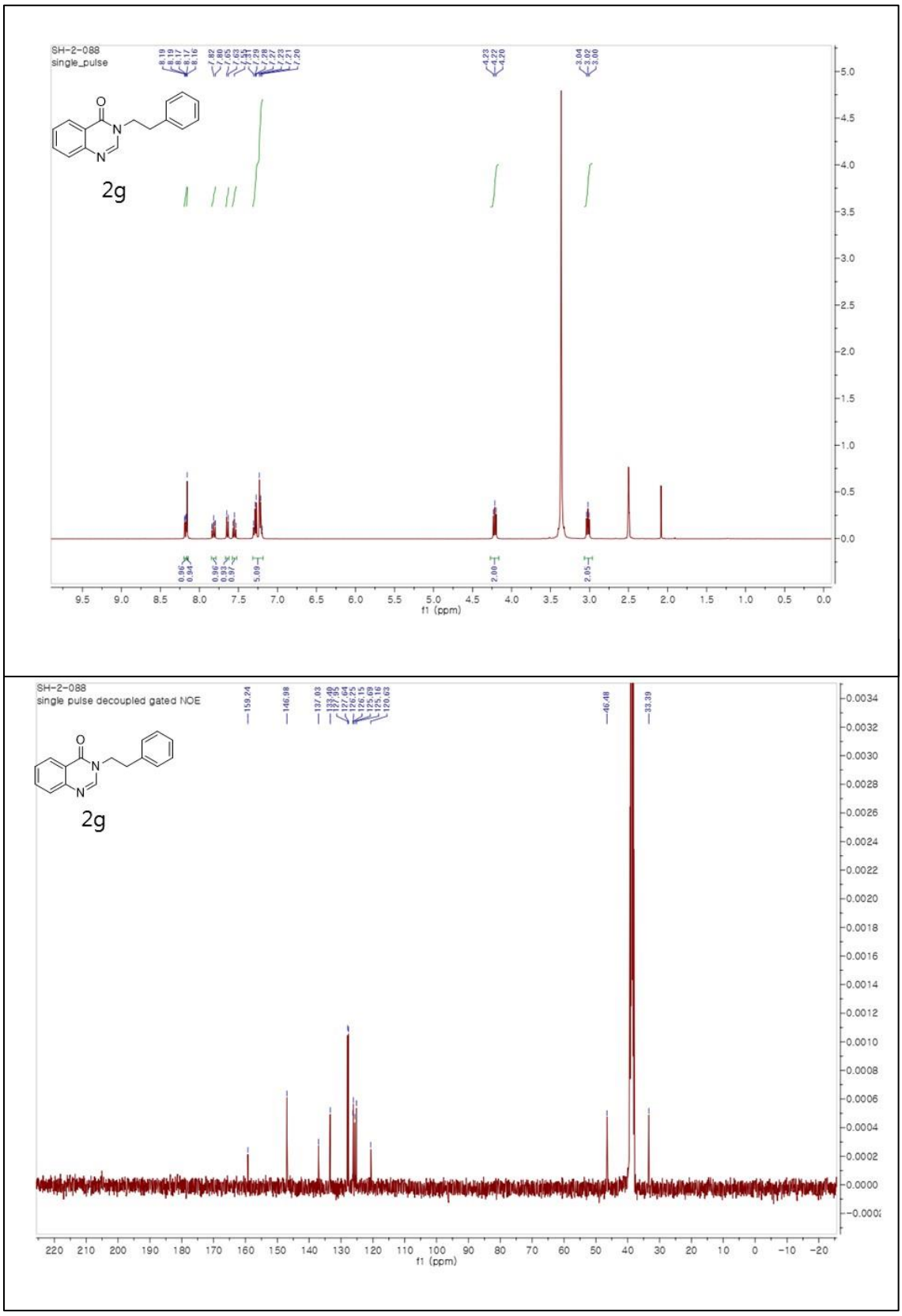
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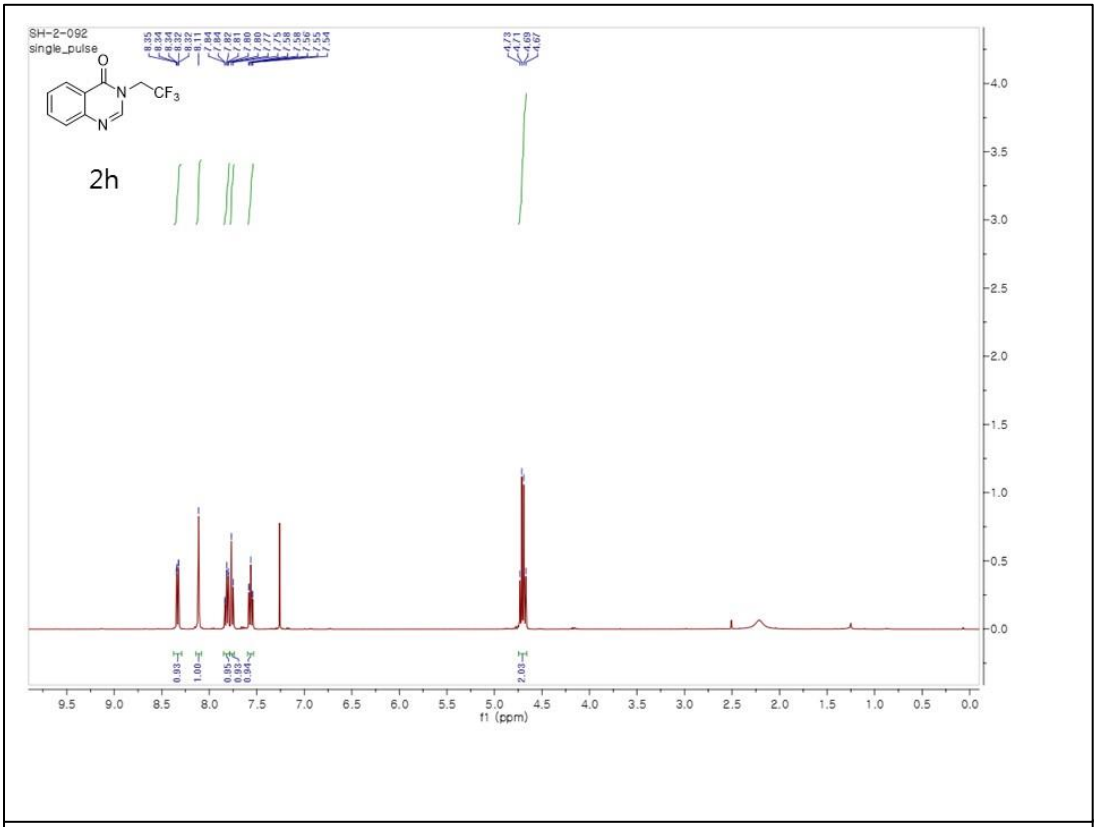
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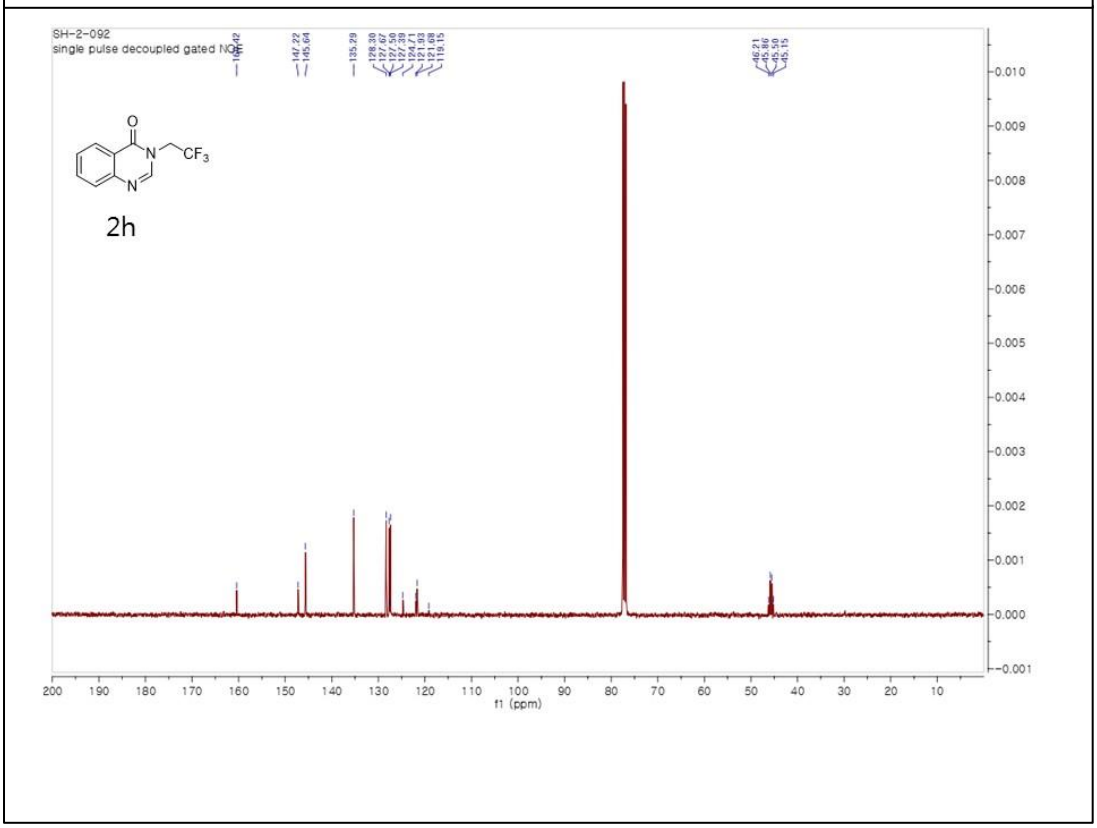
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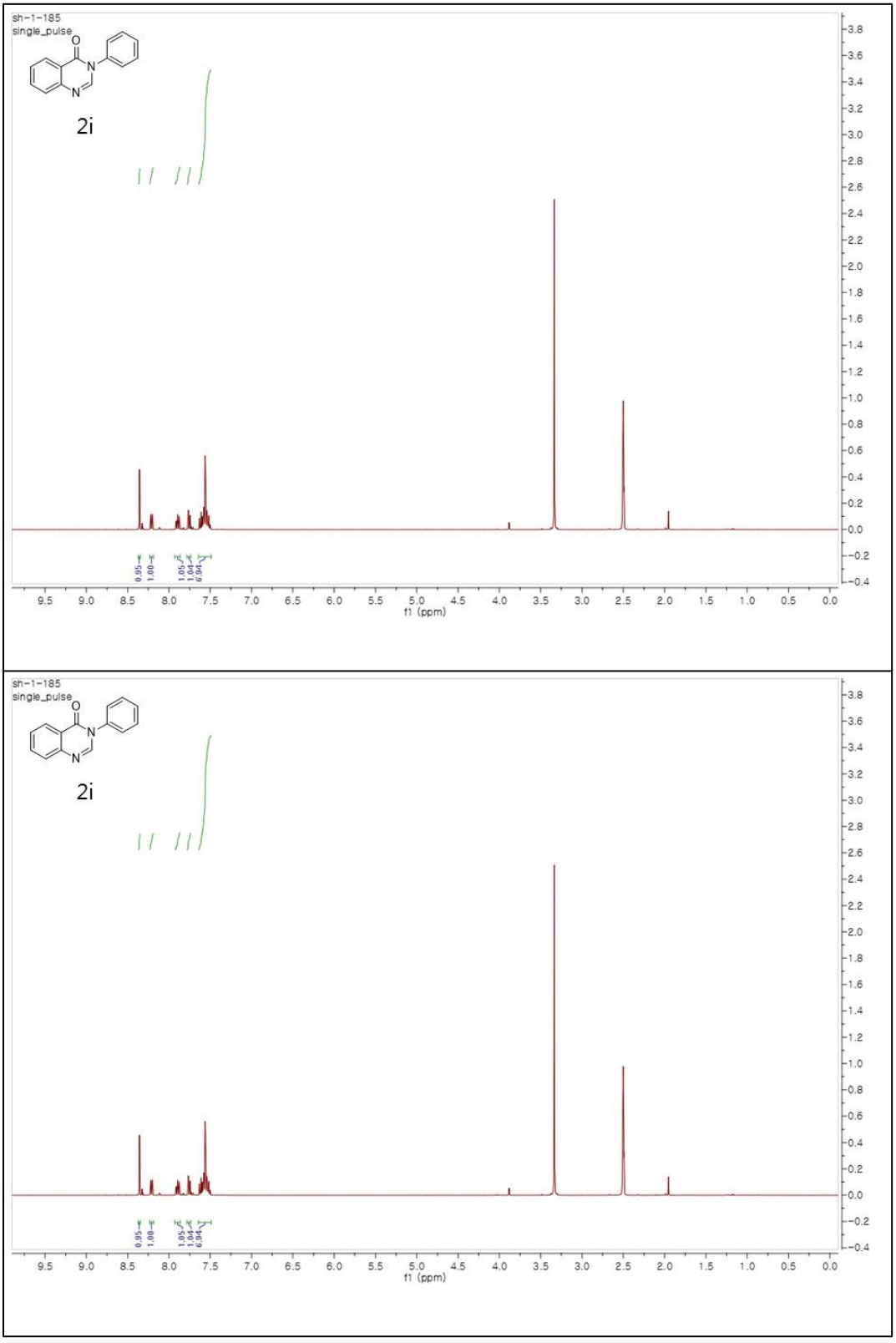
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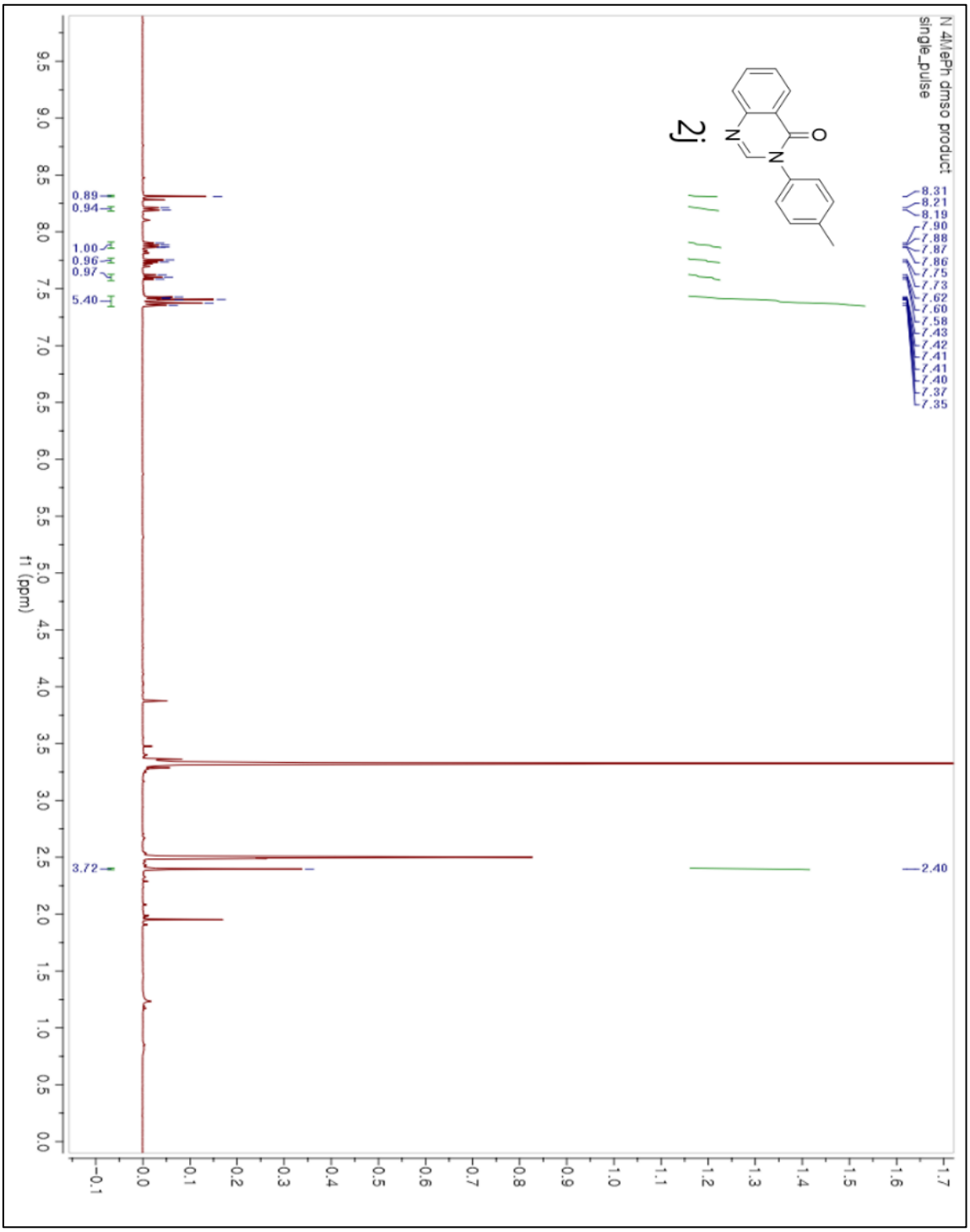
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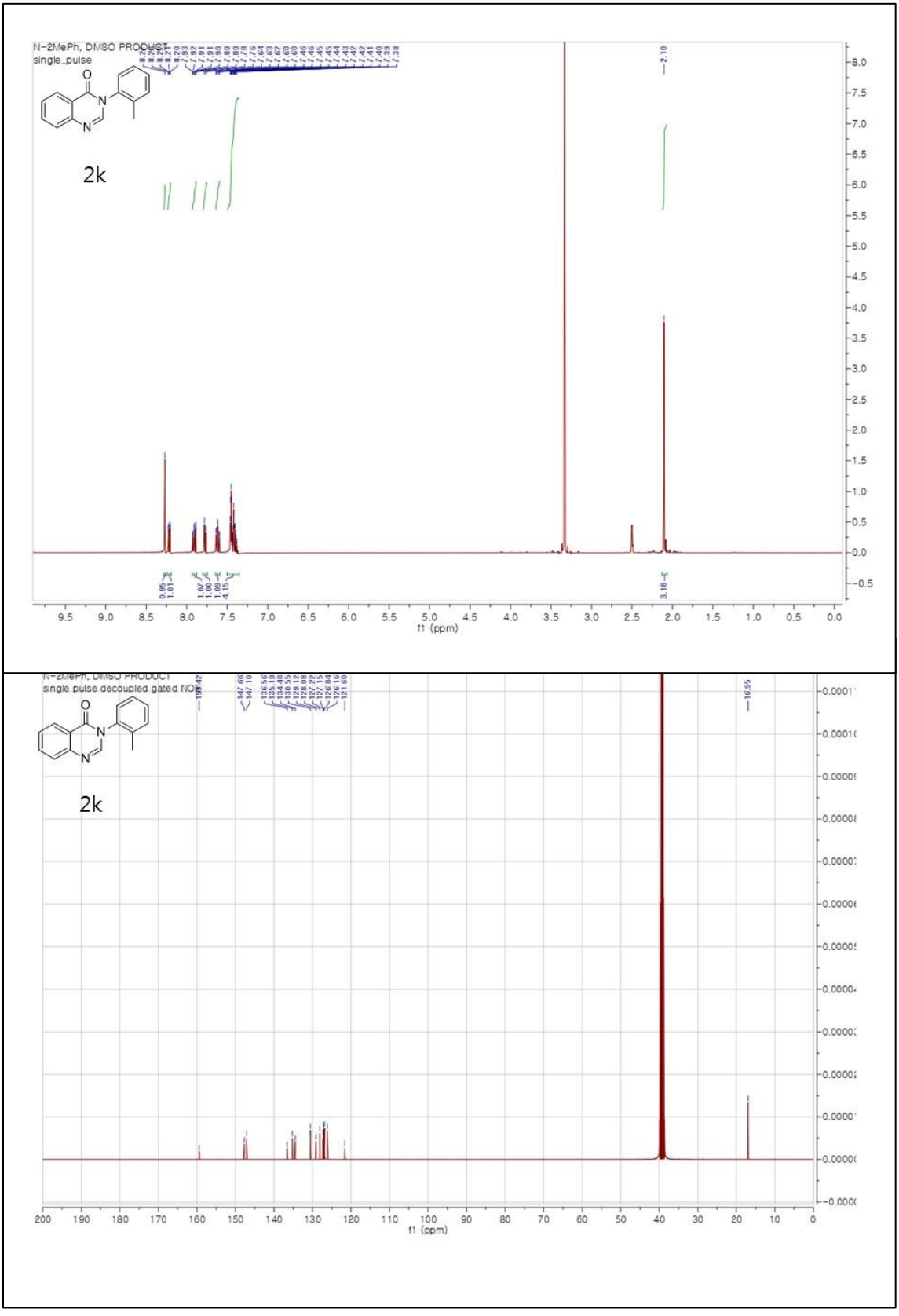
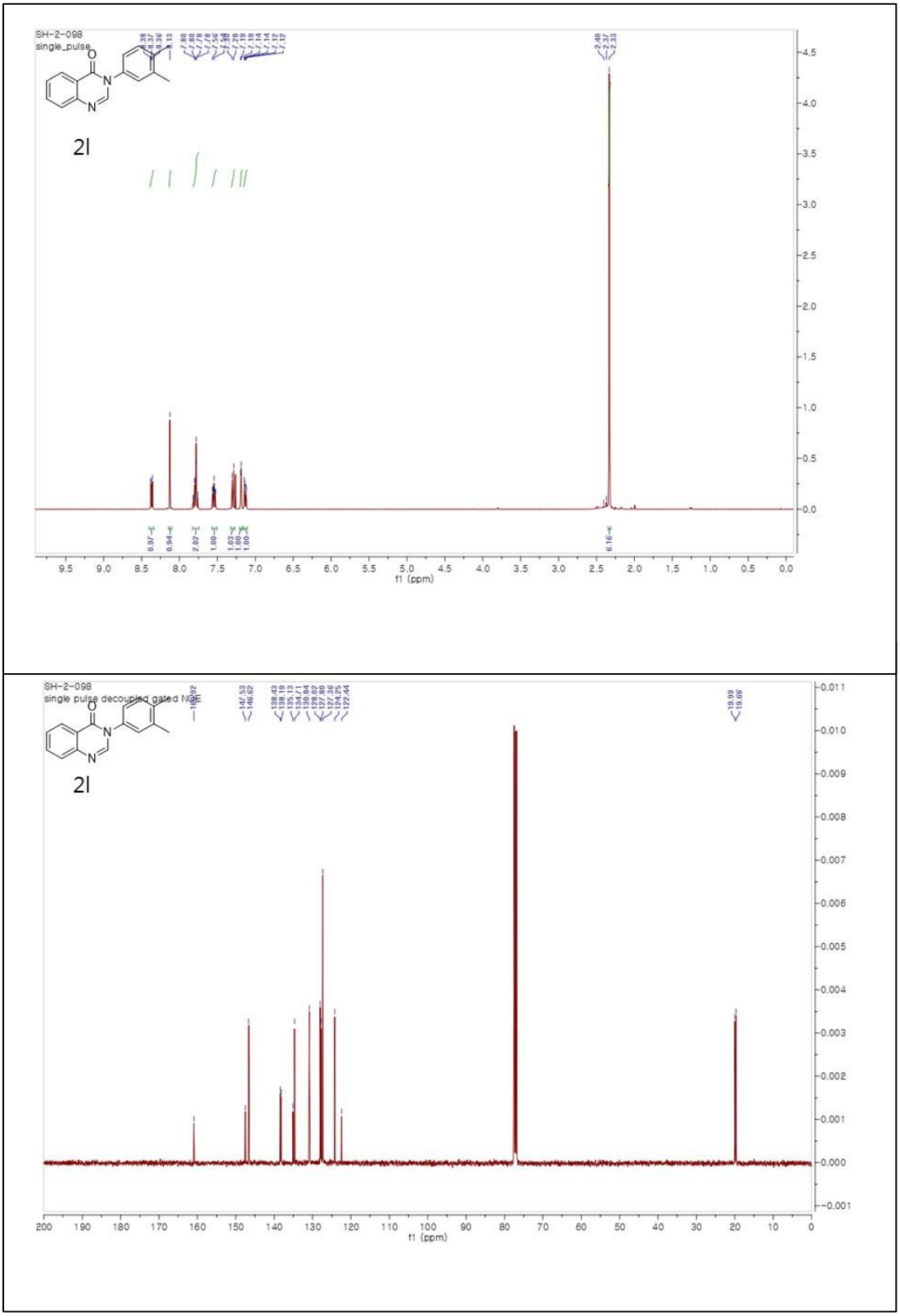
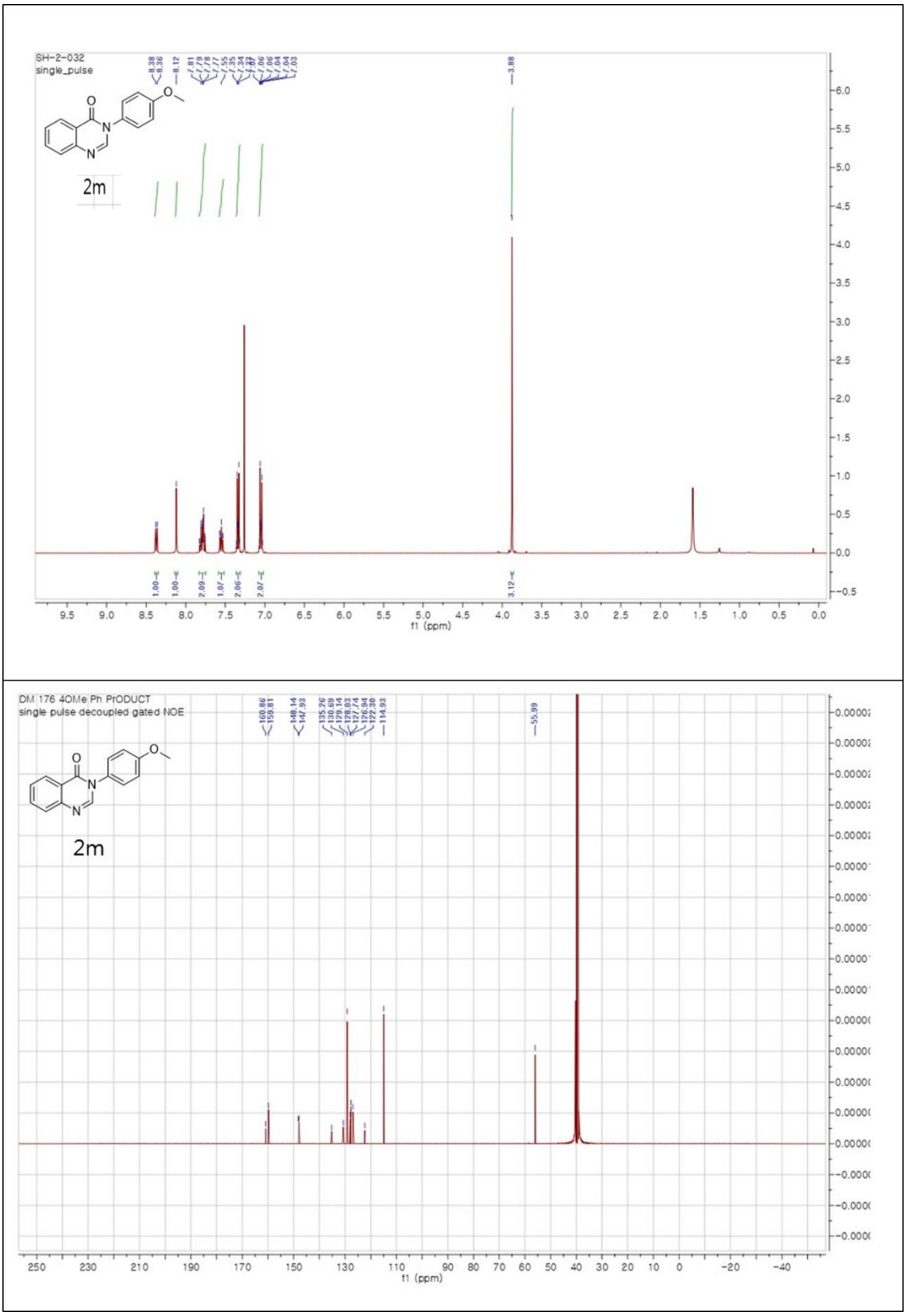
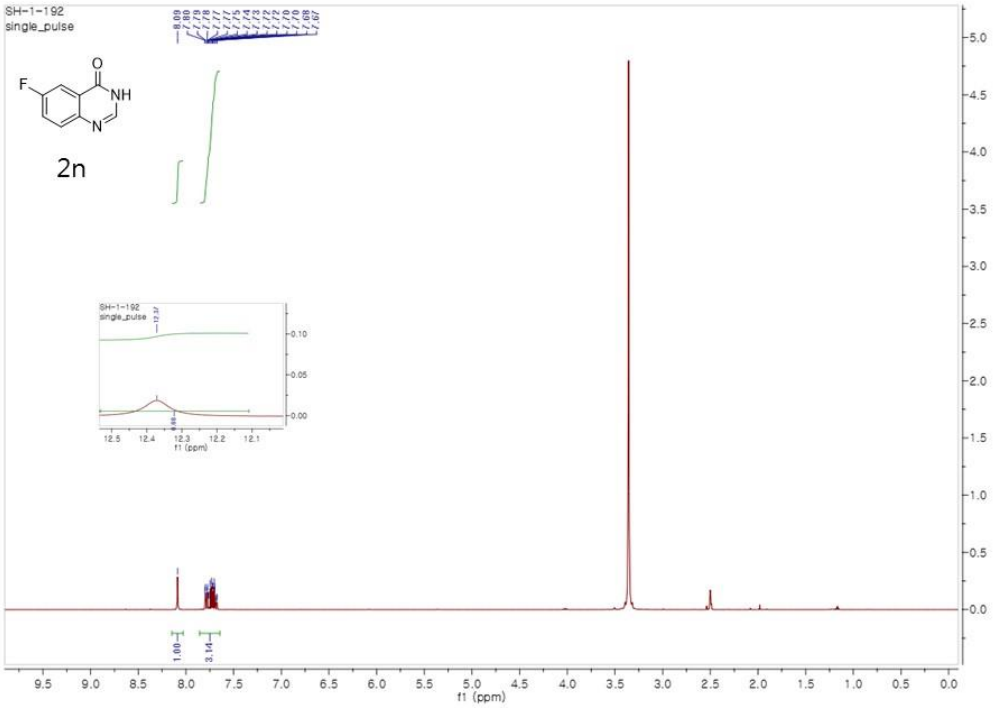
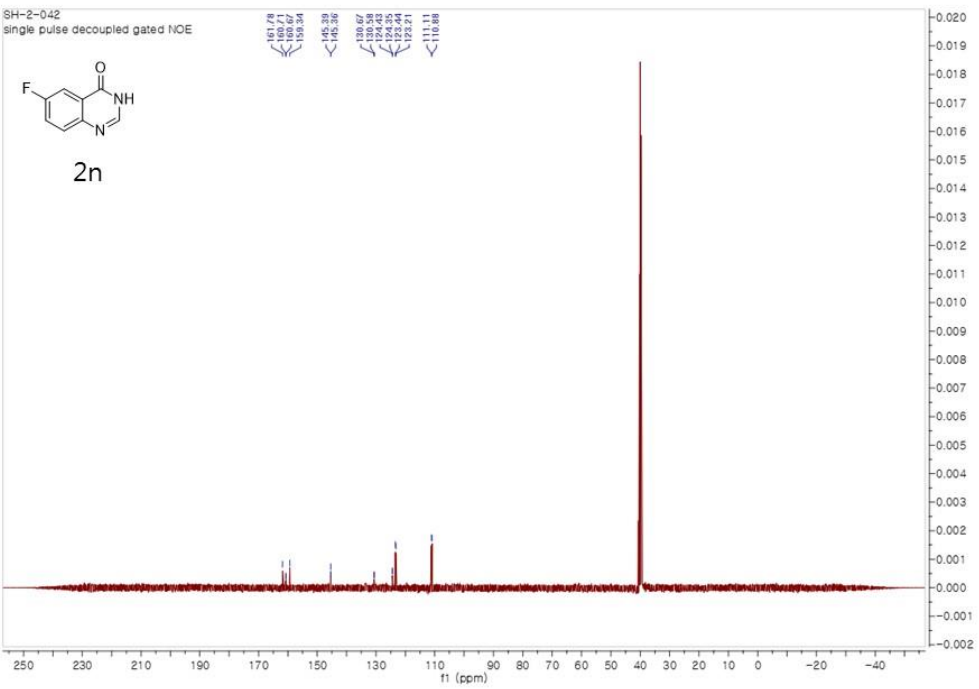
2.40
f1 (ppm)

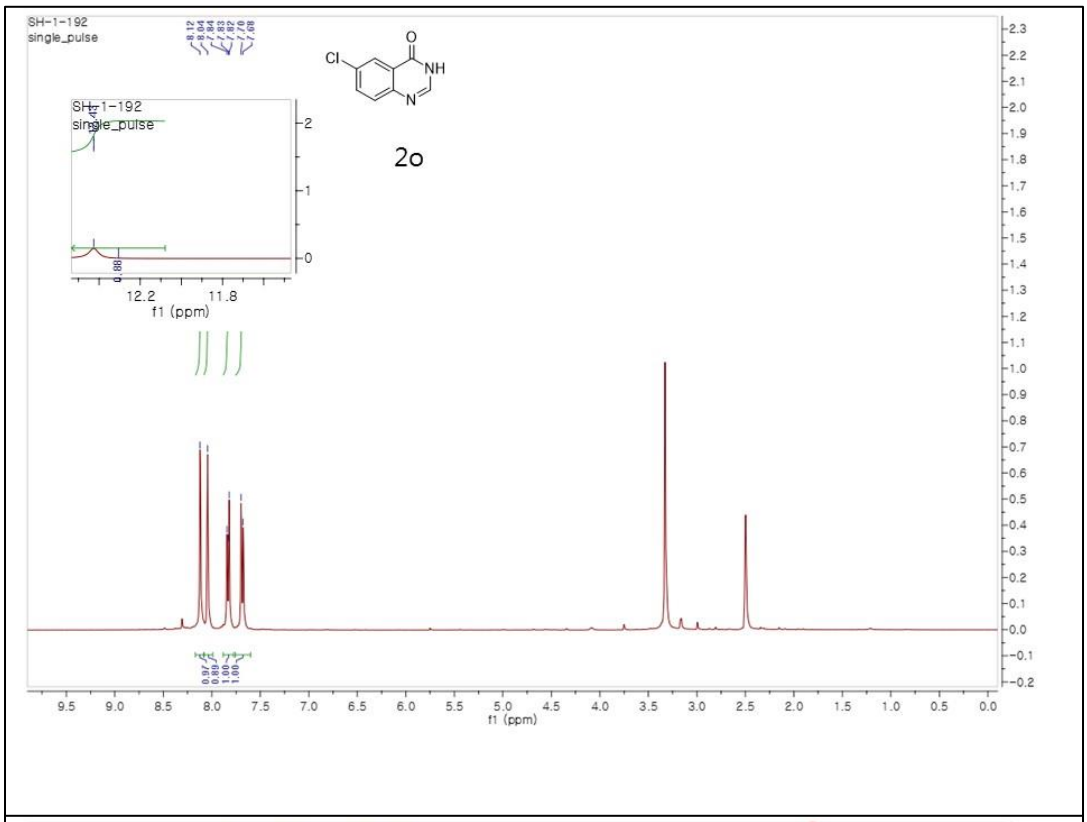

N-2MePh, DMSO PRODUCT
single_pulse
2k
f1 (ppm)
N-2MePh, DMSO PRODUCT
single pulse decoupled gated NOE
2k
f1 (ppm)

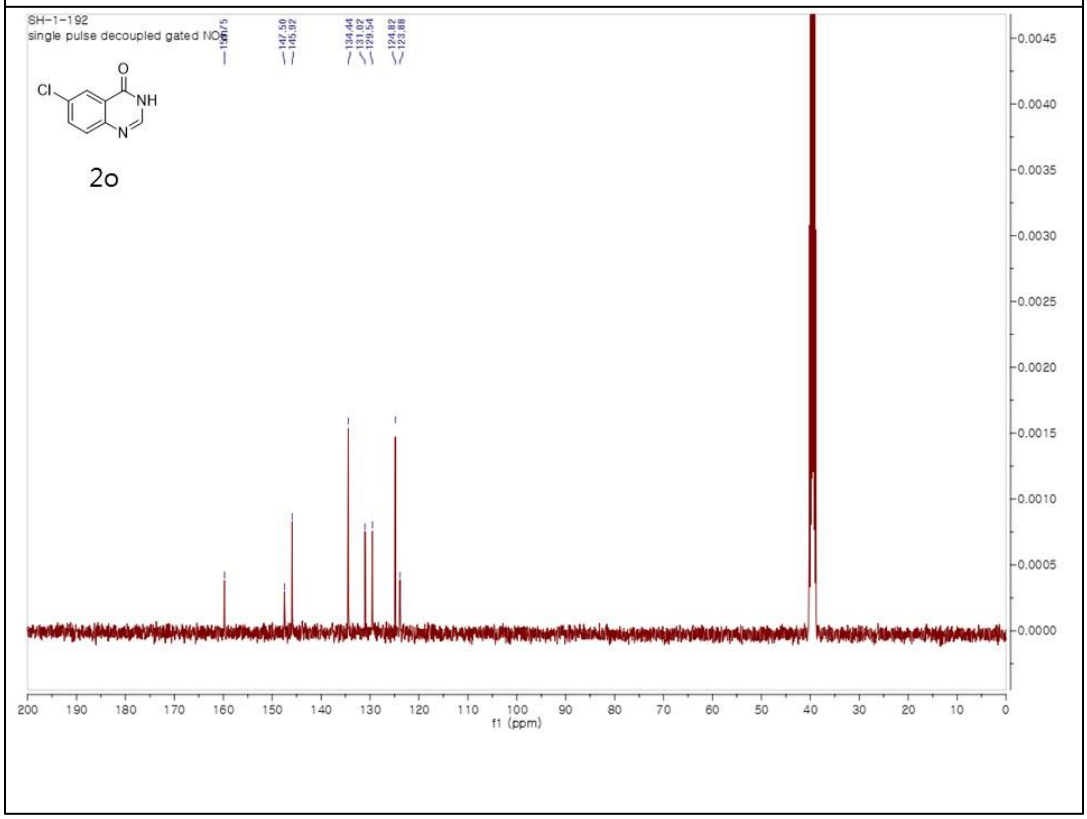

SH-2-098
single_pulse
2l
f1 (ppm)
SH-2-098
single pulse decoupled gated NOE
2l
f1 (ppm)

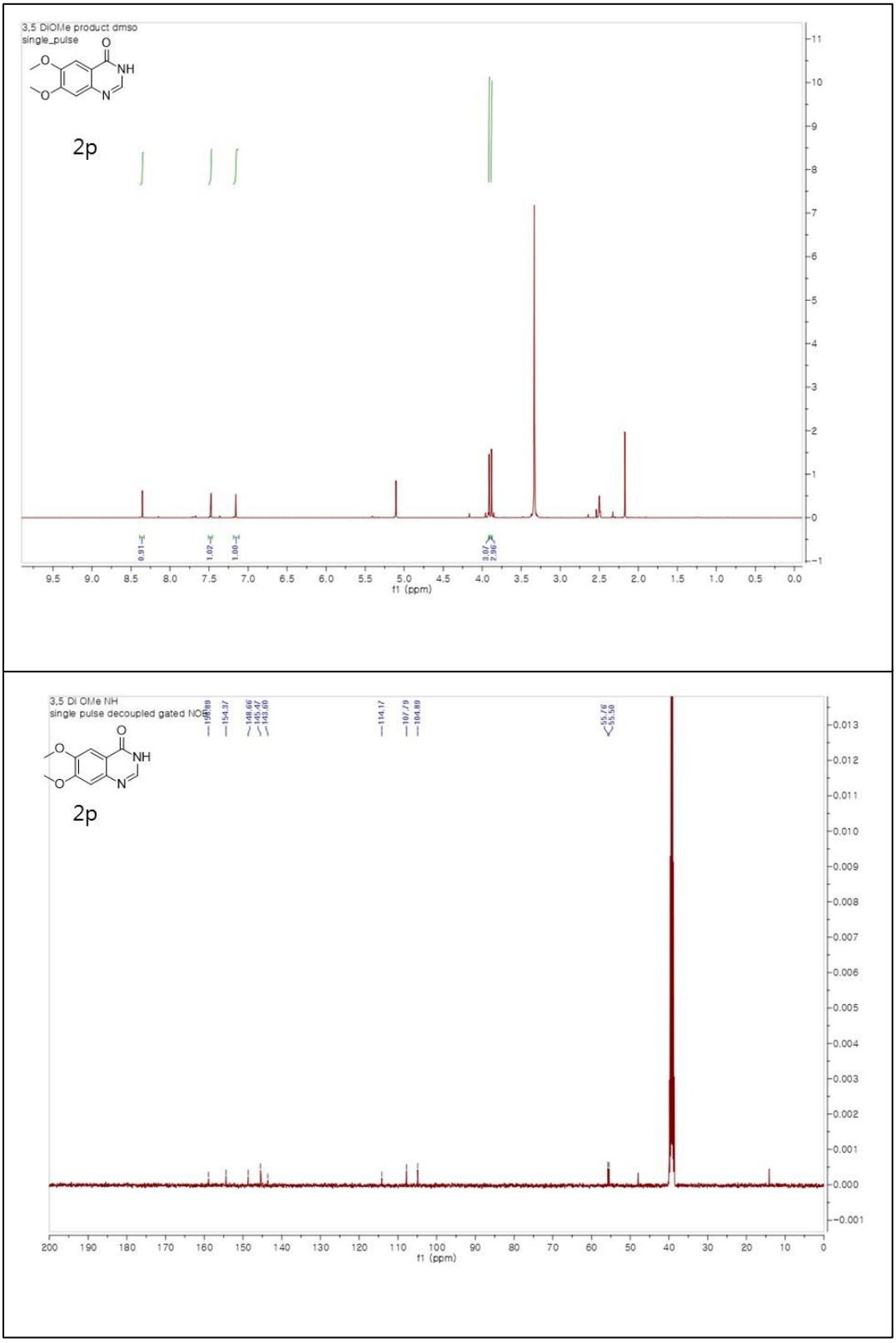

SH-2-032
single_pulse
2m
f1 (ppm)
DM 176 4OMe Ph PrODUCT
single pulse decoupled gated NOE
2m
f1 (ppm)

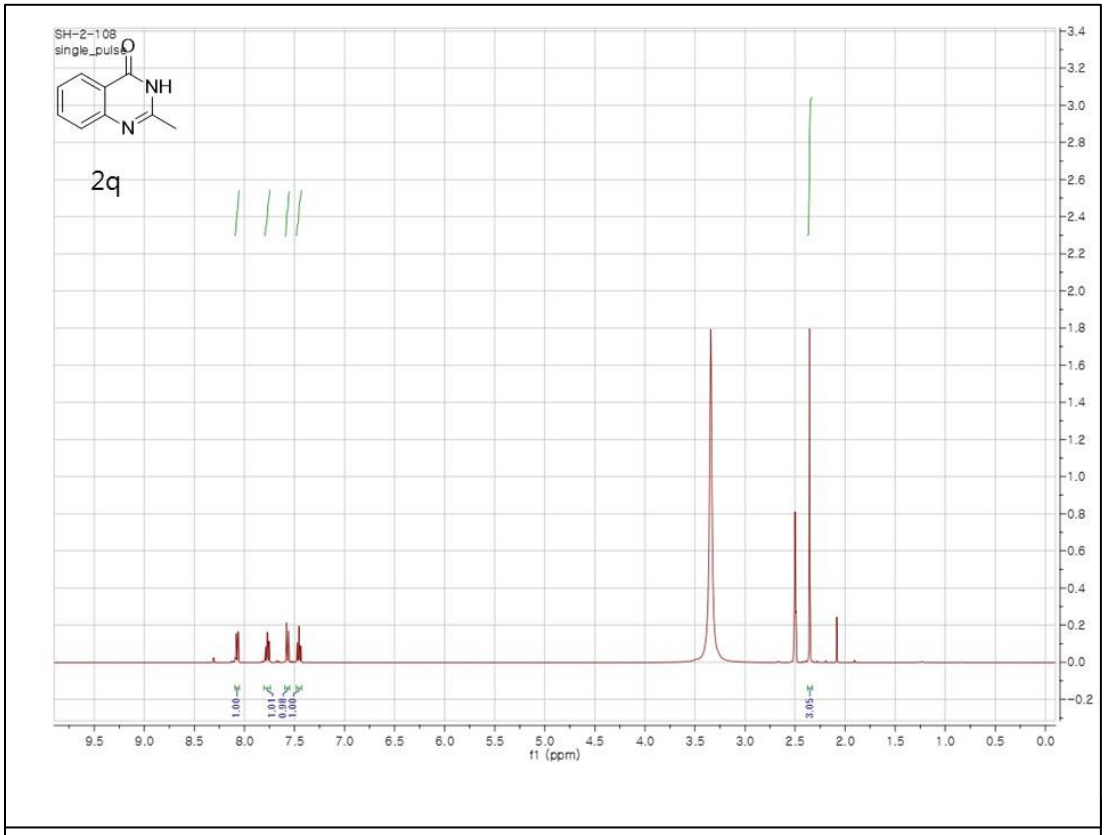

SH-1-192
single_pulse
2n
f1 (ppm)

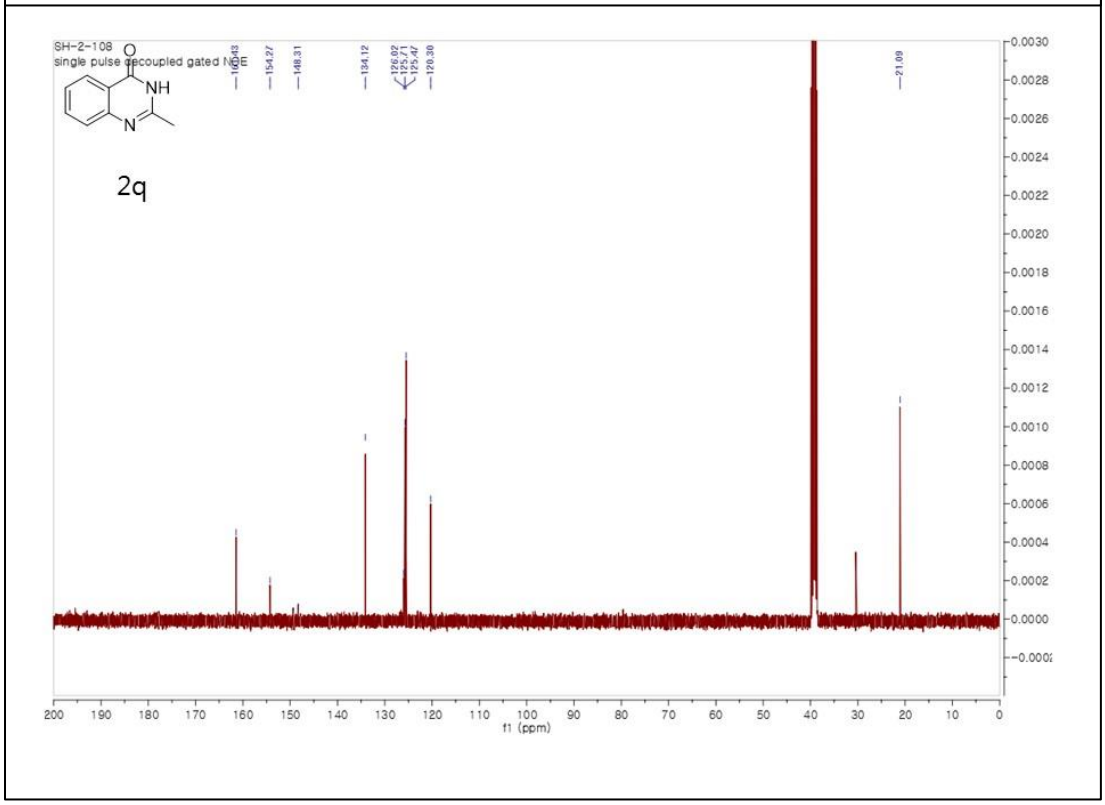

SH-2-042
single pulse decoupled gated NOE
2n
f1 (ppm)

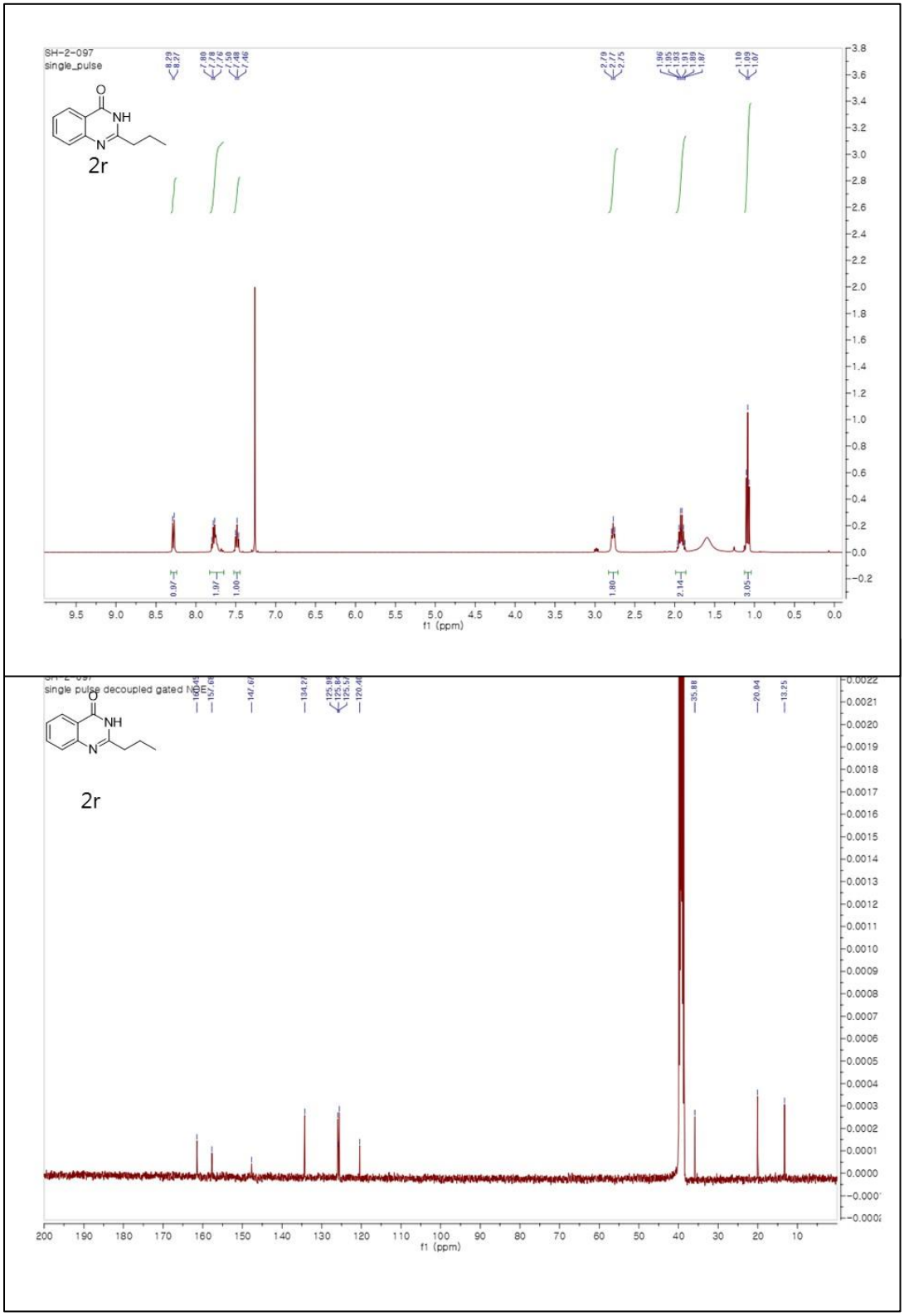

SH-1-192
single_pulse
8.12
8.04
7.84
7.83
7.82
7.76
7.68
Cl
O
NH
N
2o
SH-1-192
single_pulse
12.2
11.8
f1 (ppm)
f1 (ppm)

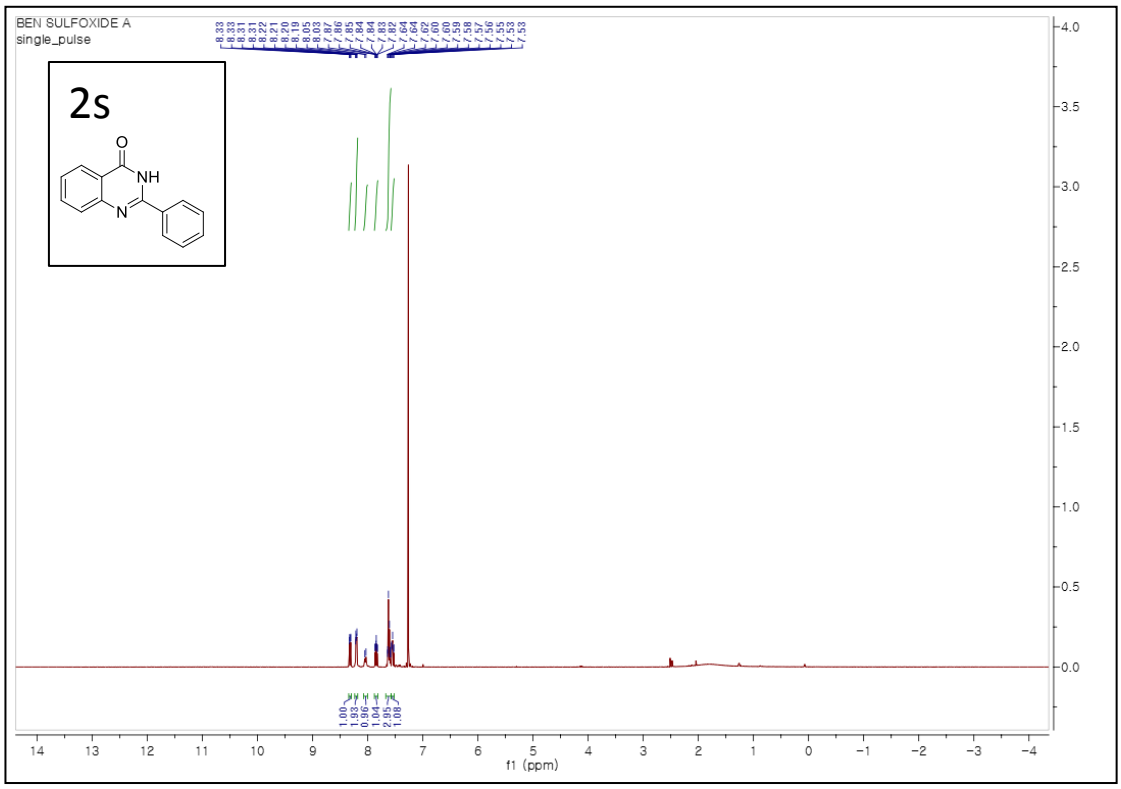

SH-1-192
single pulse decoupled gated NOE
160.75
147.50
145.92
134.44
131.82
129.54
124.82
123.88
Cl
O
NH
N
2o
f1 (ppm)

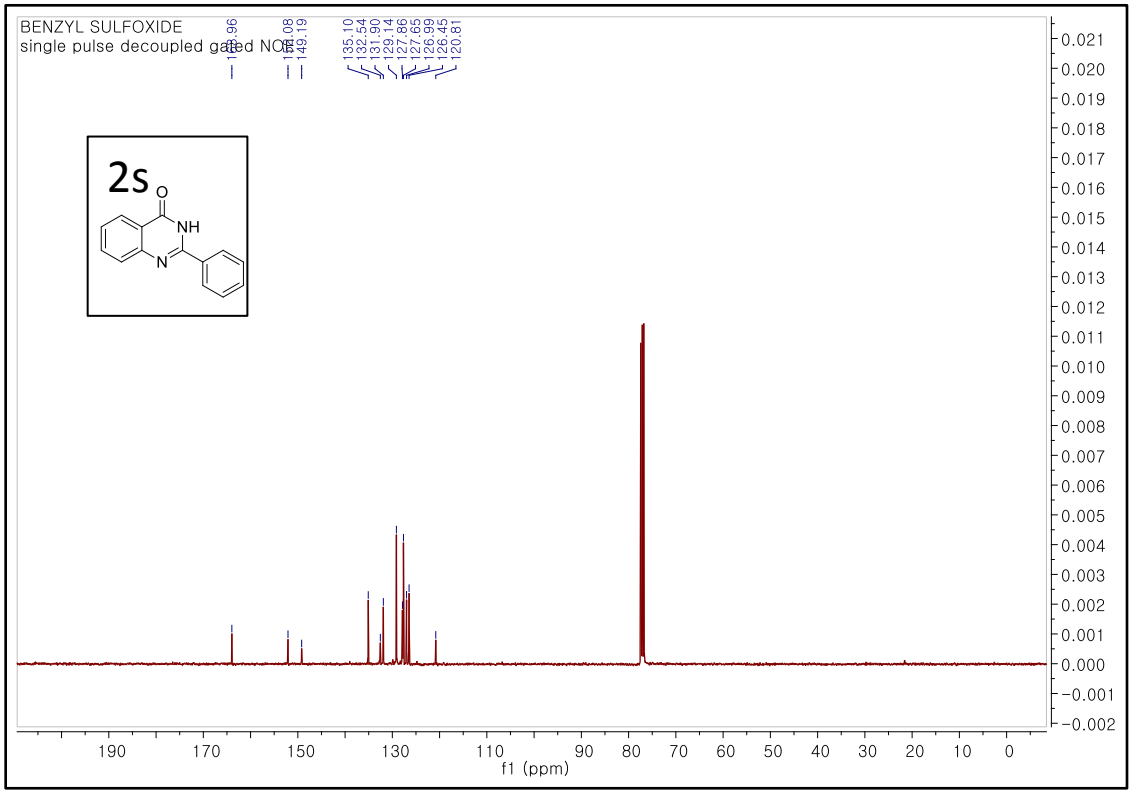

3,5 DiOMe product dmso
single_pulse
2p
f1 (ppm)
3,5 Di OMe NH
single pulse decoupled gated NOE
2p
f1 (ppm)

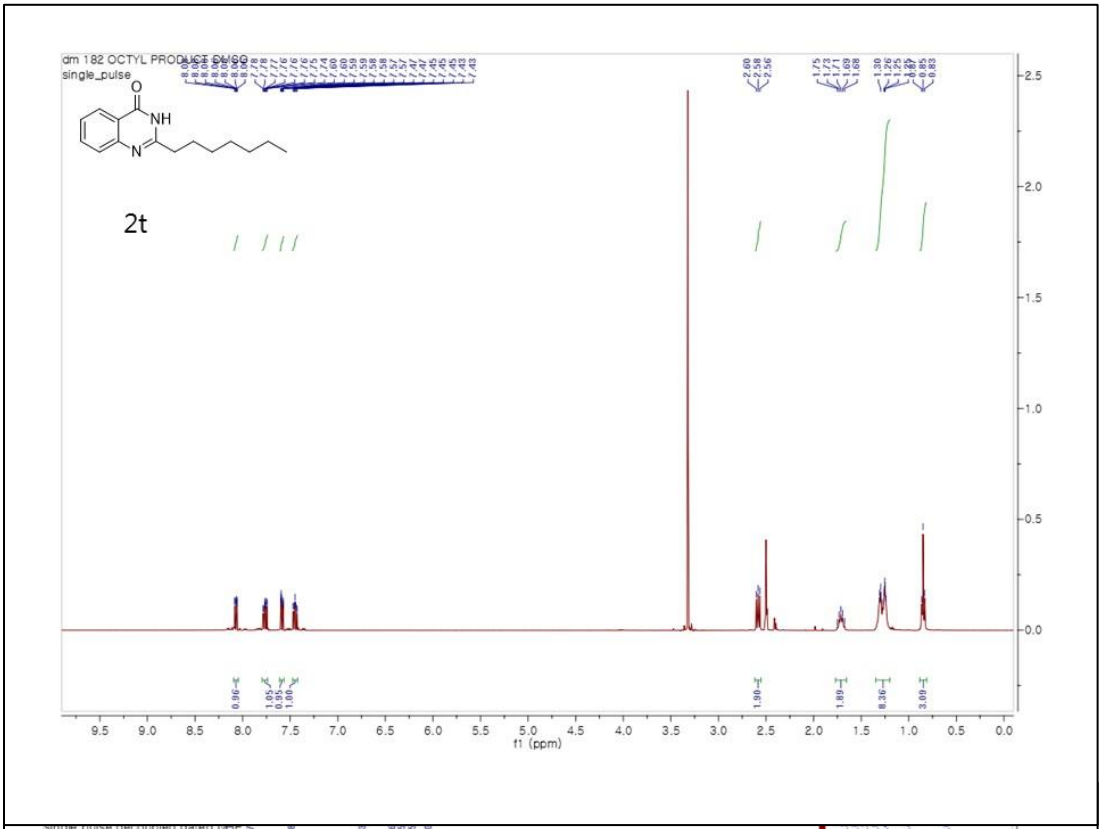

SH-2-108
single_pulse
NH
N
2q
1.00
1.01
0.98
1.00
3.05
f1 (ppm)

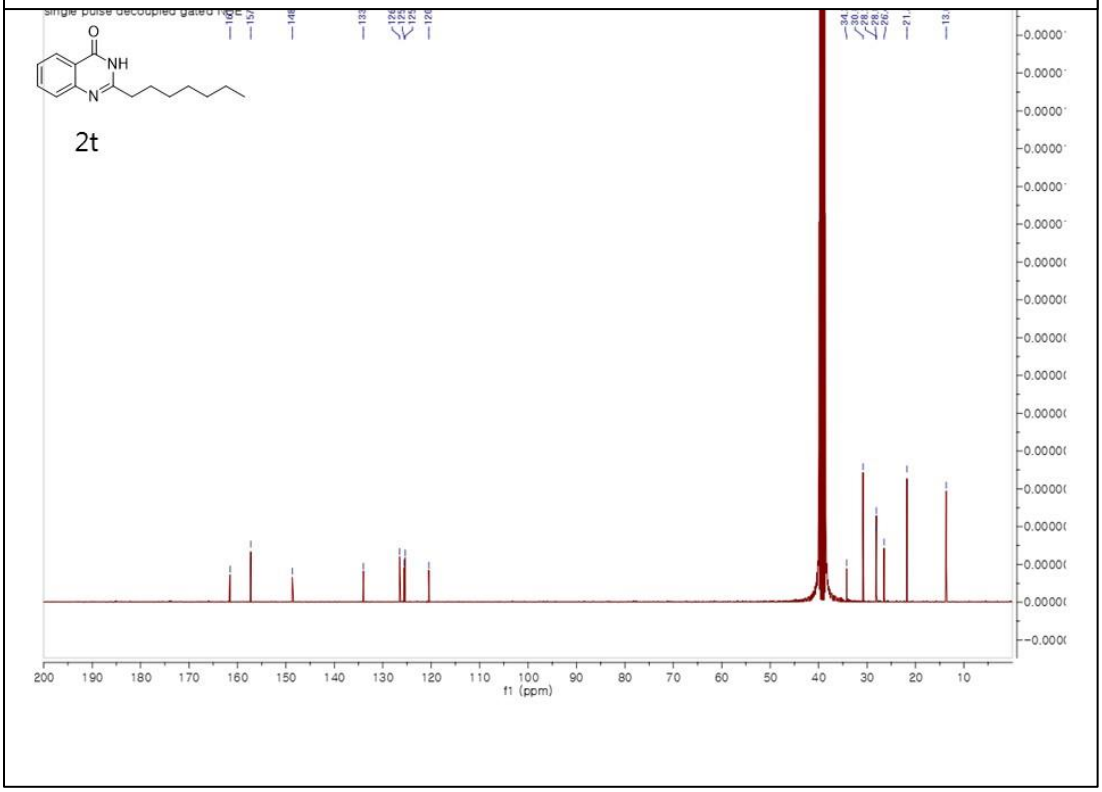

SH-2-108
single pulse decoupled gated NOE
NH
N
2q
161.43
154.27
148.31
134.12
126.02
125.71
125.47
120.30
21.09
f1 (ppm)

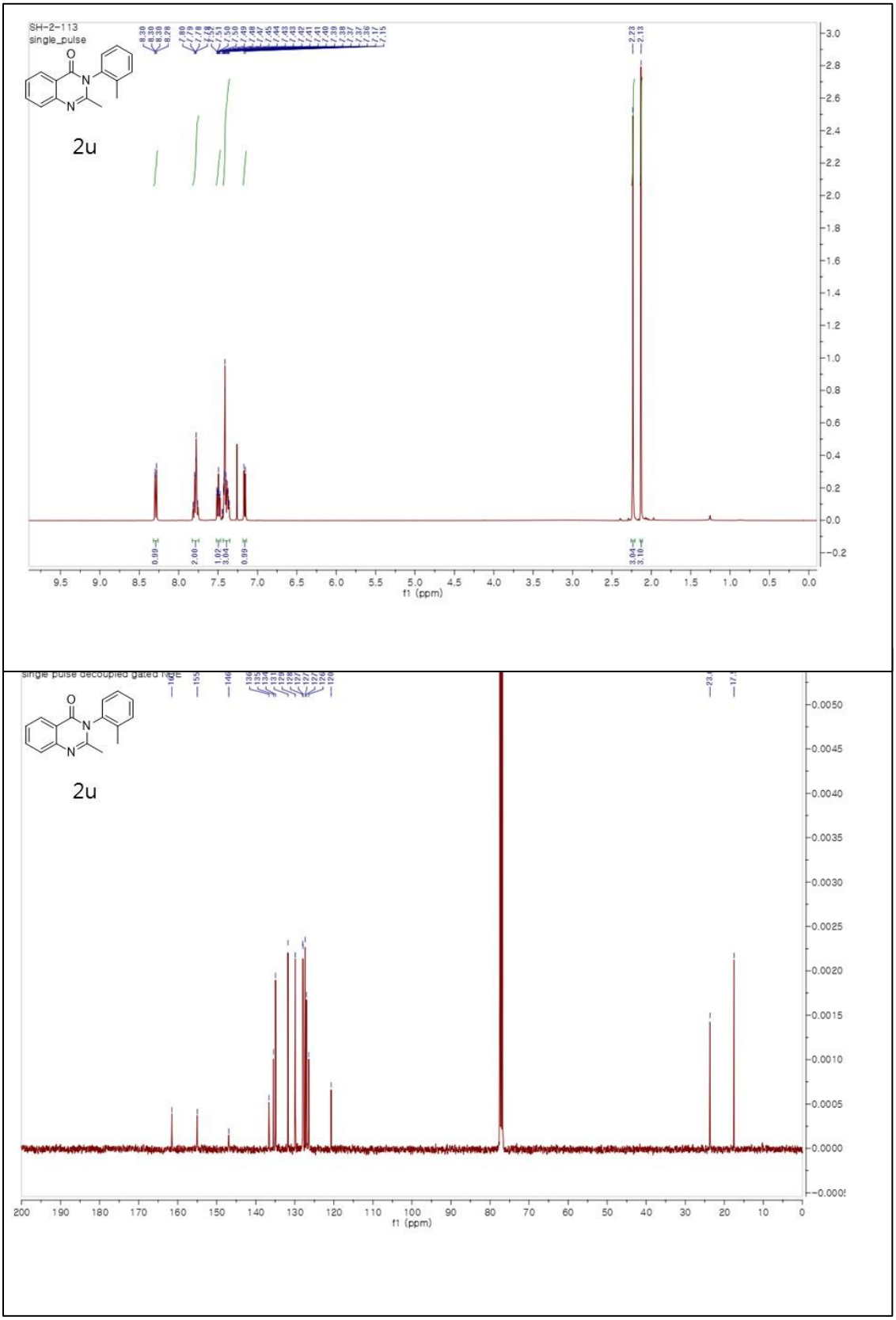

SH-2-097
single_pulse
2r
f1 (ppm)
SH-2-097
single pulse decoupled gated NOE
2r
f1 (ppm)

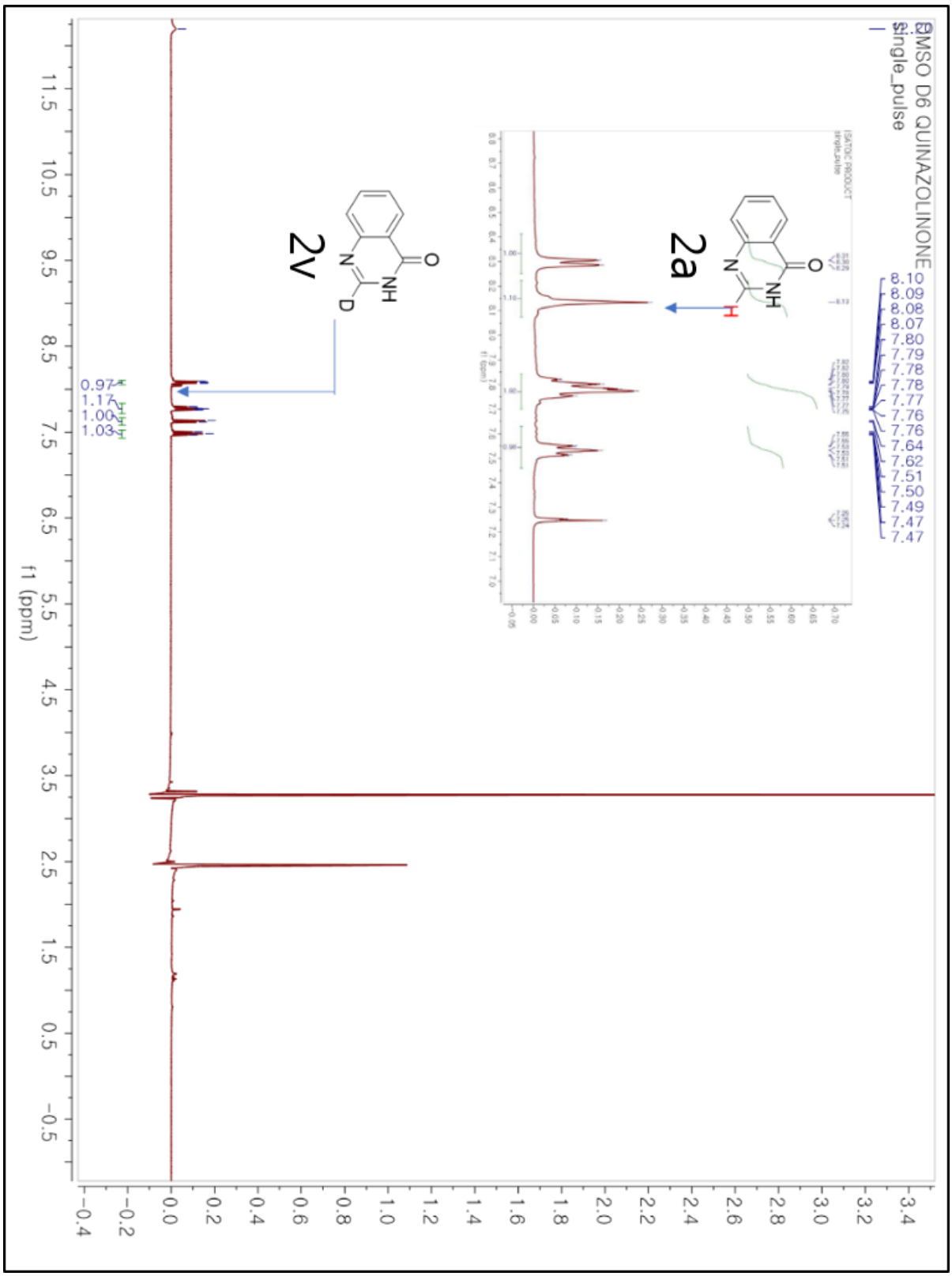

BEN SULFOXIDE A
single_pulse
2s
f1 (ppm)


BENZYL SULFOXIDE
single pulse decoupled gated NOE
2s
f1 (ppm)


single_pulse
2t
f1 (ppm)


2t
f1 (ppm)


SH-2-113
single_pulse
2u
f1 (ppm)
2u
f1 (ppm)


DMSO D6 QUINAZOLINONE
Single_pulse
8.10
8.09
8.08
8.07
7.80
7.79
7.78
7.78
7.77
7.76
7.76
7.64
7.62
7.51
7.50
7.49
7.47
7.47
2a
2v
0.97
1.17
1.00
1.03
f1 (ppm)