

Electronic Supporting Information

Title: *p*-TSA·H₂O catalyzed metal-free and environmentally benign synthesis of 4-aryl quinolines from Arylamine, Arylacetylene, and Dimethyl sulfoxide

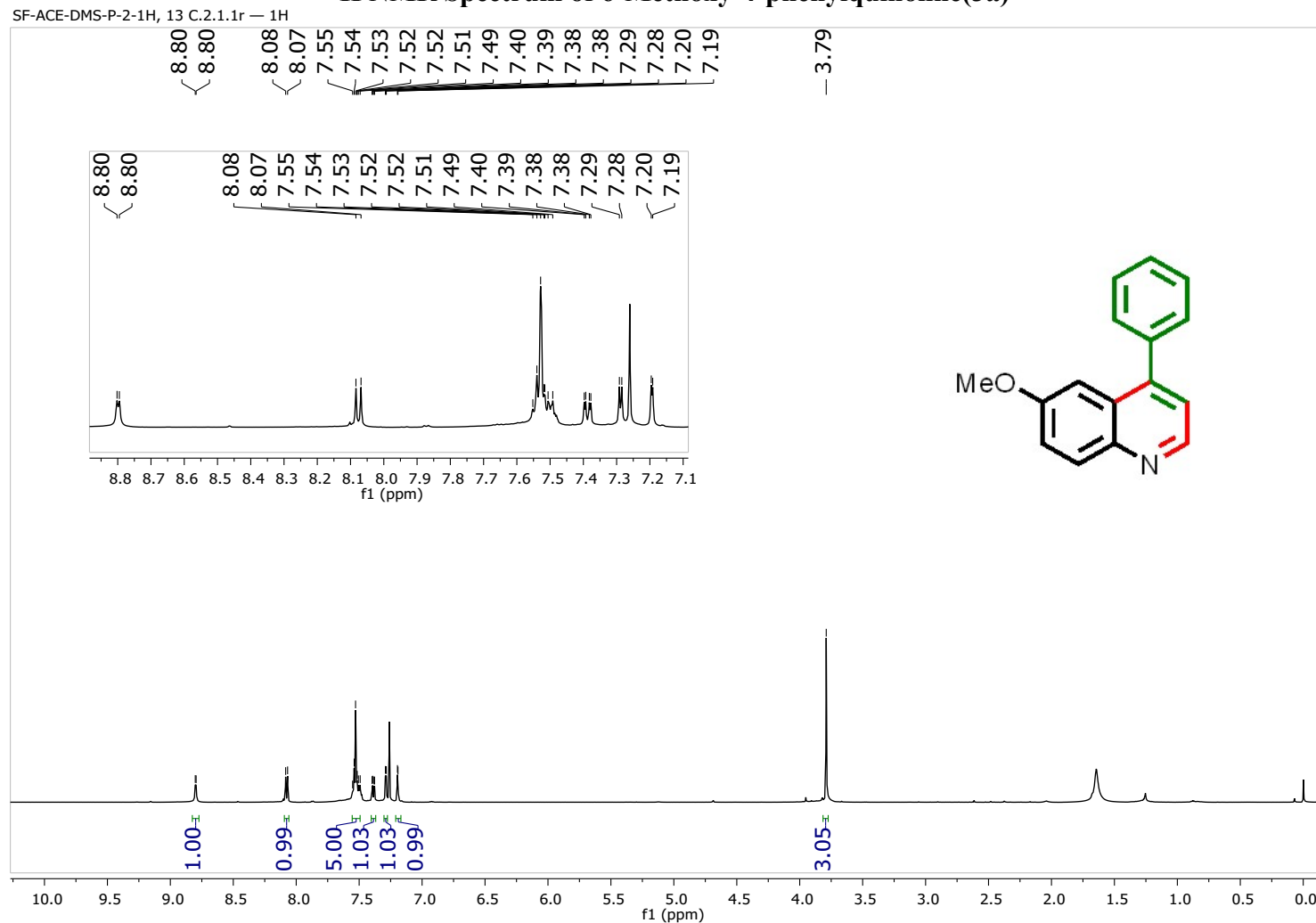
Simra Faraz,^a and Abu Taleb Khan^{a*}

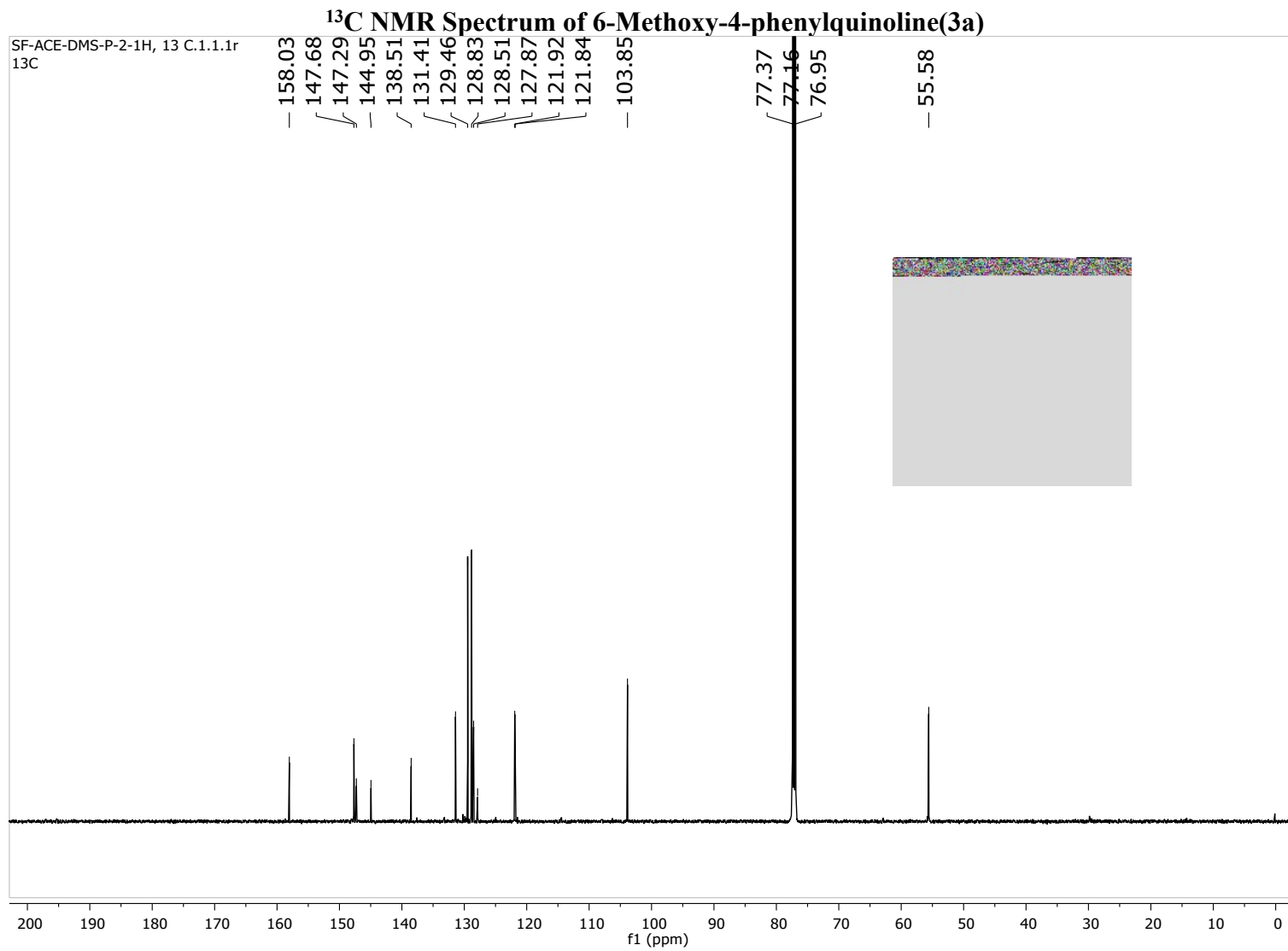
^a*Department of Chemistry, Indian Institute of Guwahati, Guwahati 781039, Assam, India.*

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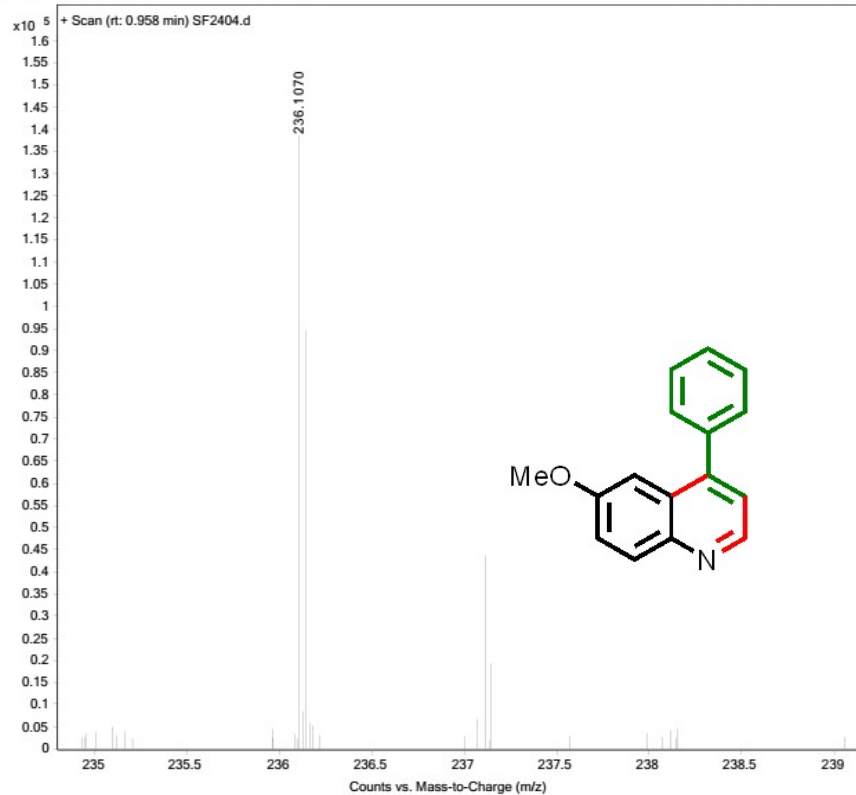
¹H NMR Spectrum of 6-Methoxy-4-phenylquinoline(3a)





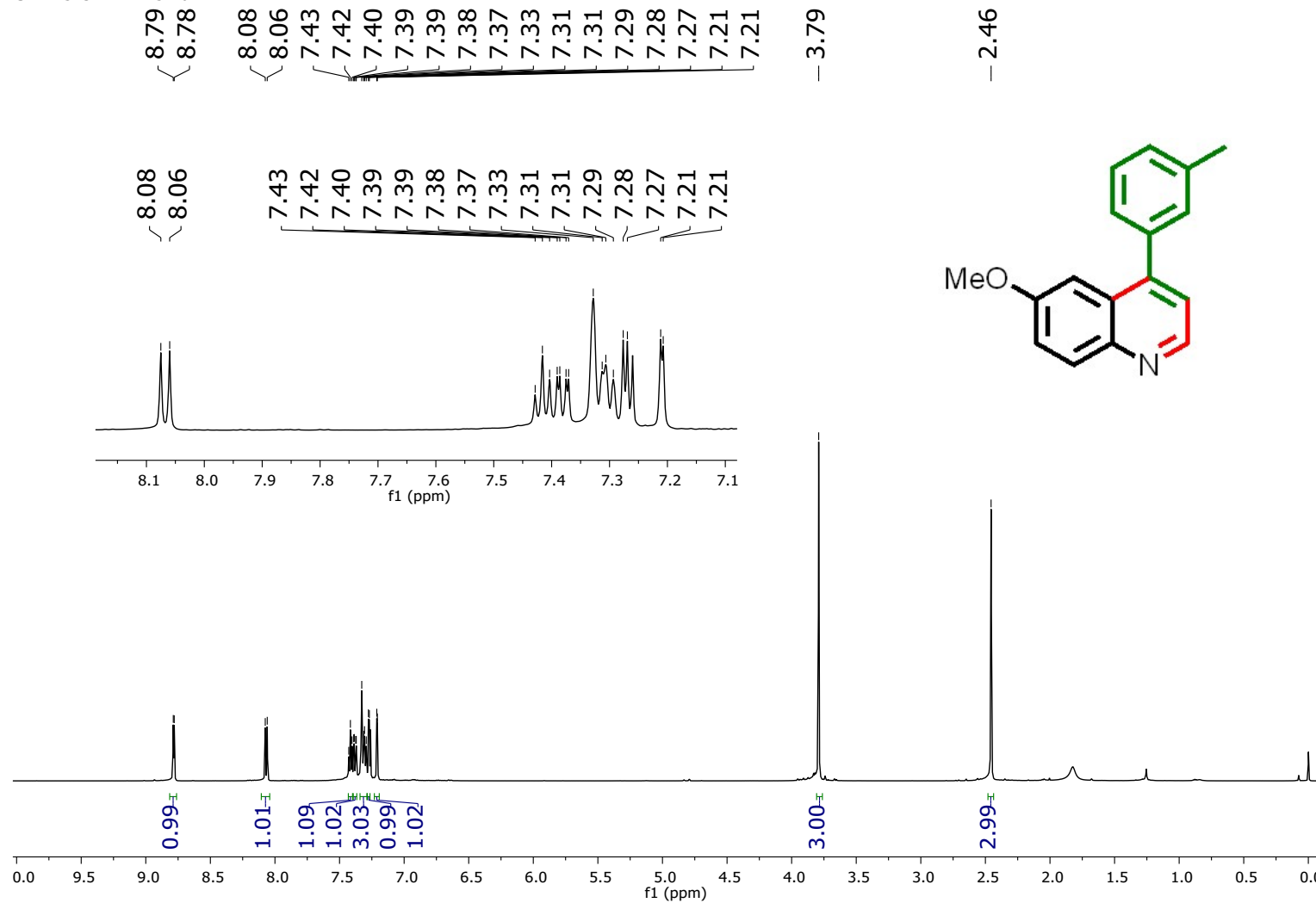
HRMS Spectrum of 6-Methoxy-4-phenylquinoline(3a)

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User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF2404.d
ACQ Method	DIRECT MASS_POSITIVE_01.m	Comment		Acquired Time	17-04-2023 11:49:14 (UTC+05:30)



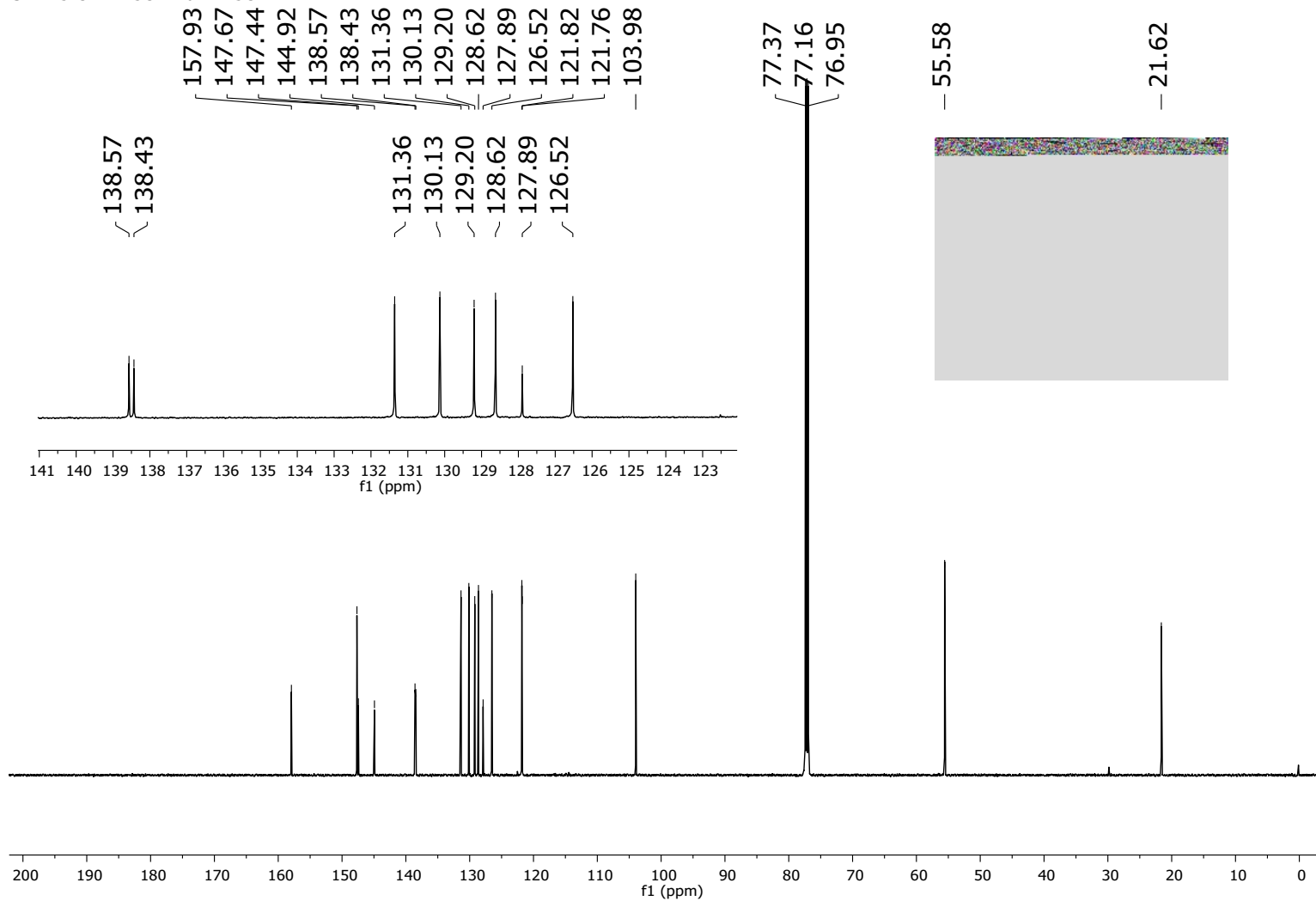
¹H NMR Spectrum of 6-Methoxy-4-(*m*-tolyl)quinoline (3b)

SFPA-3-CH-E-1H.3.fid — 1H



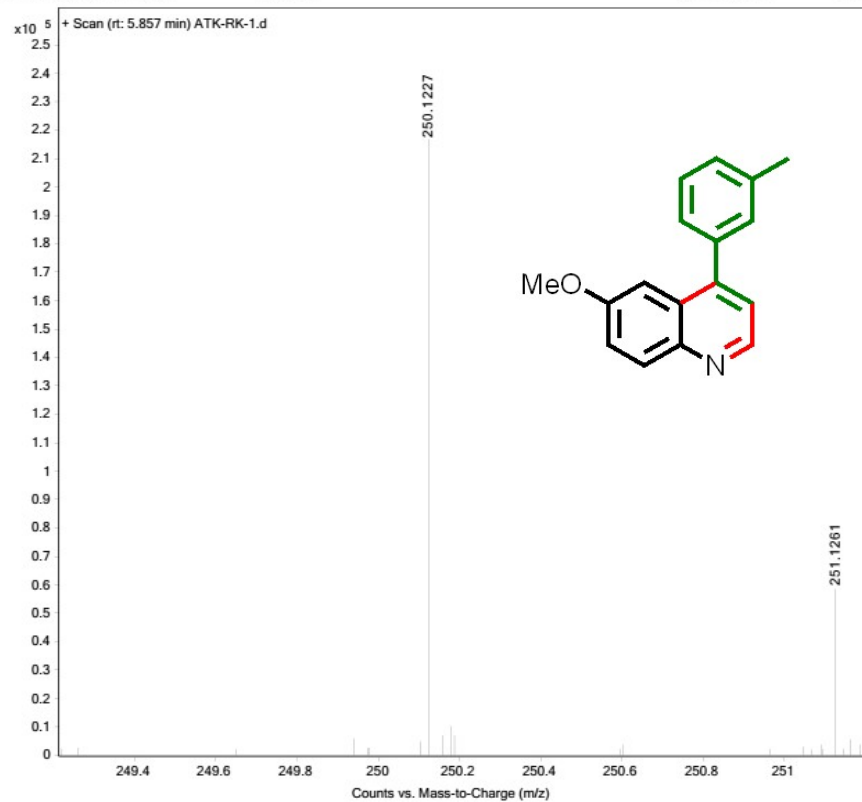
¹³C NMR Spectrum of 6-Methoxy-4-(*m*-tolyl)quinoline (3b)

SFPA-3-CH-E-13C.2.fid — 13C



HRMS Spectrum of 6-Methoxy-4-(*m-tolyl*)quinoline (3b)

Sample Name	Sample71	Position	P1-D3	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK-RK-1.d
ACQ Method	LC-COLUMN-TRAINING-METHOD.m	Comment		Acquired Time	11-04-2023 01:26:48 (UTC+05:30)



¹H NMR Spectrum of 6-Methoxy-4-(*p*-tolyl)quinoline(3c)

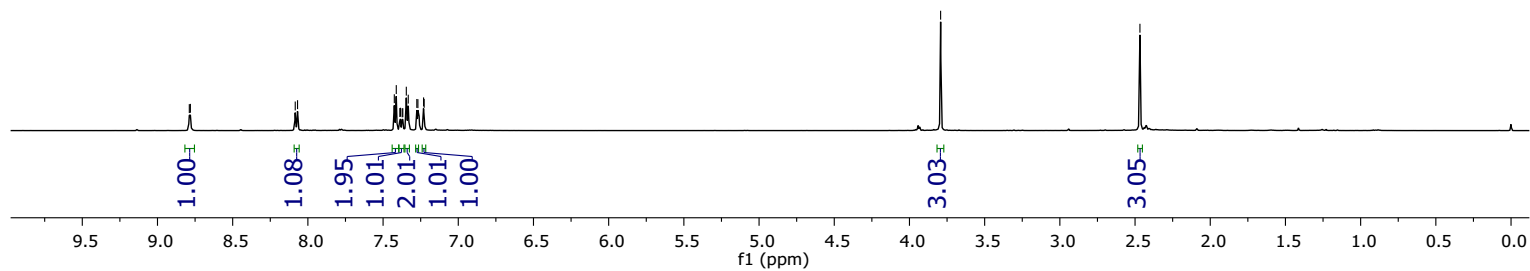
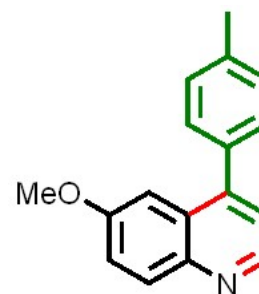
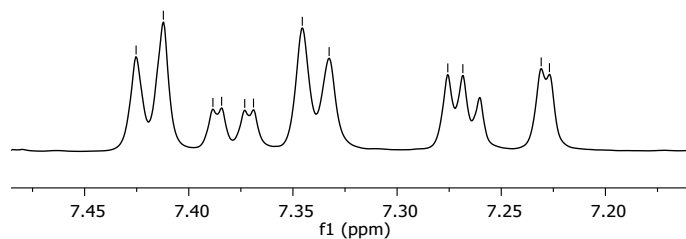
SF-PA-PE-DMSO-1H.1.fid - 1H

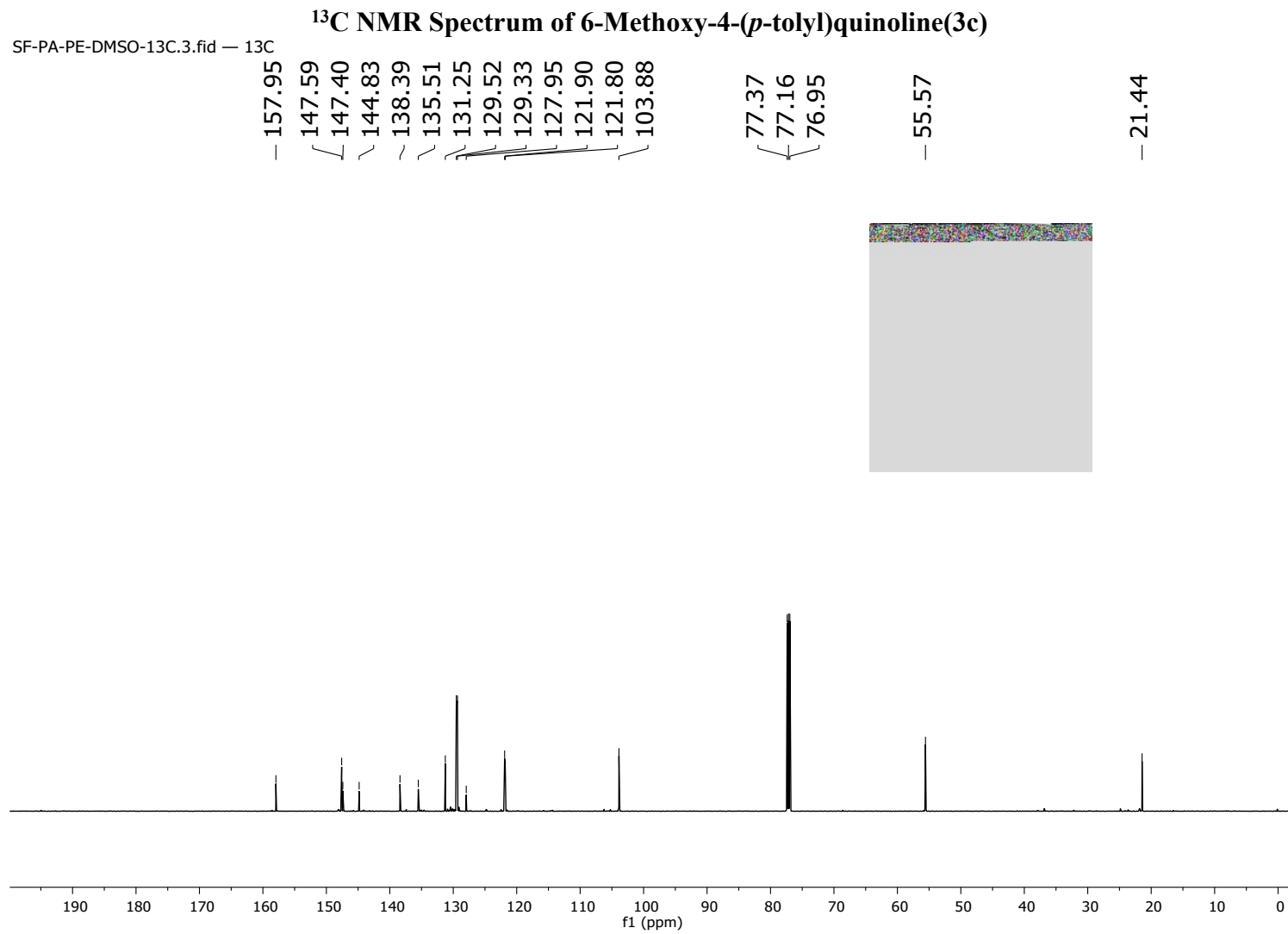
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8.78
8.08
8.07
7.43
7.41
7.39
7.38
7.37
7.37
7.35
7.33
7.28
7.27
7.23
7.23

3.79

2.47

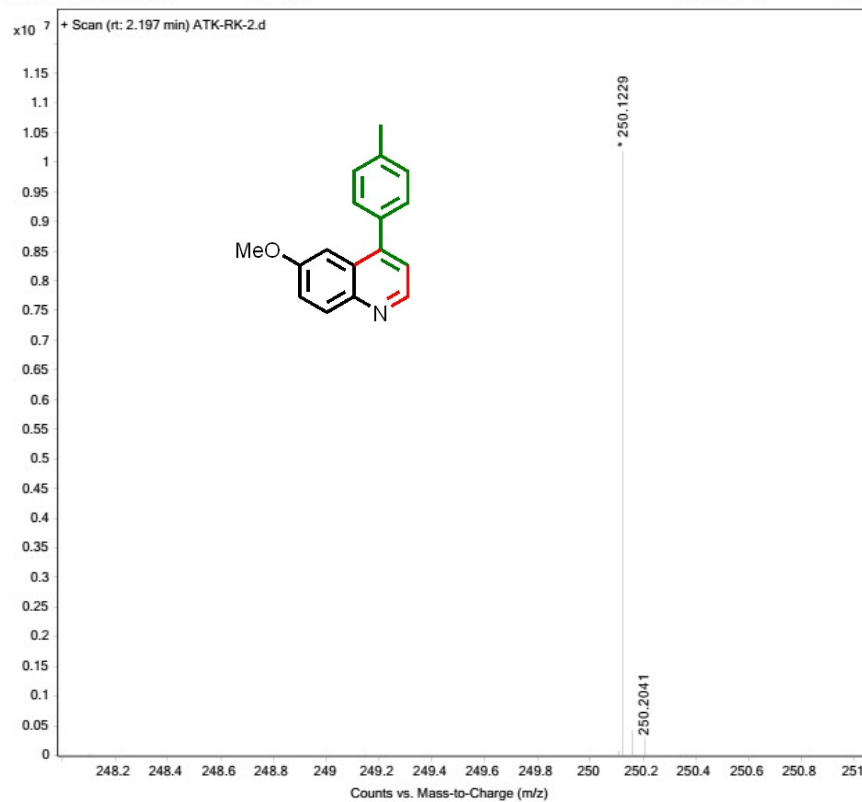
7.43
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7.35
7.33
7.28
7.27
7.23
7.23





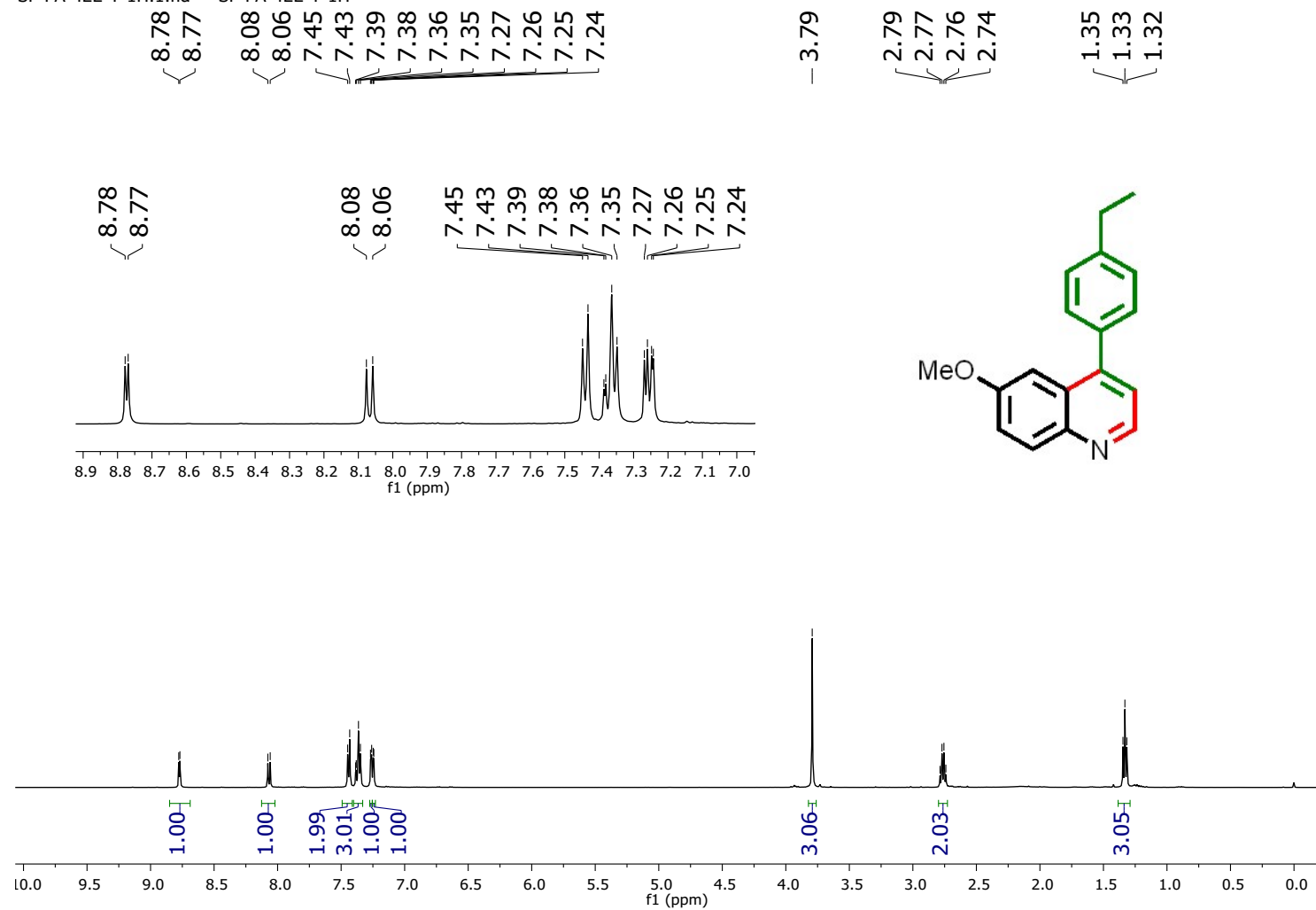
HRMS Spectrum of 6-Methoxy-4-(*p*-tolyl)quinoline(3c)

Sample Name	Sample73	Position	P1-D4	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK-RK-2.d
ACQ Method	LC-COLUMN-TRAINING-METHOD.m	Comment		Acquired Time	11-04-2023 01:40:54 (UTC+05:30)



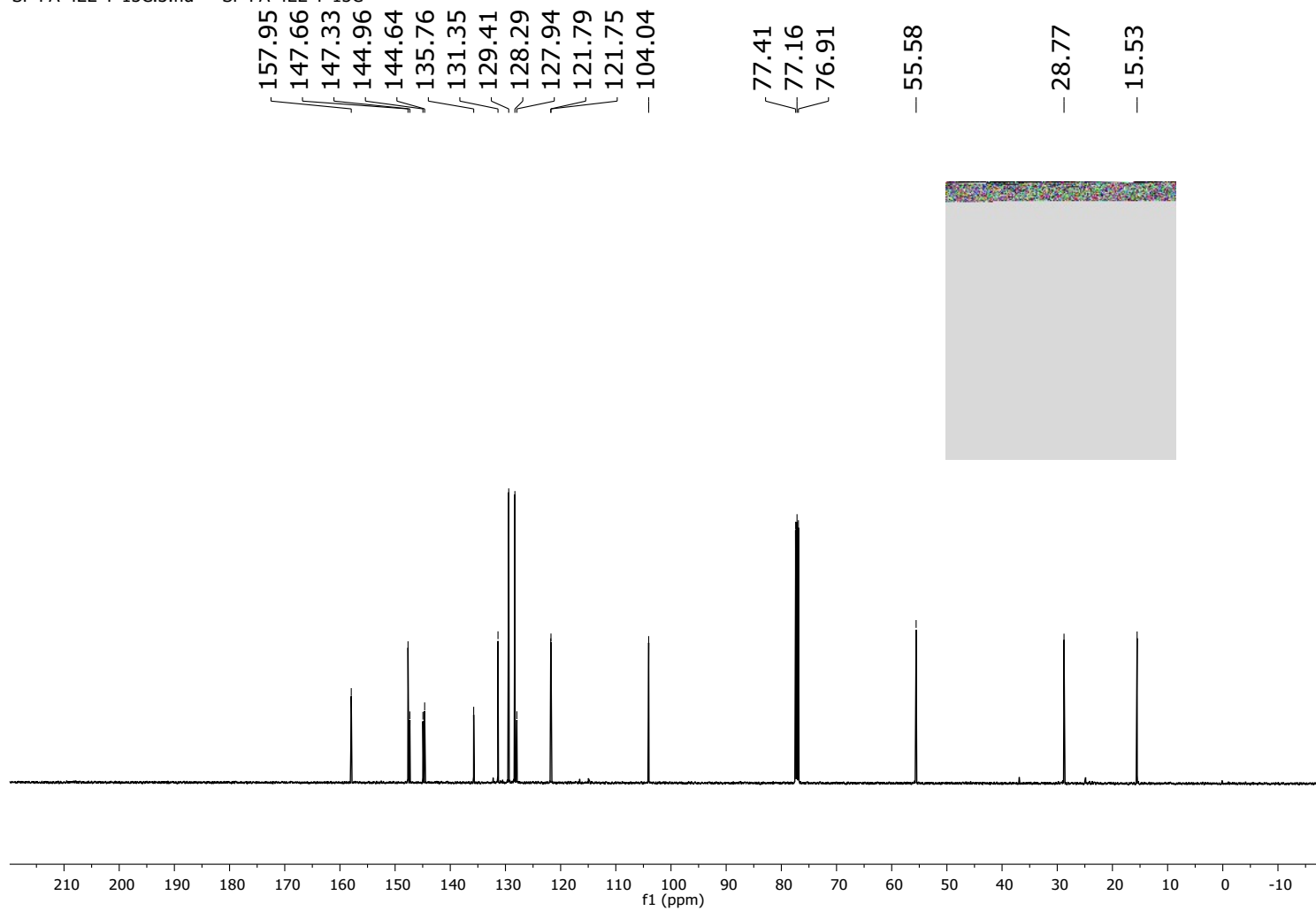
¹H NMR Spectrum of 4-(4-Ethylphenyl)-6-methoxyquinoline(3d)

SF-PA-4EE-T-1H.1.fid — SF-PA-4EE-T-1H



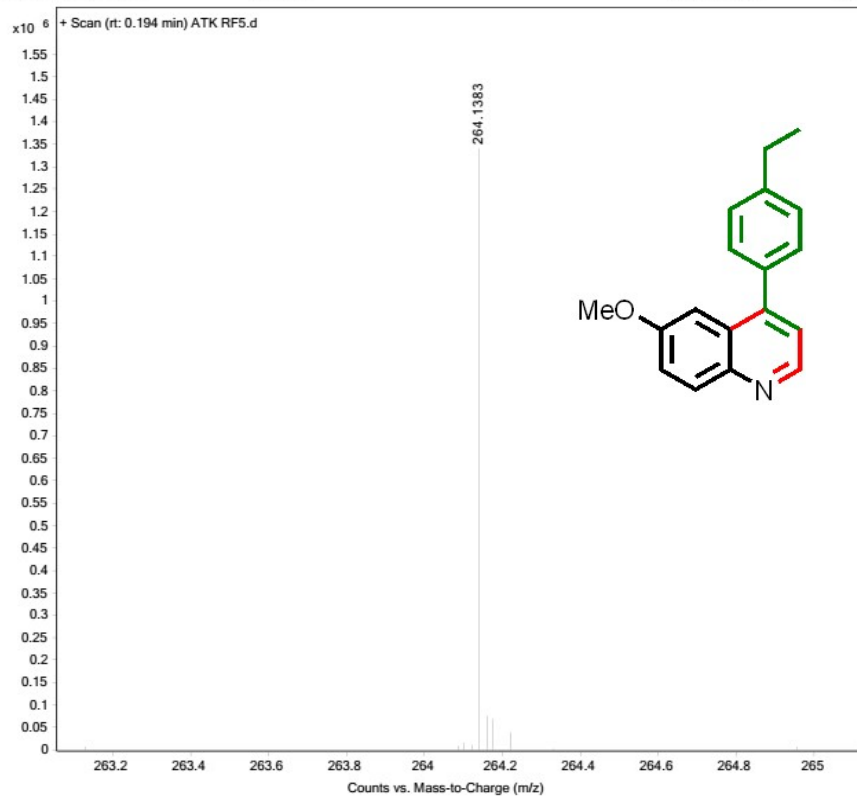
¹³C NMR Spectrum of 4-(4-Ethylphenyl)-6-methoxyquinoline(3d)

SF-PA-4EE-T-13C.3.fid — SF-PA-4EE-T-13C



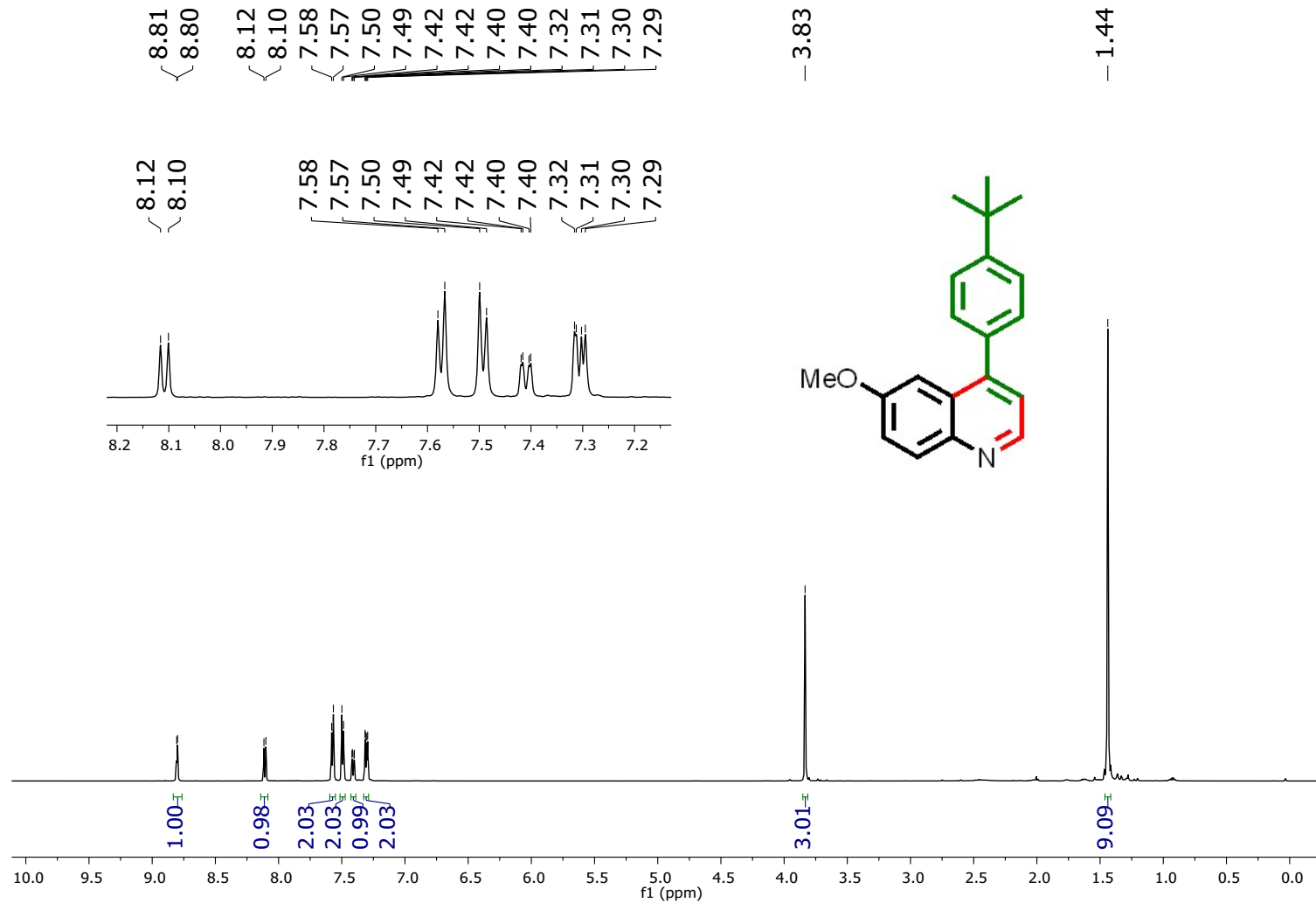
HRMS Spectrum of 4-(4-Ethylphenyl)-6-methoxyquinoline(3d)

Sample Name	SampleS8	Position	P1-B9	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK_RF5.d
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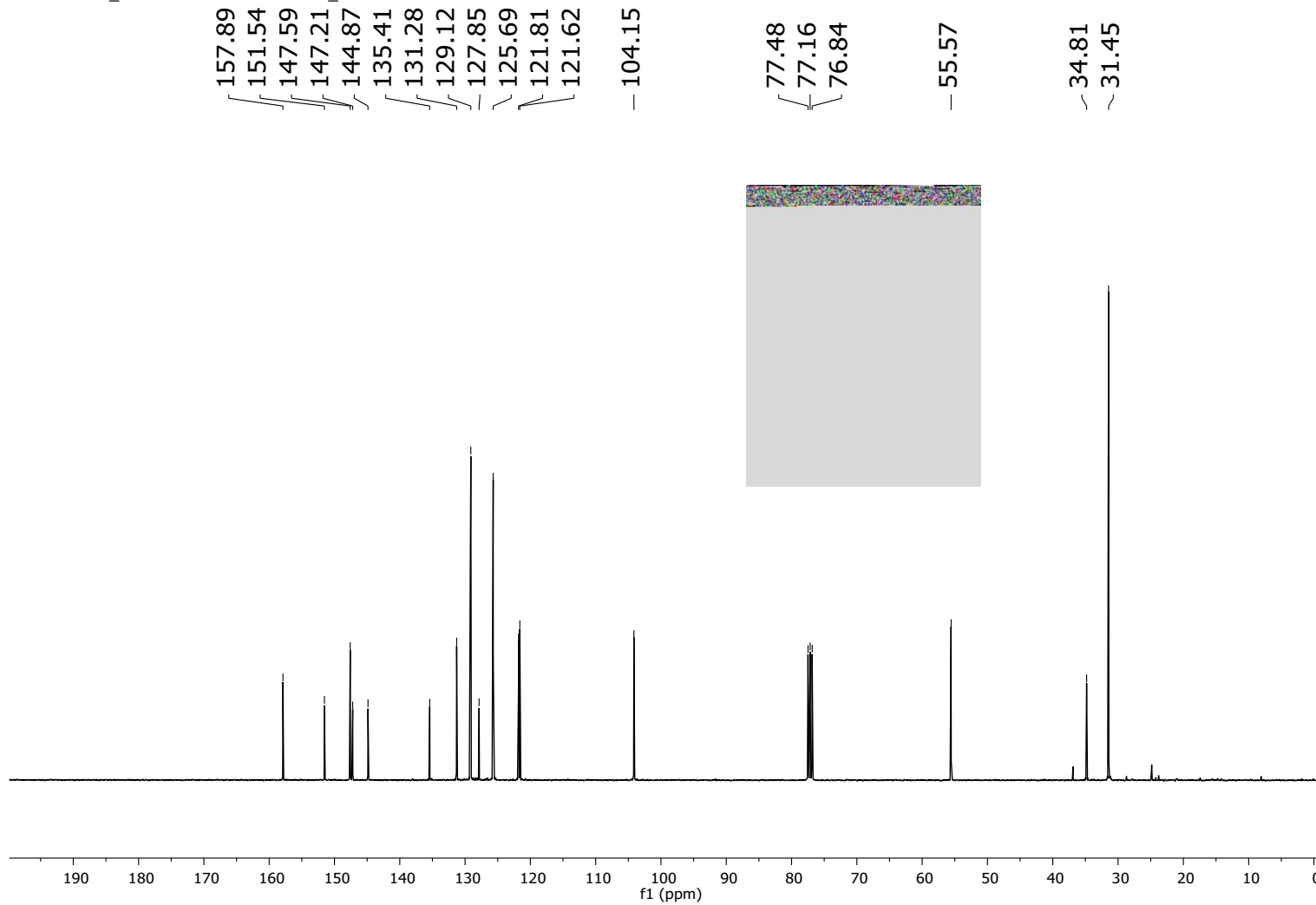
¹H NMR Spectrum of 4-(4-(*tert*-Butyl)phenyl)-6-methoxyquinoline (3e)

SF-PT-3DMS-1H.1.fid — 1H



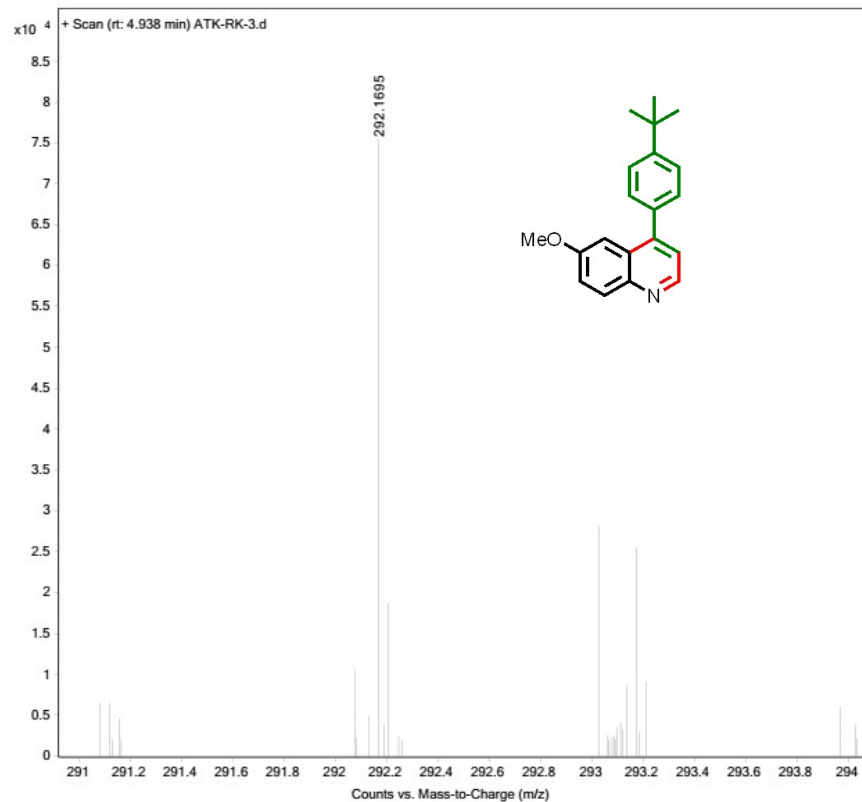
¹³C NMR Spectrum of 4-(4-(*tert*-Butyl)phenyl)-6-methoxyquinoline(3e)

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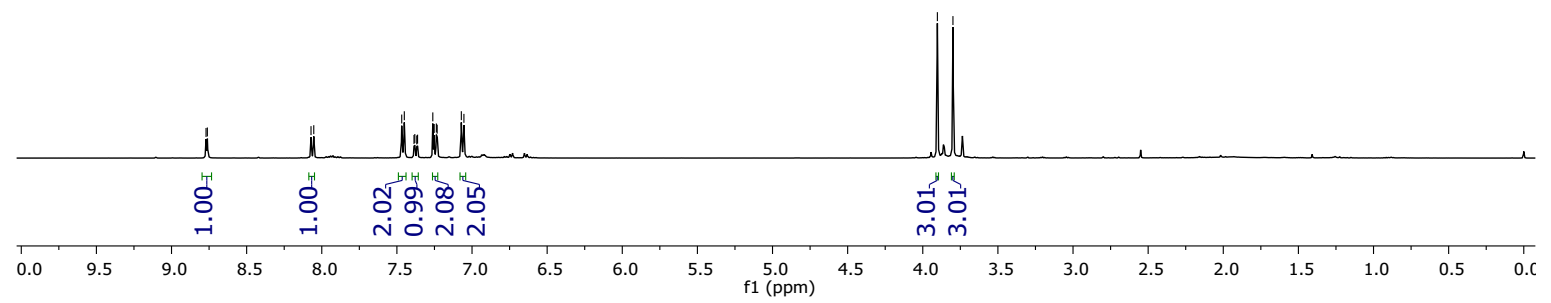
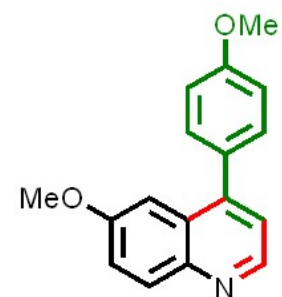
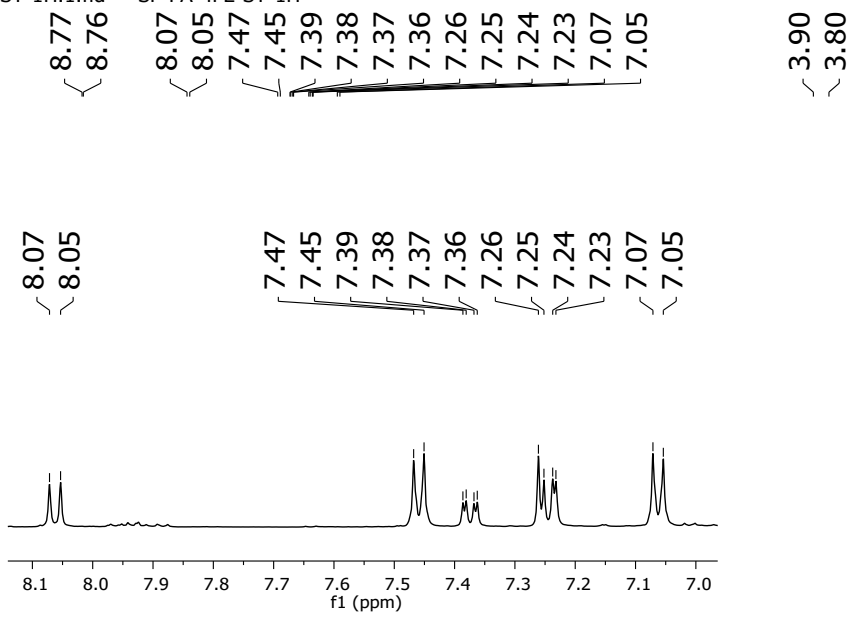
HRMS Spectrum of 4-(4-(*tert*-Butyl)phenyl)-6-methoxyquinoline(3e)

Sample Name	Sample75	Position	P1-D5	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK-RK-3.d
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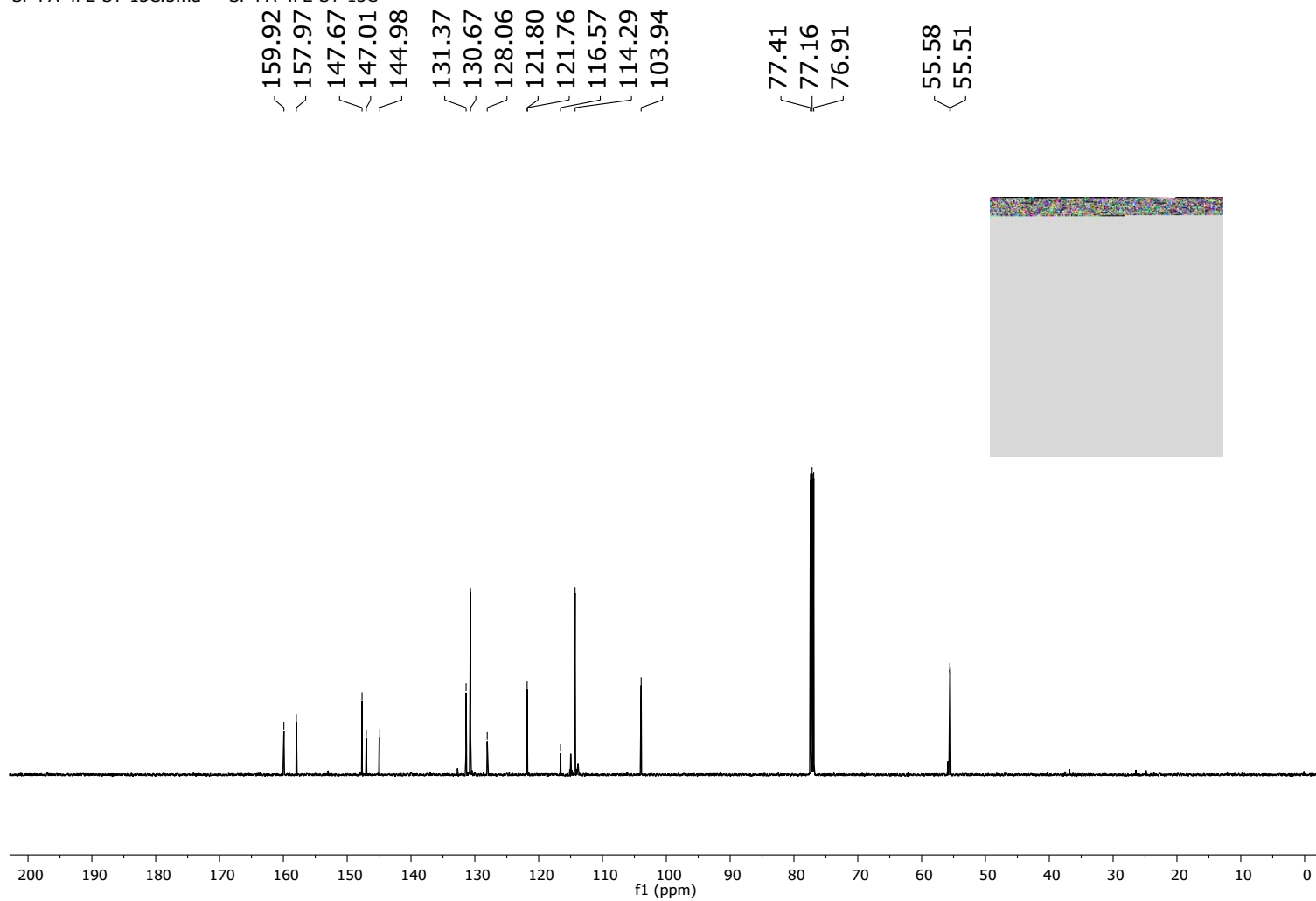
¹H NMR Spectrum of 6-Methoxy-4-(4-methoxyphenyl)quinoline(3f)

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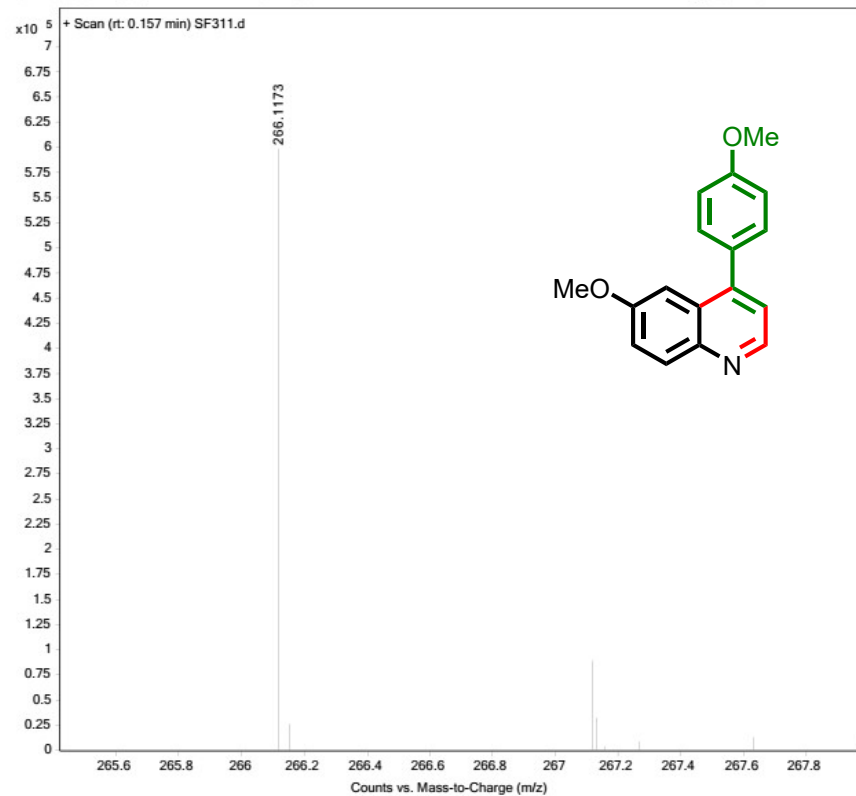
¹³C NMR Spectrum of 6-Methoxy-4-(4-methoxyphenyl)quinoline(3f)

SF-PA-4FE-ST-13C.3.fid — SF-PA-4FE-ST-13C



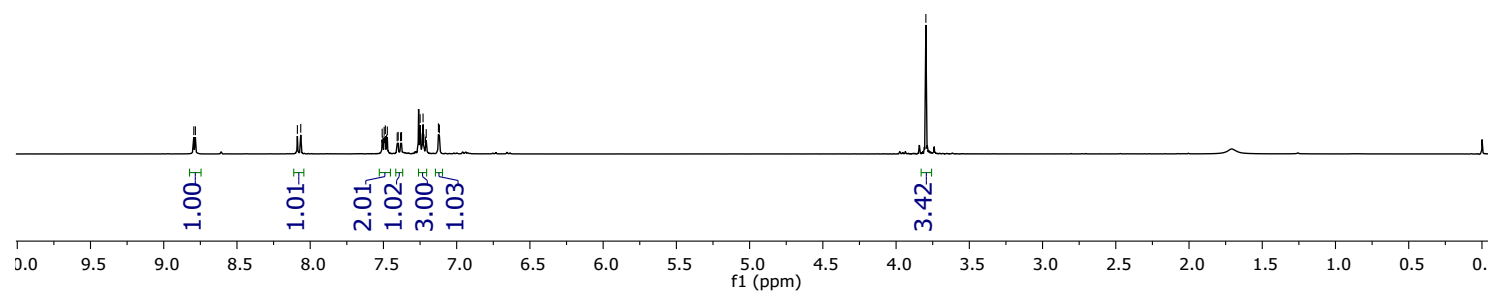
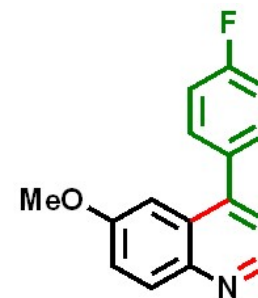
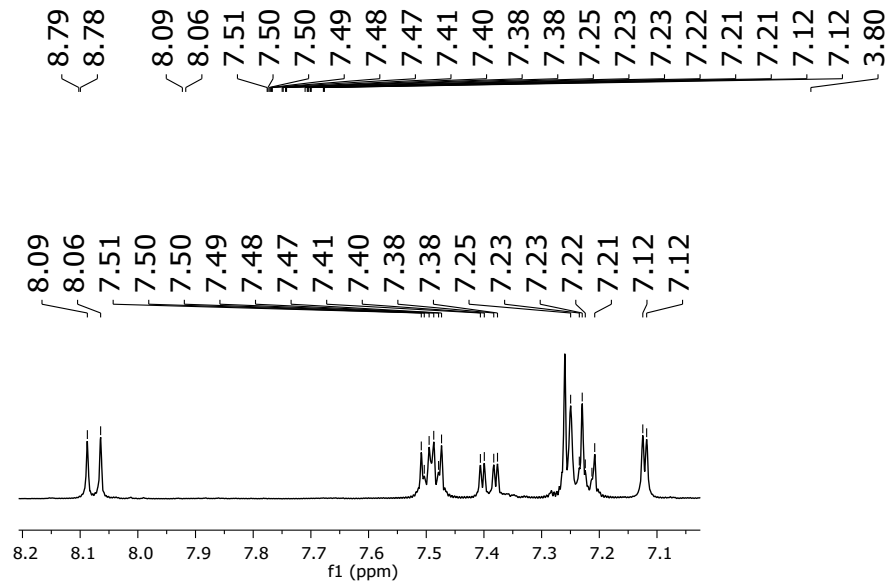
HRMS Spectrum of 6-Methoxy-4-(4-methoxyphenyl)quinoline(3f)

Sample Name	Sample59	Position	P1-A11	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF311.d
ACQ Method	DIRECT MASS_POSITIVE_01_1.m	Comment		Acquired Time	27-04-2023 15:28:13 (UTC+05:30)



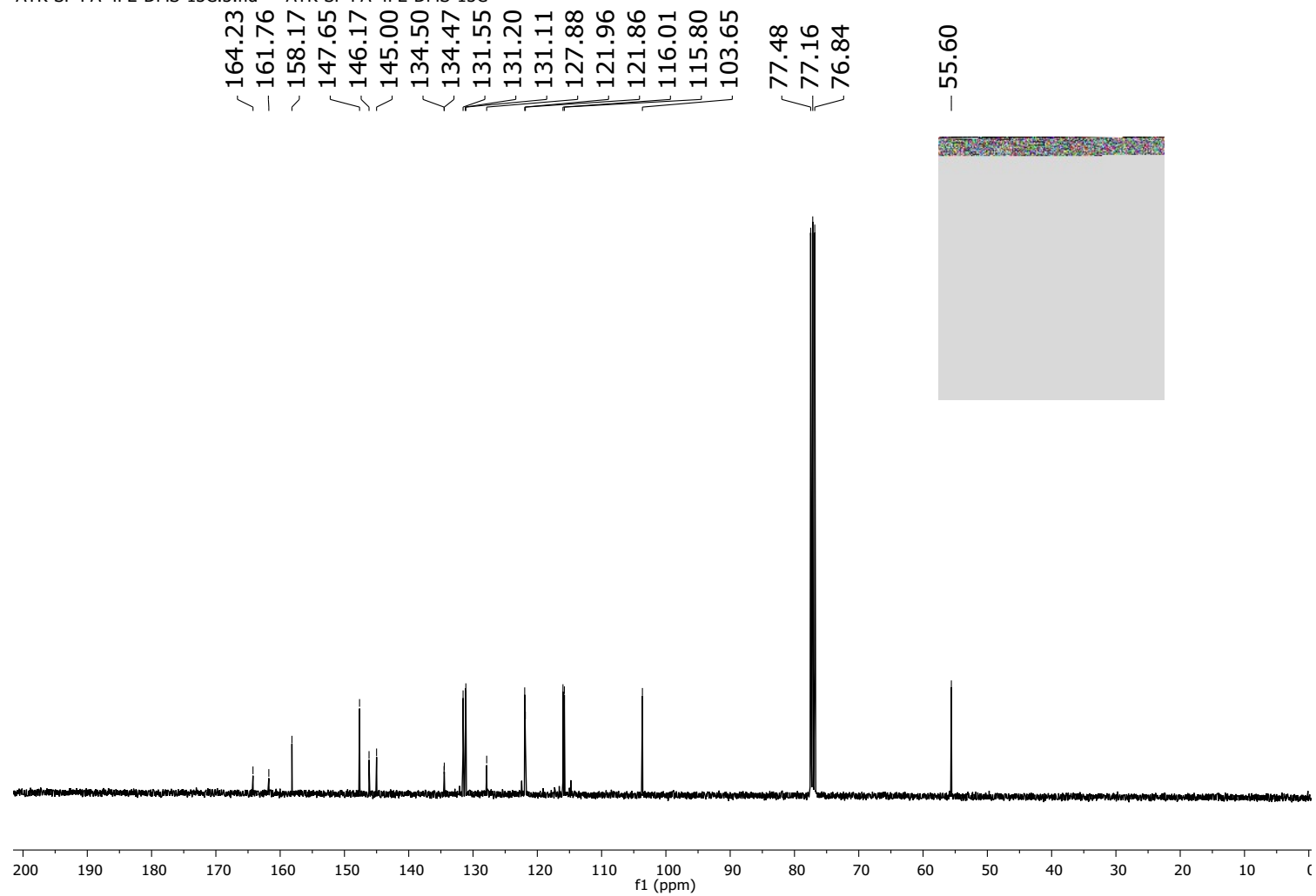
¹H NMR Spectrum of 4-(4-Fluorophenyl)-6-methoxyquinoline(3g)

ATK-SF-PA-4FE-DMS-1H.1.fid — ATK-SF-PA-4FE-DMS-1H



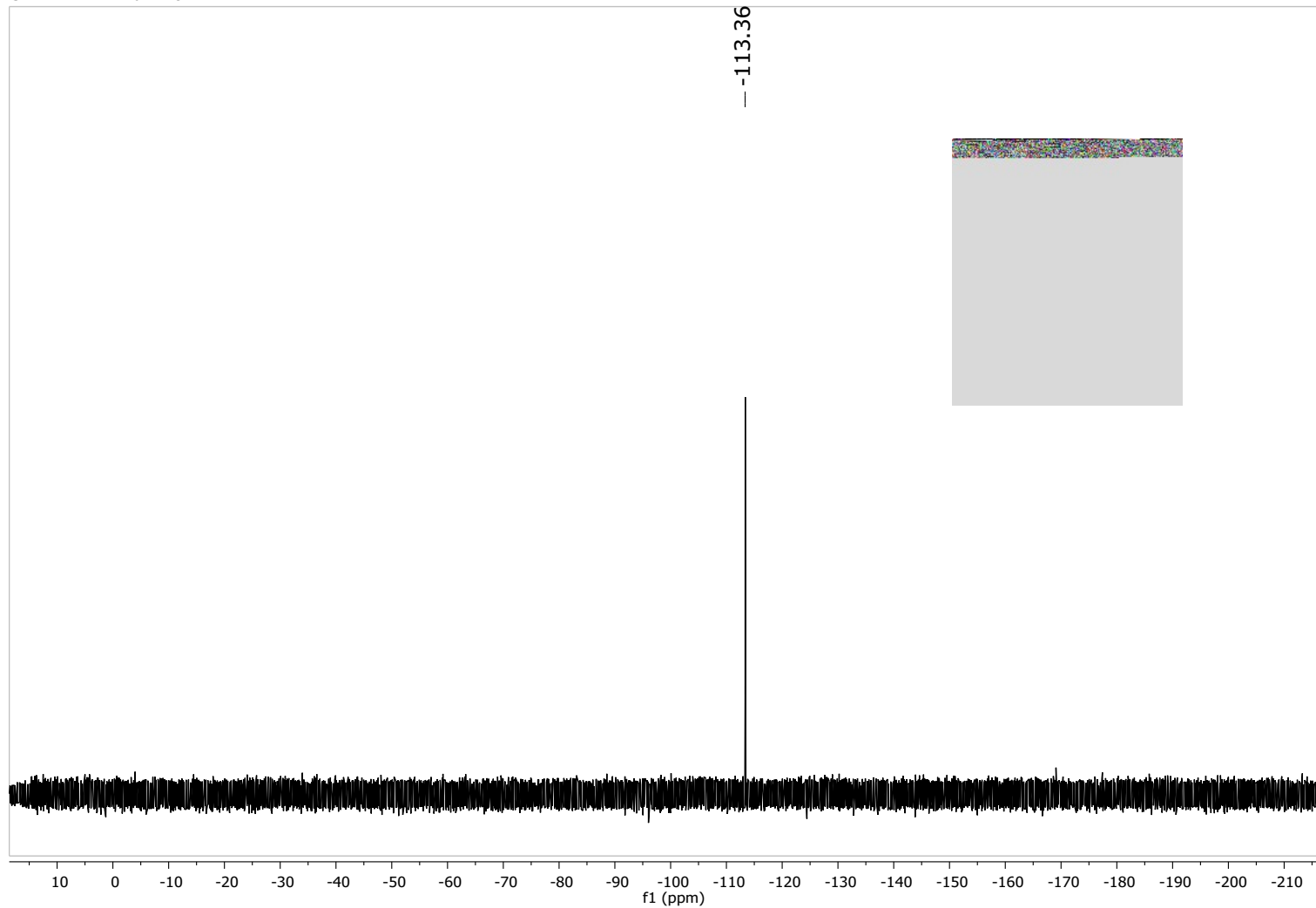
¹³C NMR Spectrum of 4-(4-Fluorophenyl)-6-methoxyquinoline(3g)

ATK-SF-PA-4FE-DMS-13C.3.fid — ATK-SF-PA-4FE-DMS-13C



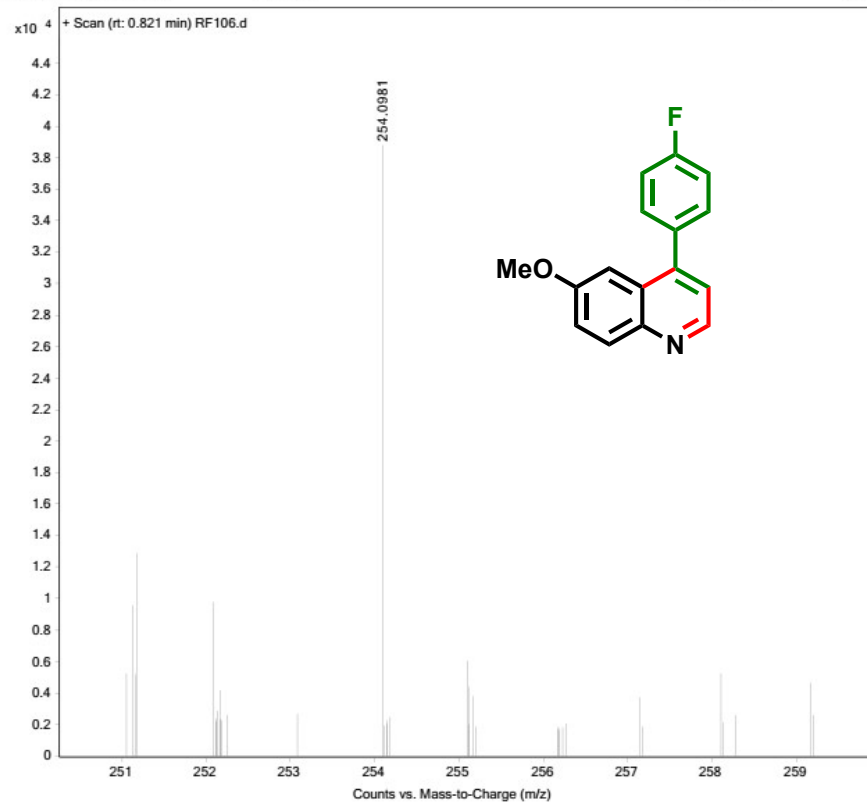
¹⁹F NMR Spectrum of 4-(4-Fluorophenyl)-6-methoxyquinoline(3g)

SF-F-4-2F-1H.1.fid — 19F



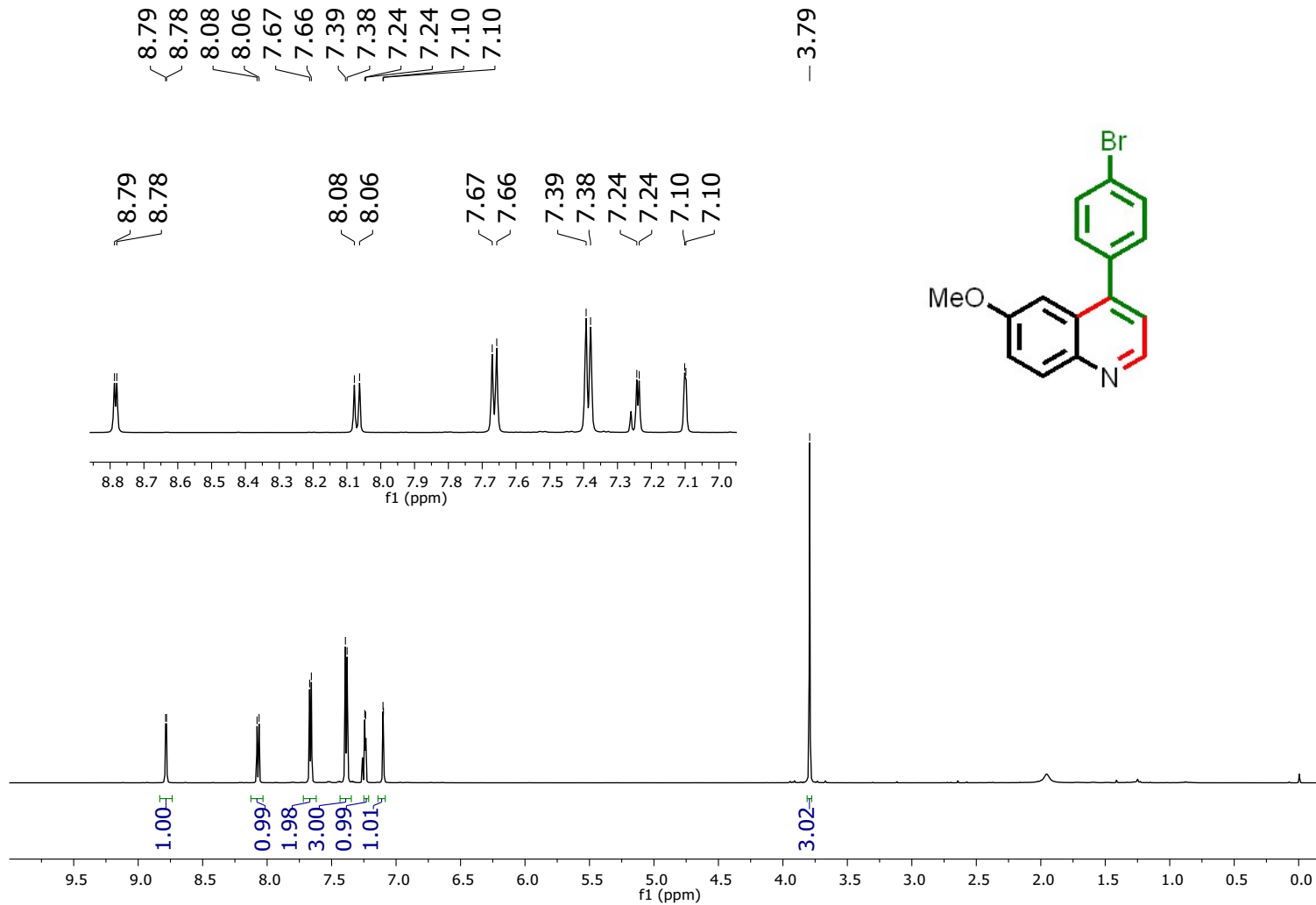
HRMS Spectrum of 4-(4-Fluorophenyl)-6-methoxyquinoline(3g)

Sample Name	Sample33	Position	P1-C10	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	RF106.d
ACQ Method	DIRECT MASS_POSITIVE_D1_1.m	Comment		Acquired Time	19-05-2023 16:28:19 (UTC+05:30)



¹H NMR Spectrum of 4-(4-Bromophenyl)-6-methoxyquinoline(3h)

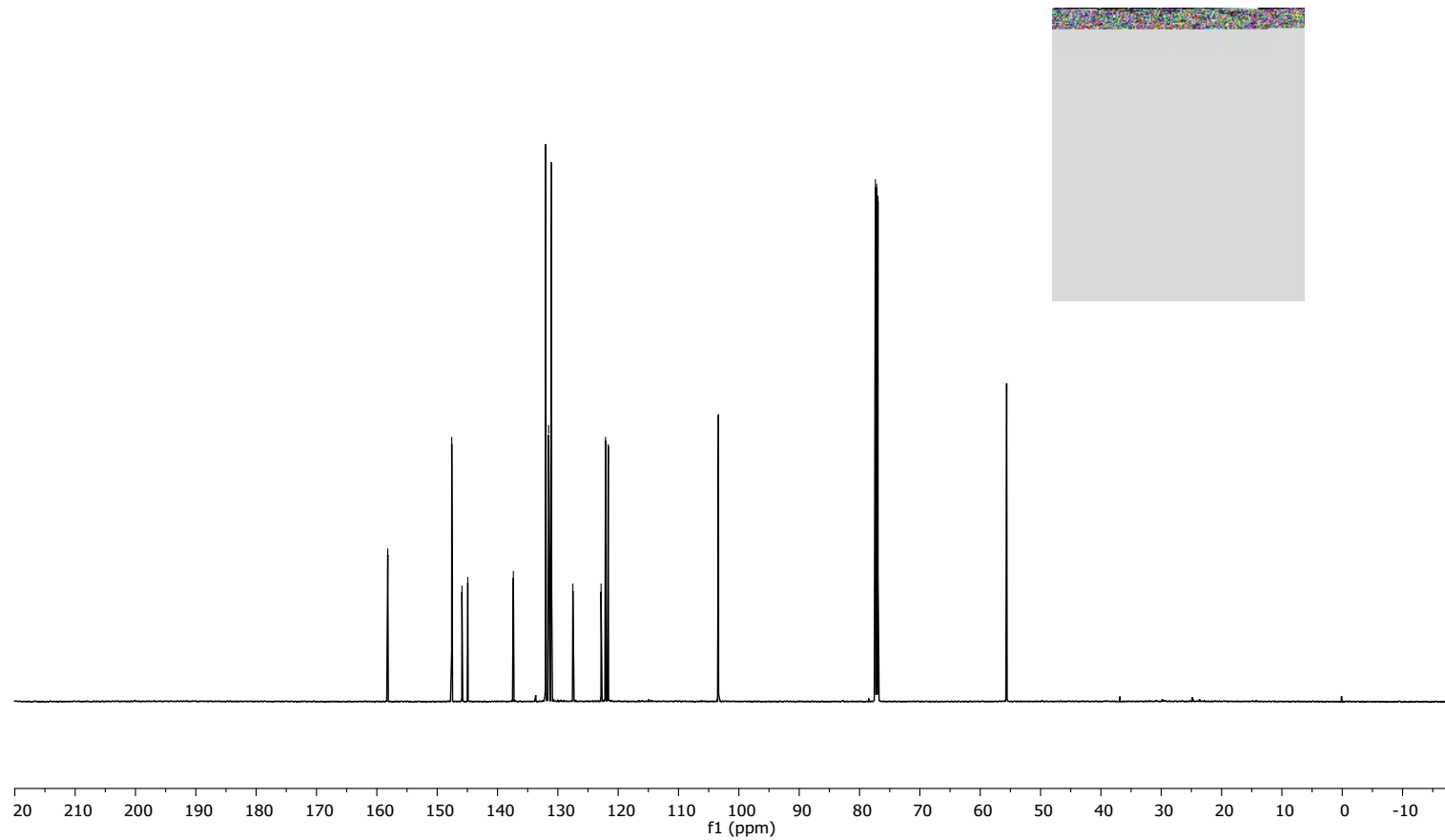
SF-PA-BR-EDMS-1H.1.fid — 1H



SF-PA-BR-EDMS-13C.1.fid — 13C

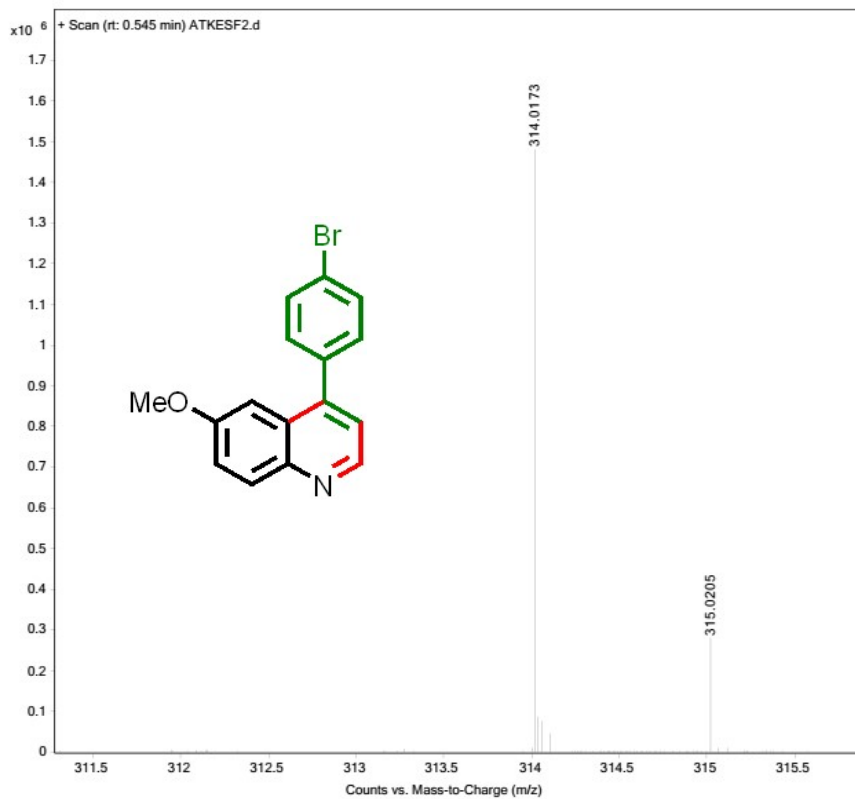
¹³C NMR Spectrum of 4-(4-Bromophenyl)-6-methoxyquinoline(3h)

- 158.19
- 147.59
- 145.89
- 144.93
- 137.37
- 132.04
- 131.52
- 131.04
- 127.51
- 122.84
- 122.10
- 121.65
- 103.38
- 77.37
- 77.16
- 76.95
- 55.61

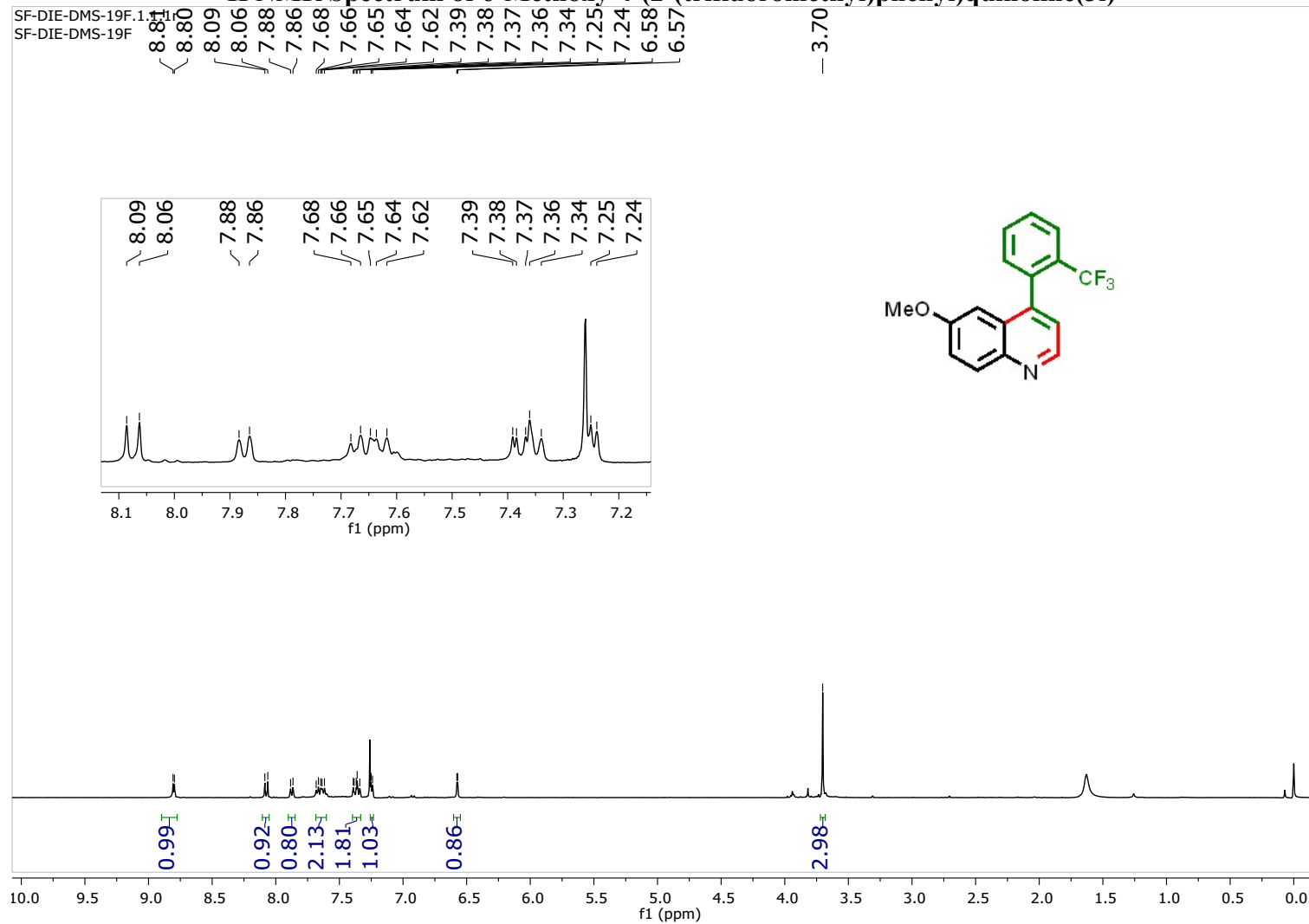


HRMS Spectrum of 4-(4-Bromophenyl)-6-methoxyquinoline(3h)

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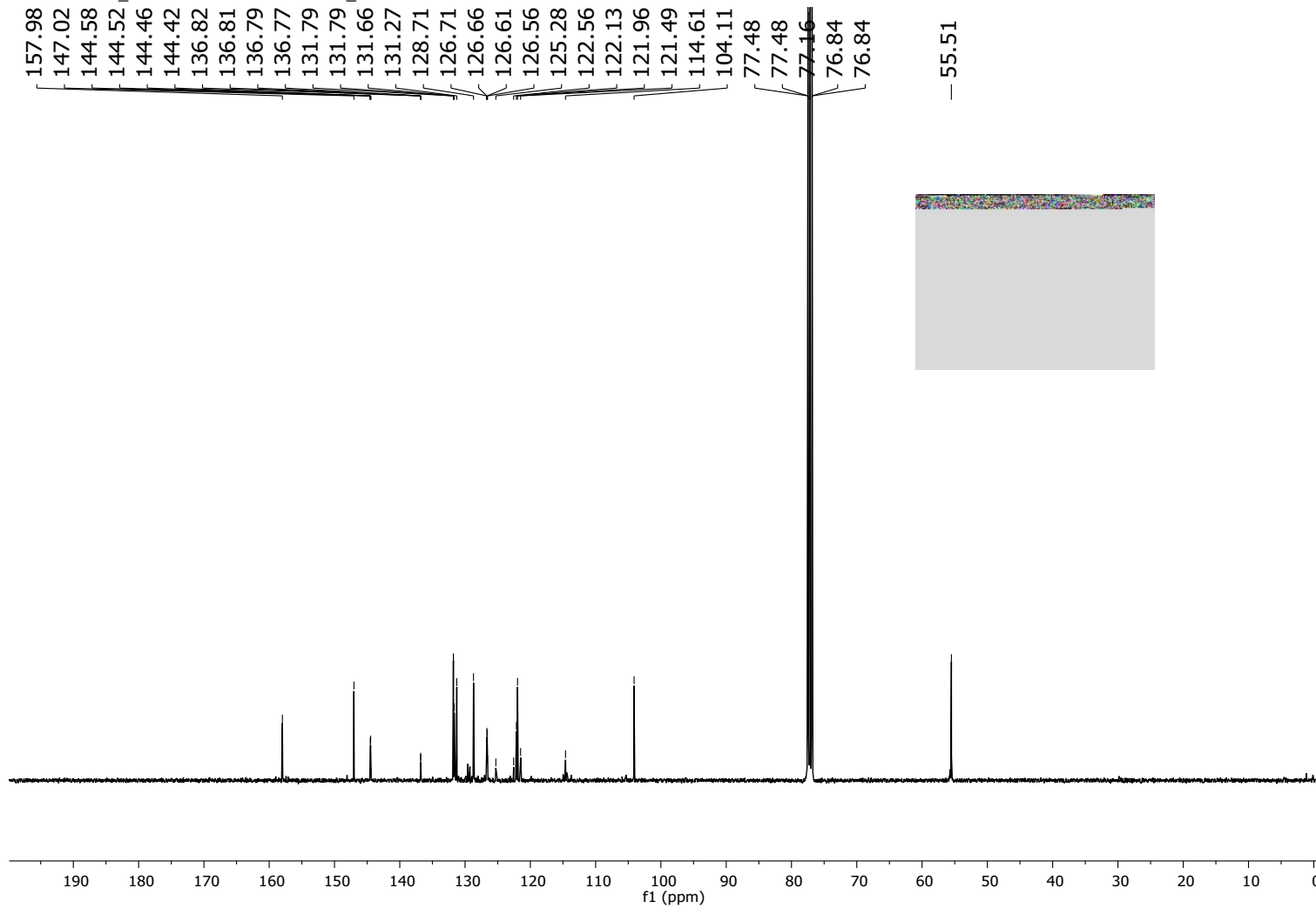


¹H NMR Spectrum of 6-Methoxy-4-(2-(trifluoromethyl)phenyl)quinoline(3i)



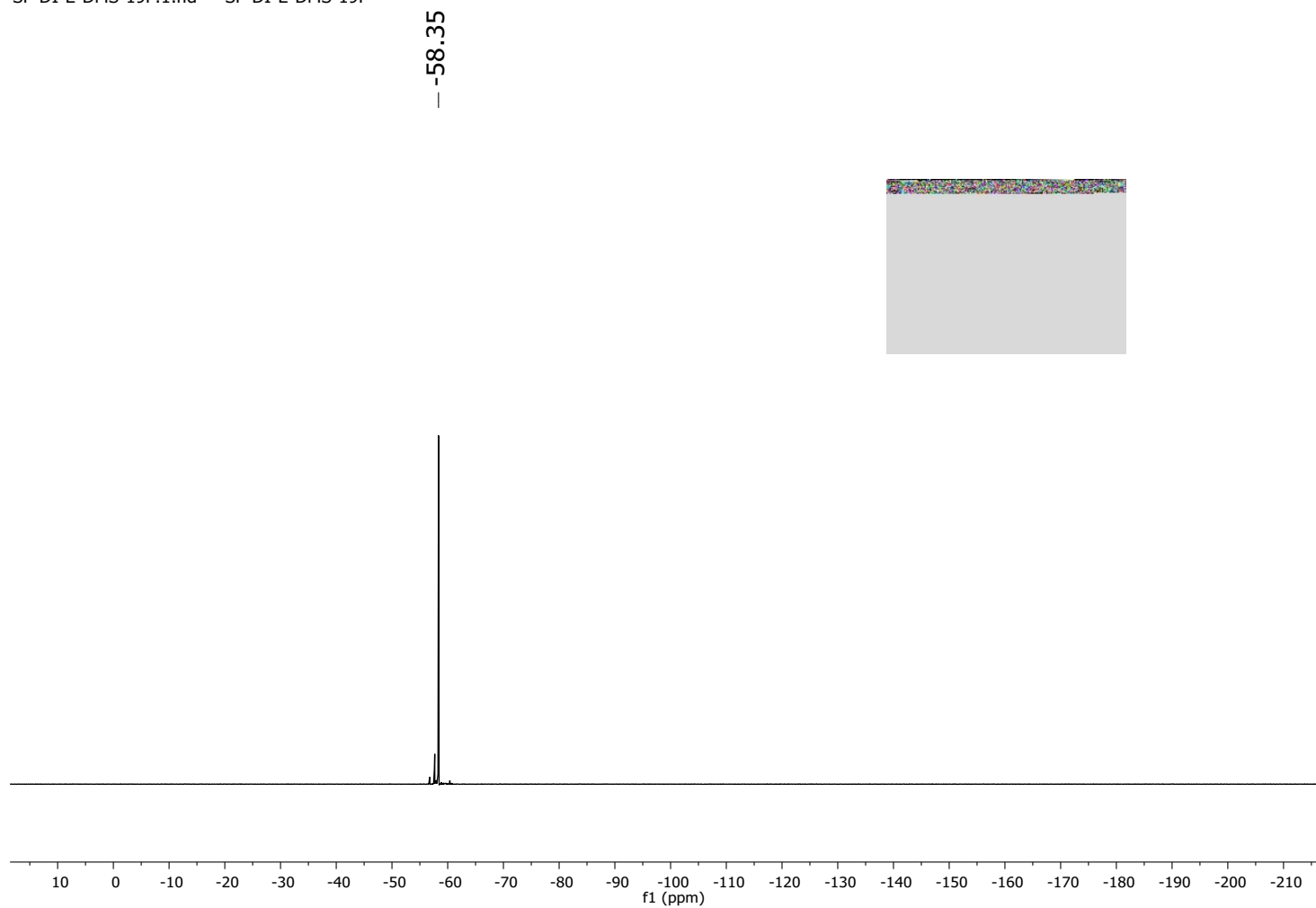
¹³C NMR Spectrum of 6-Methoxy-4-(2-(trifluoromethyl)phenyl)quinoline(3i)

SF-DI-E-DMS_13C.11.fid - SF-DI-E-DMS_13C



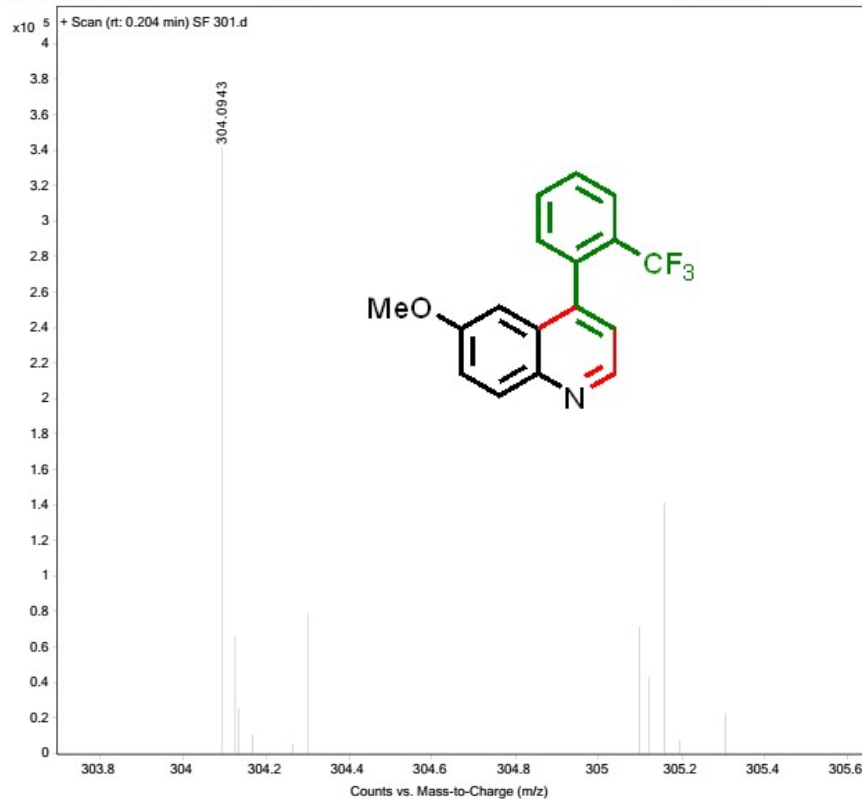
¹⁹F NMR Spectrum of 6-Methoxy-4-(2-(trifluoromethyl)phenyl)quinoline(3i).

SF-DI-E-DMS-19F.1.fid — SF-DI-E-DMS-19F

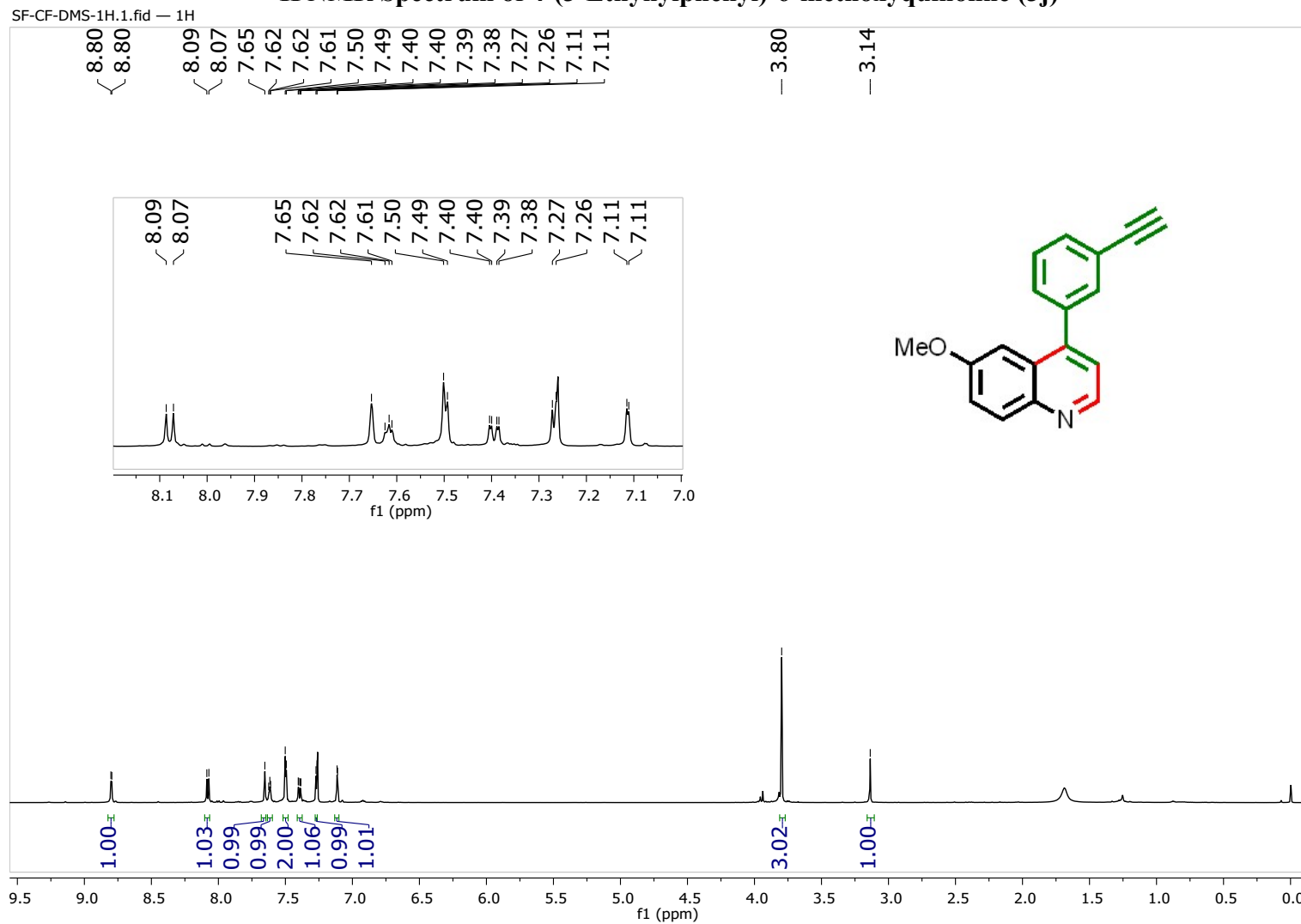


HRMS Spectrum of 6-Methoxy-4-(2-(trifluoromethyl)phenyl)quinoline(3i)

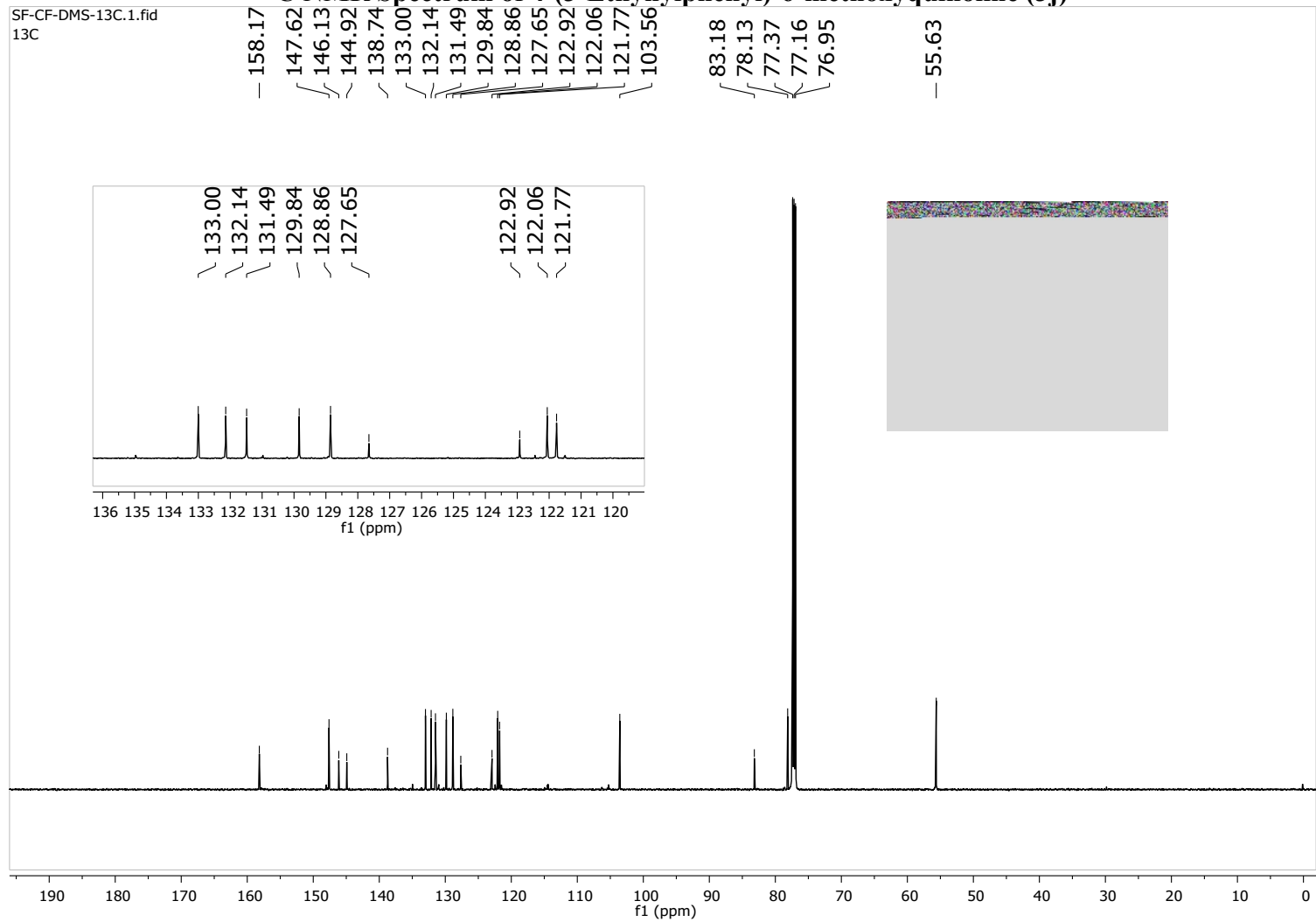
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Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF 301.d
ACQ Method	DIRECT MASS_POSITIVE_01_1.m	Comment		Acquired Time	24-04-2023 15:21:22 (UTC+05:30)



¹H NMR Spectrum of 4-(3-Ethynylphenyl)-6-methoxyquinoline (3j)

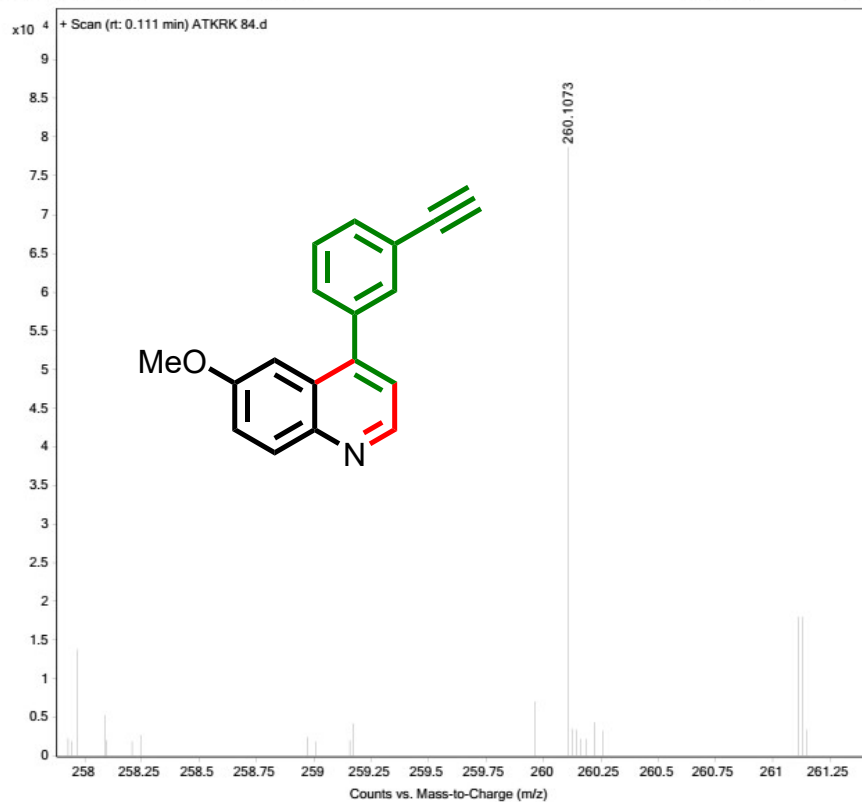


¹³C NMR Spectrum of 4-(3-Ethynylphenyl)-6-methoxyquinoline (3j)



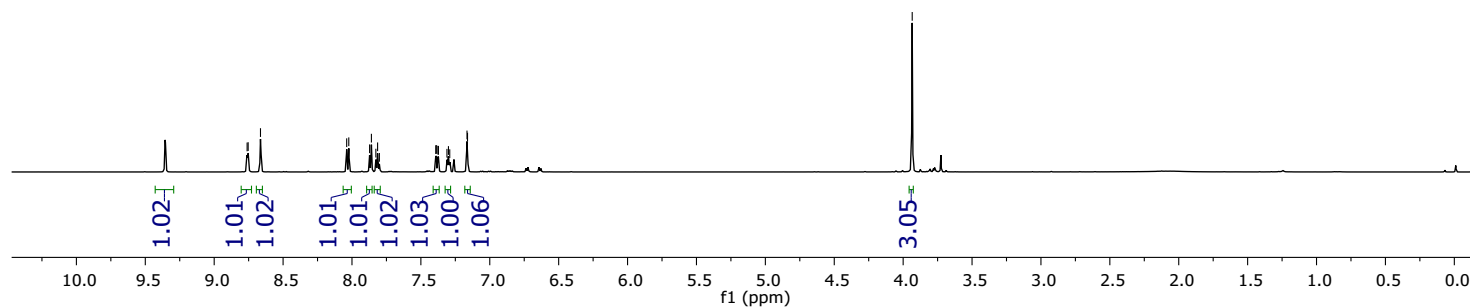
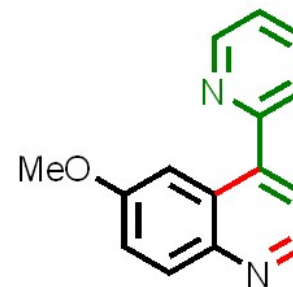
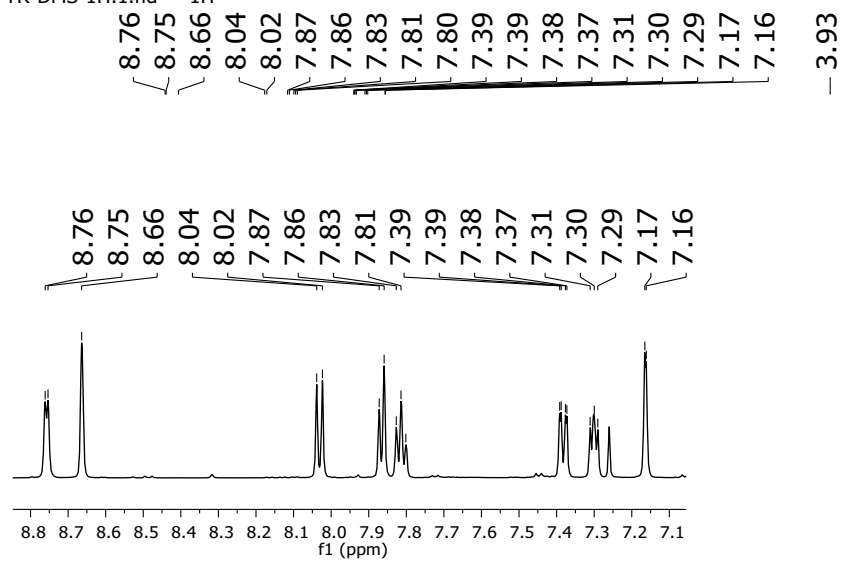
HRMS Spectrum of 4-(3-Ethynylphenyl)-6-methoxyquinoline (3j)

Sample Name	Sample23	Position	P1-C1	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATKRRK 84.d
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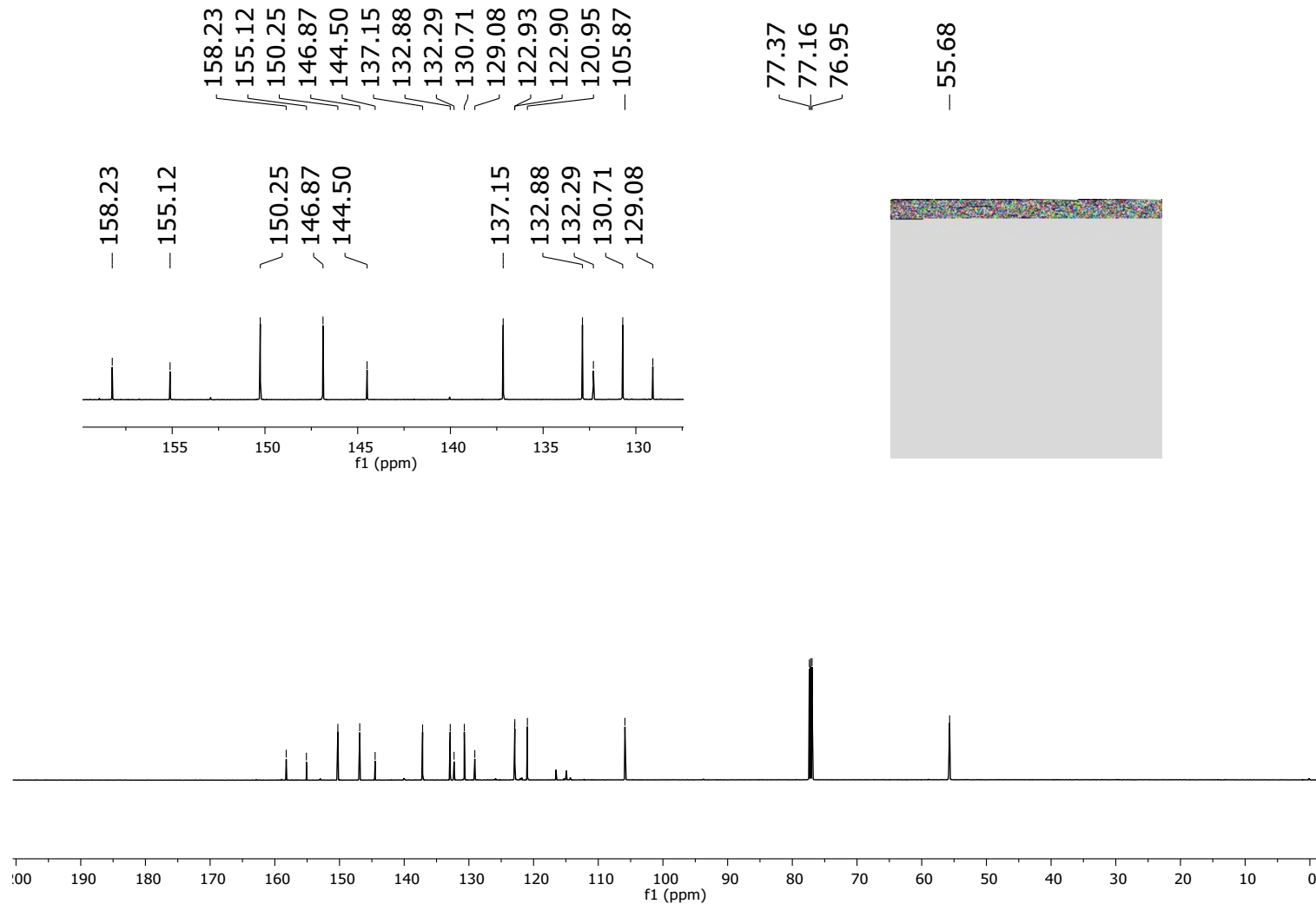
¹H NMR Spectrum of 6-Methoxy-4-(pyridin-2-yl)quinoline (3k)

SF-PA-PYR-DMS-1H.1.fid - 1H



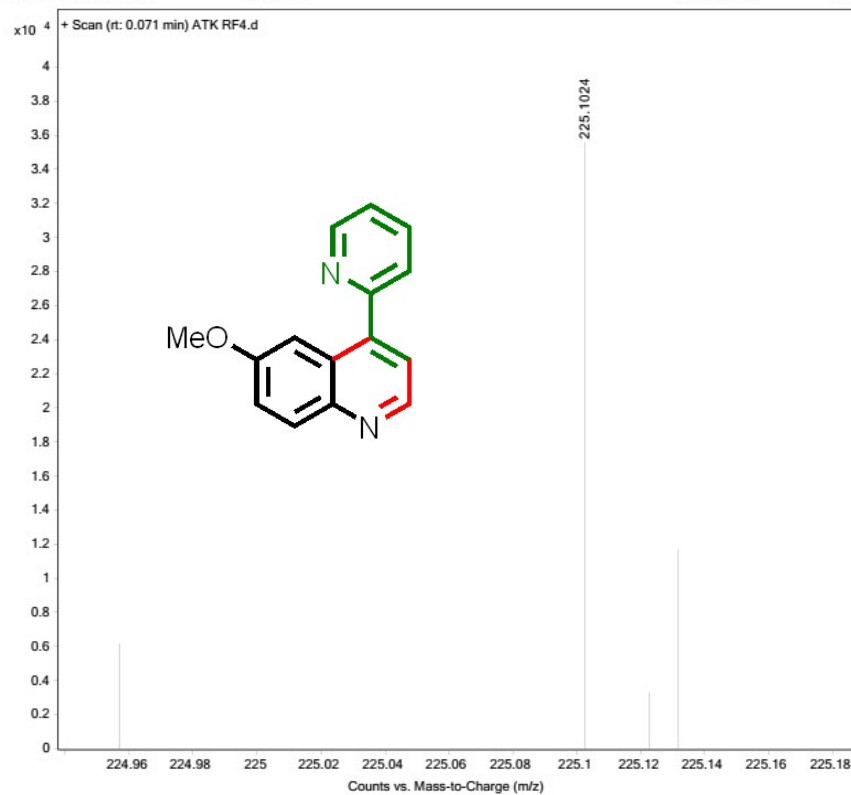
¹³C NMR Spectrum of 6-Methoxy-4-(pyridin-2-yl)quinoline (3k)

SF-PA-PYR-DMS-13C.3.fid - 13C



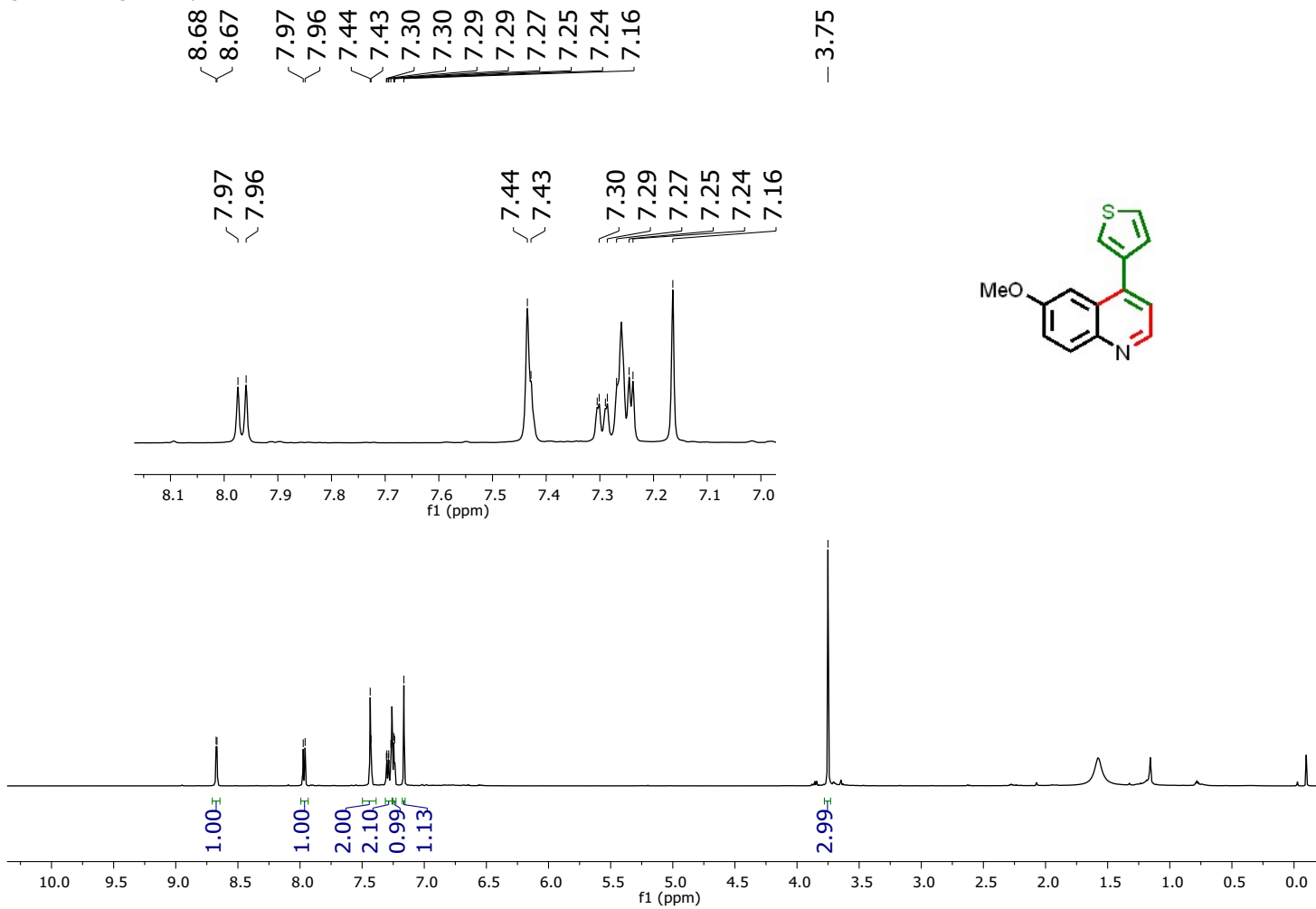
HRMS Spectrum of 6-Methoxy-4-(pyridin-2-yl)quinoline (3k)

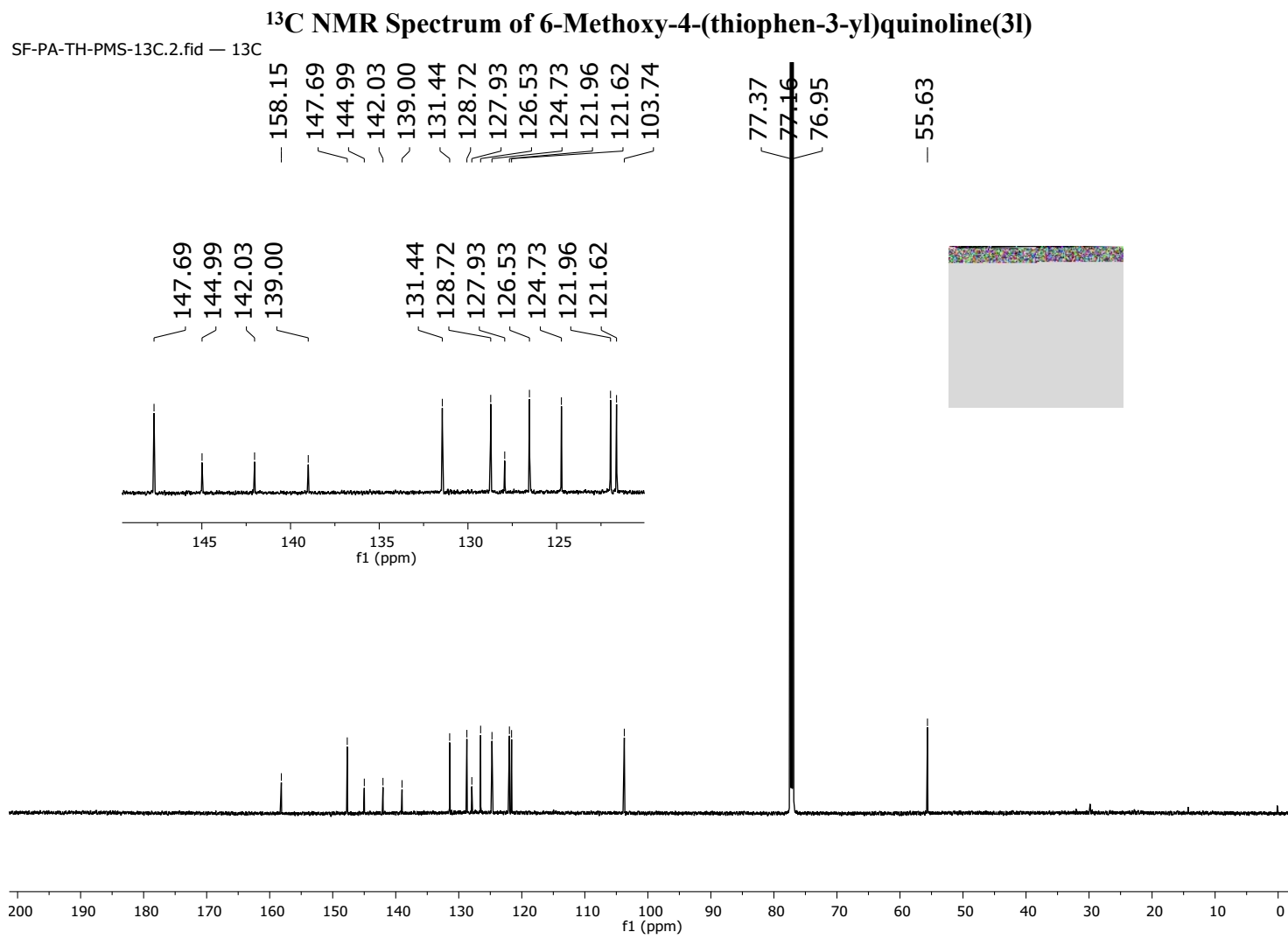
Sample Name	Sample62	Position	P1-C2	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK RF4.d
ACQ Method	DIRECT MASS_POSITIVE_01.m	Comment		Acquired Time	17-04-2023 16:25:16 (UTC+05:30)



¹H NMR Spectrum of 6-Methoxy-4-(thiophen-3-yl)quinoline(3I)

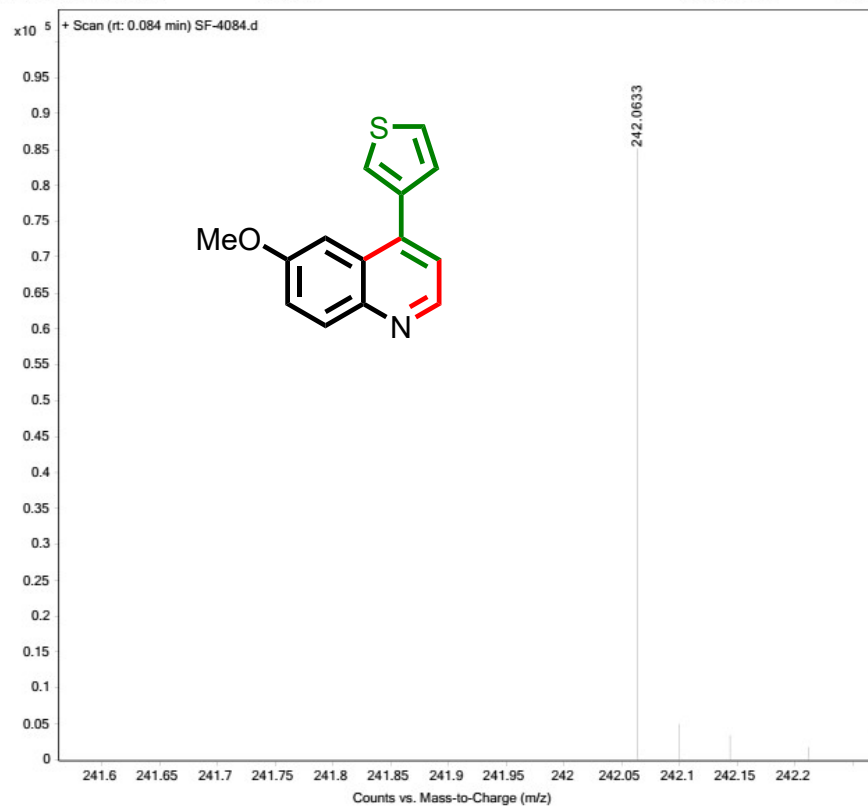
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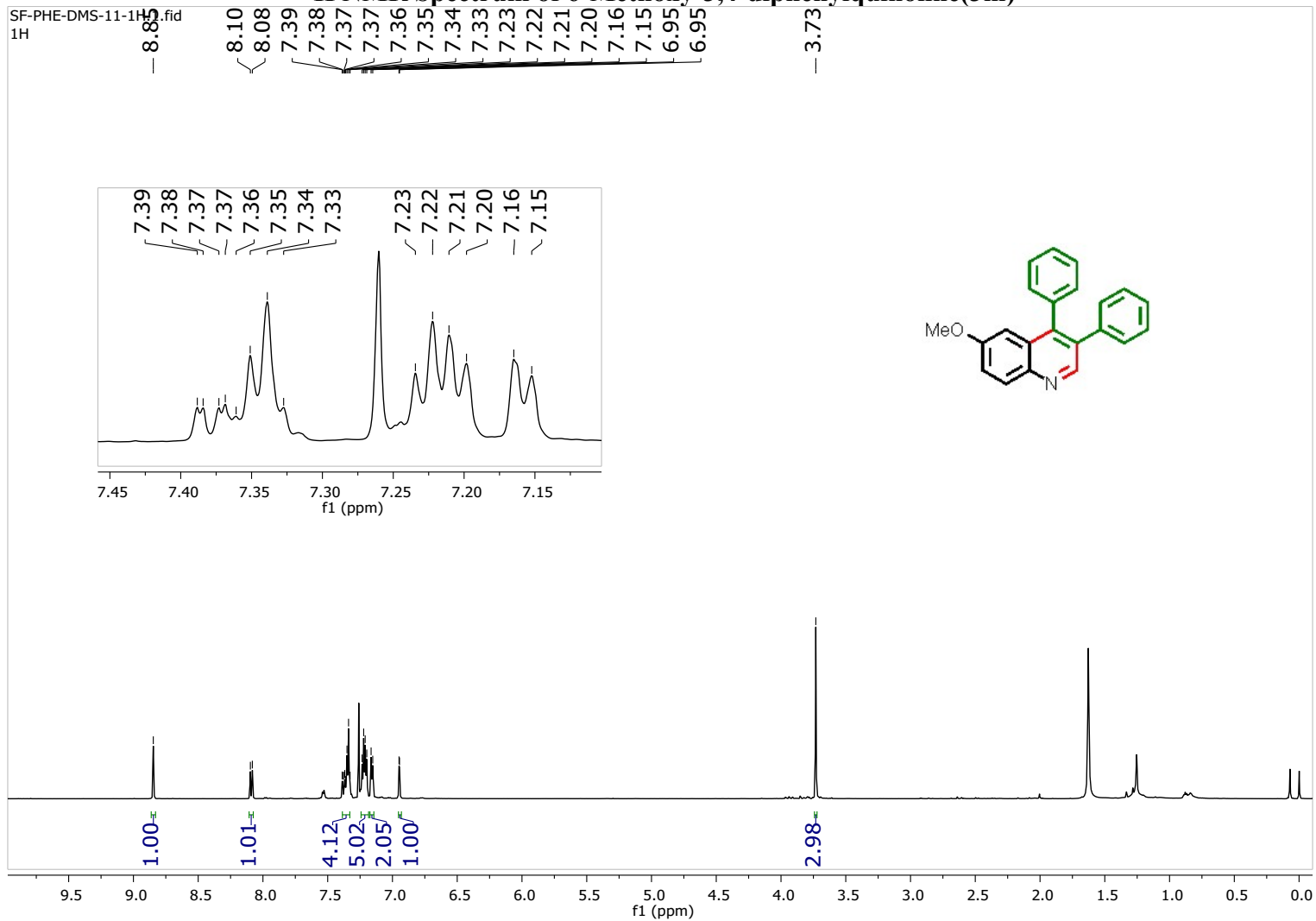


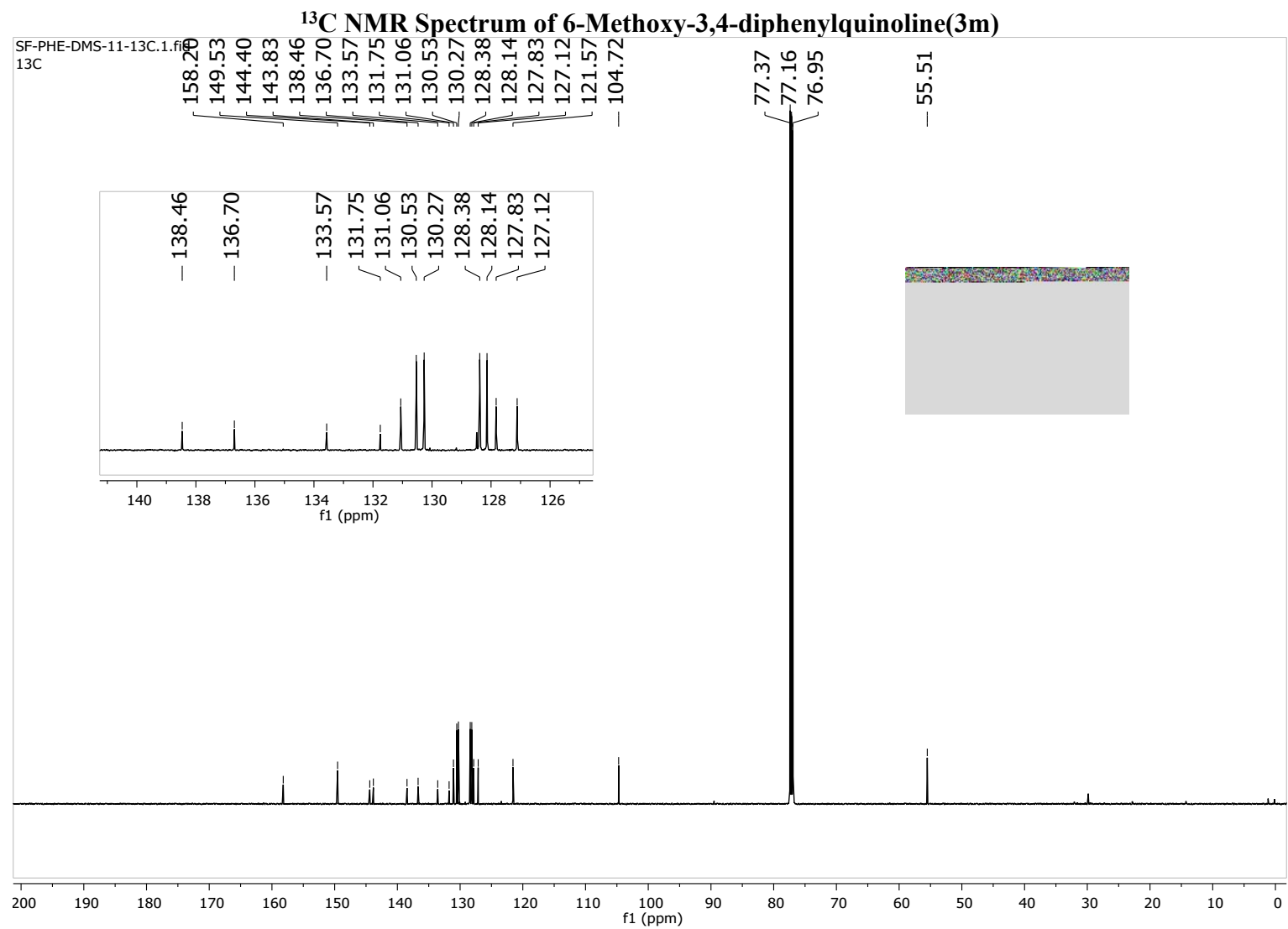
HRMS Spectrum of 6-Methoxy-4-(thiophen-3-yl)quinoline(3I)

Sample Name	Sample19	Position	P1-BB	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF-4084.d
ACQ Method	DIRECT MASS_POSITIVE_01_1.m	Comment		Acquired Time	02-05-2023 11:06:40 (UTC+05:30)



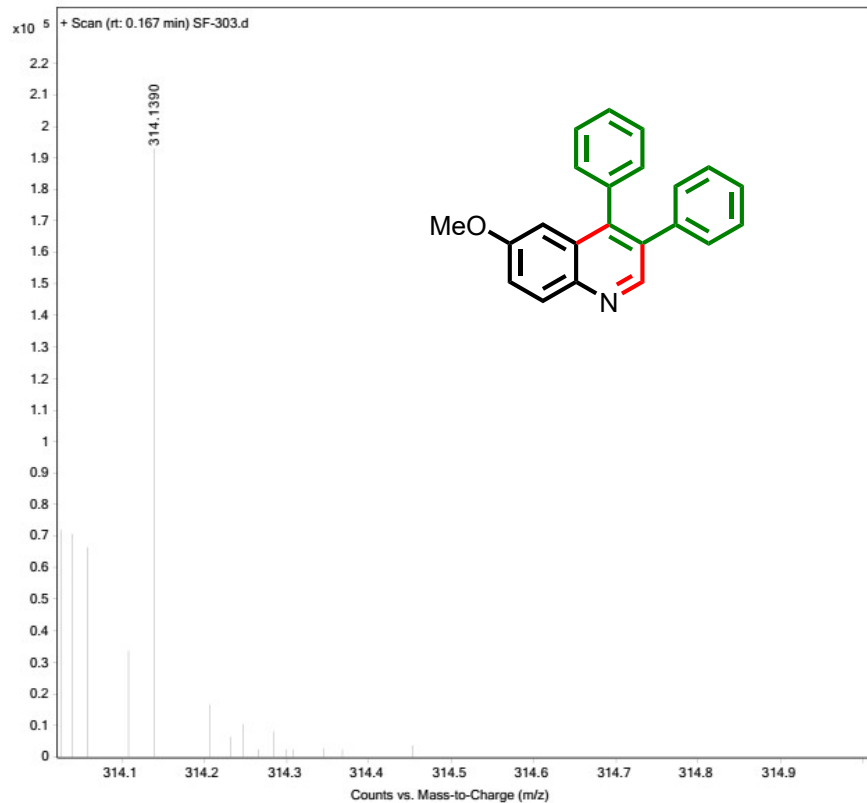
¹H NMR Spectrum of 6-Methoxy-3,4-diphenylquinoline(3m)



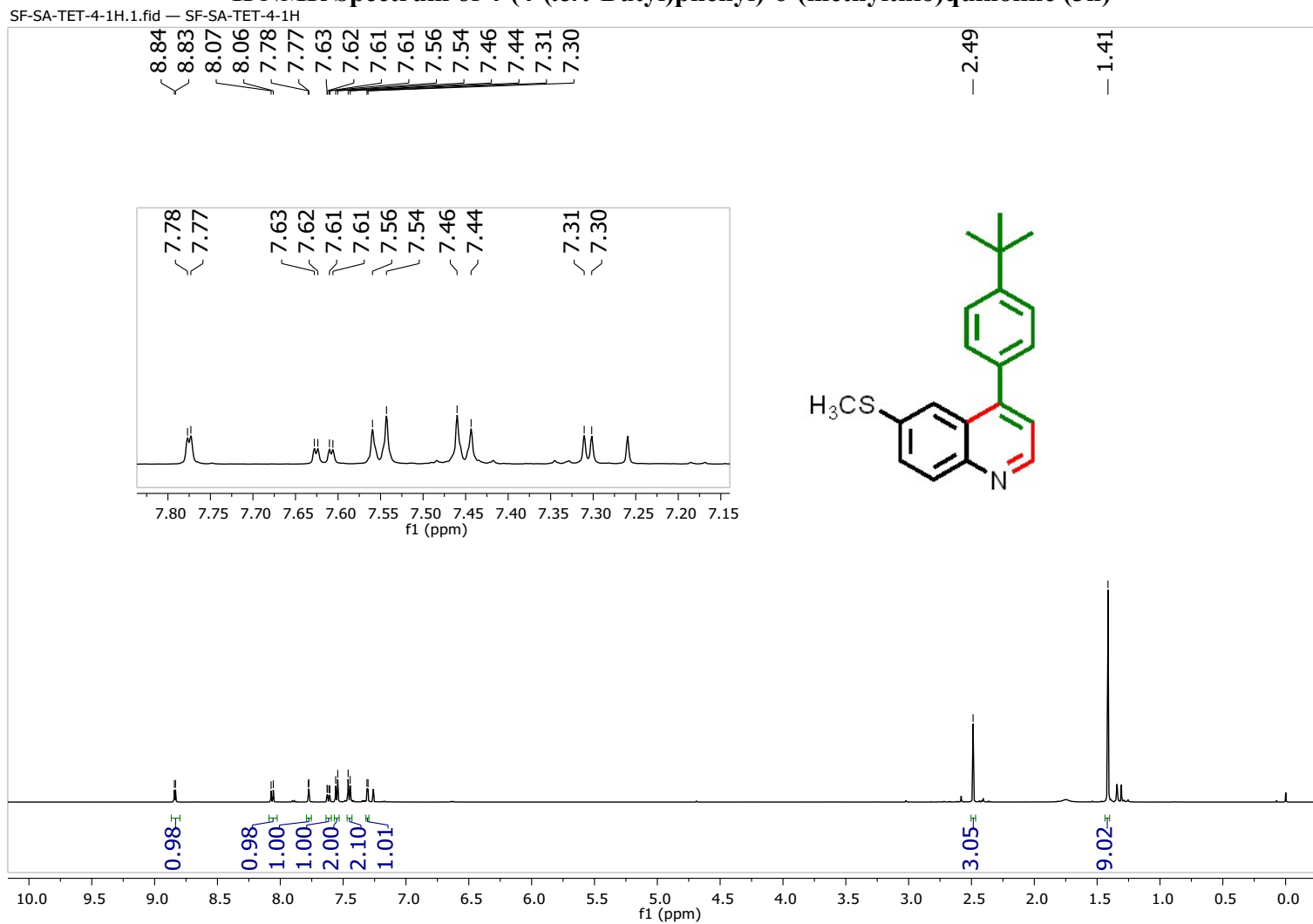


HRMS Spectrum of 6-Methoxy-3,4-diphenylquinoline(3m)

Sample Name	Sample48	Position	P1-E2	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF-303.d
ACQ Method	DIRECT MASS_POSITIVE_01_1.m	Comment		Acquired Time	24-04-2023 15:25:28 (UTC+05:30)

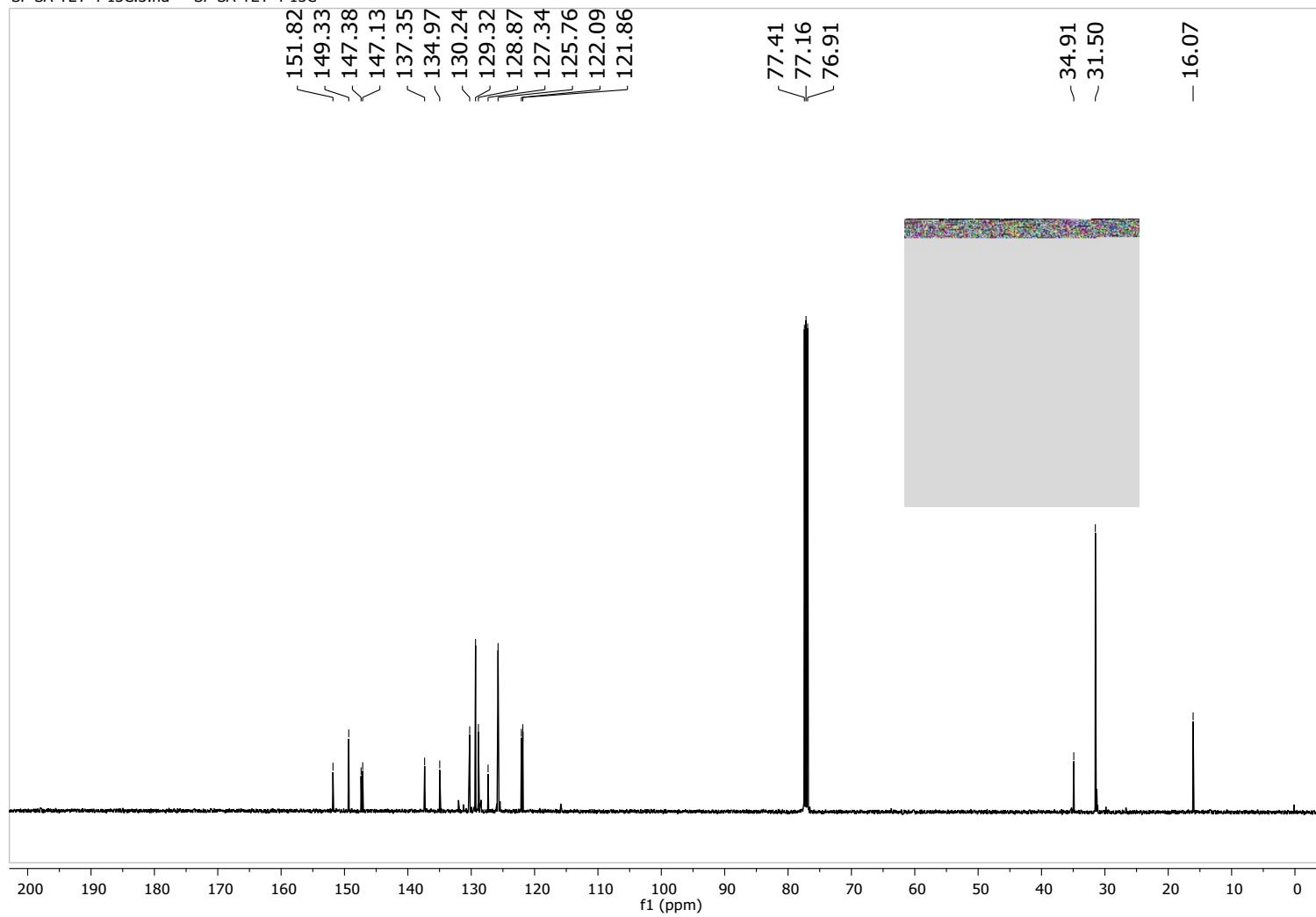


¹H NMR Spectrum of 4-(4-(*tert*-Butyl)phenyl)-6-(methylthio)quinoline (3n)



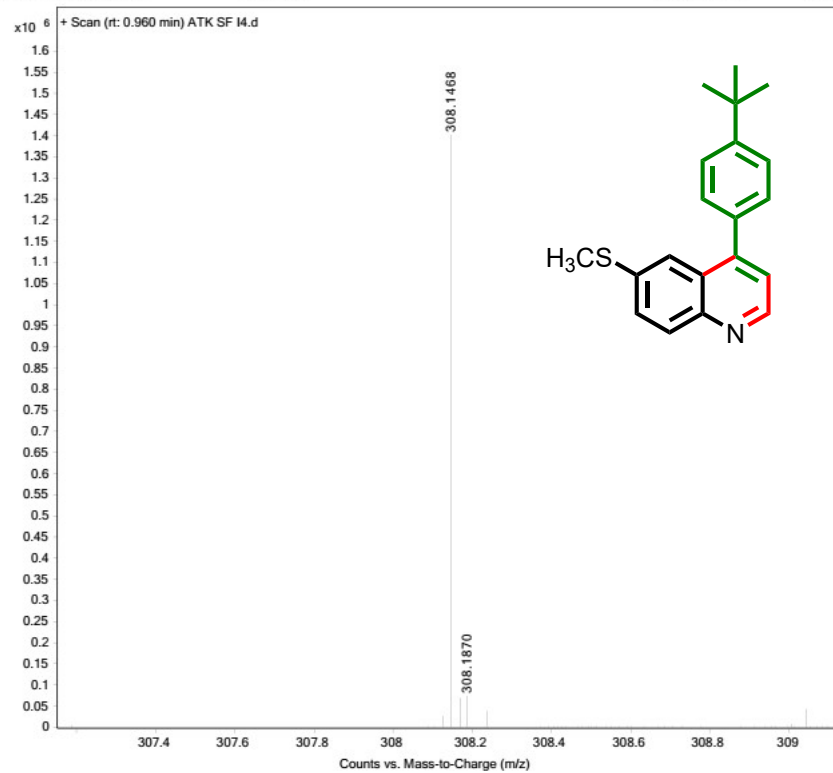
¹³C NMR Spectrum of 4-(4-(*tert*-Butyl)phenyl)-6-(methylthio)quinoline (3n)

SF-SA-TET-4-13C.3.fid — SF-SA-TET-4-13C

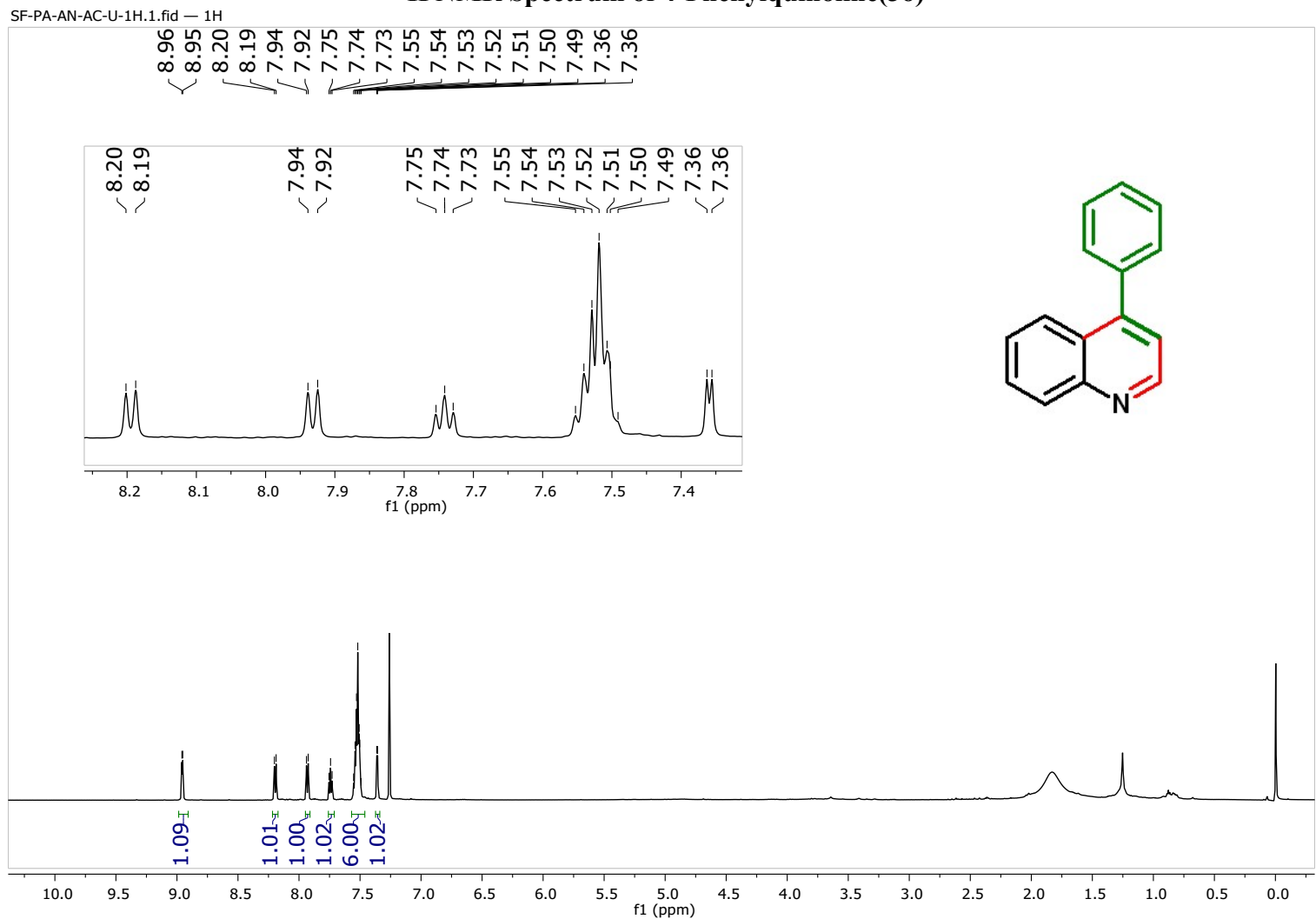


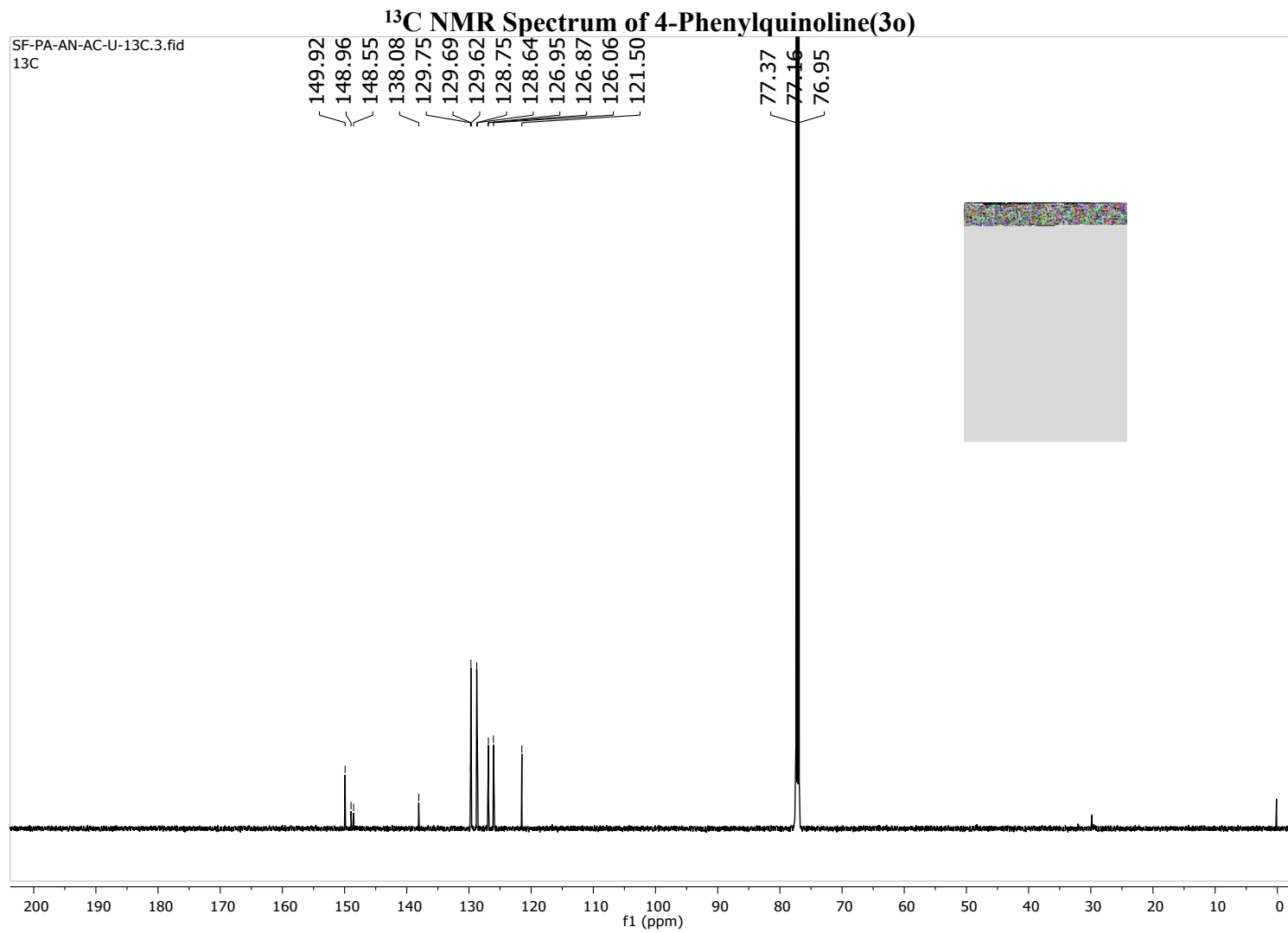
HRMS Spectrum of 4-(4-(*tert*-Butyl)phenyl)-6-(methylthio)quinoline (3n)

Sample Name	Sample11	Position	P1-A11	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK_SF_14.d
ACQ Method	DIRECT MASS_POSITIVE_01.m	Comment		Acquired Time	19-04-2023 15:22:24 (UTC+05:30)



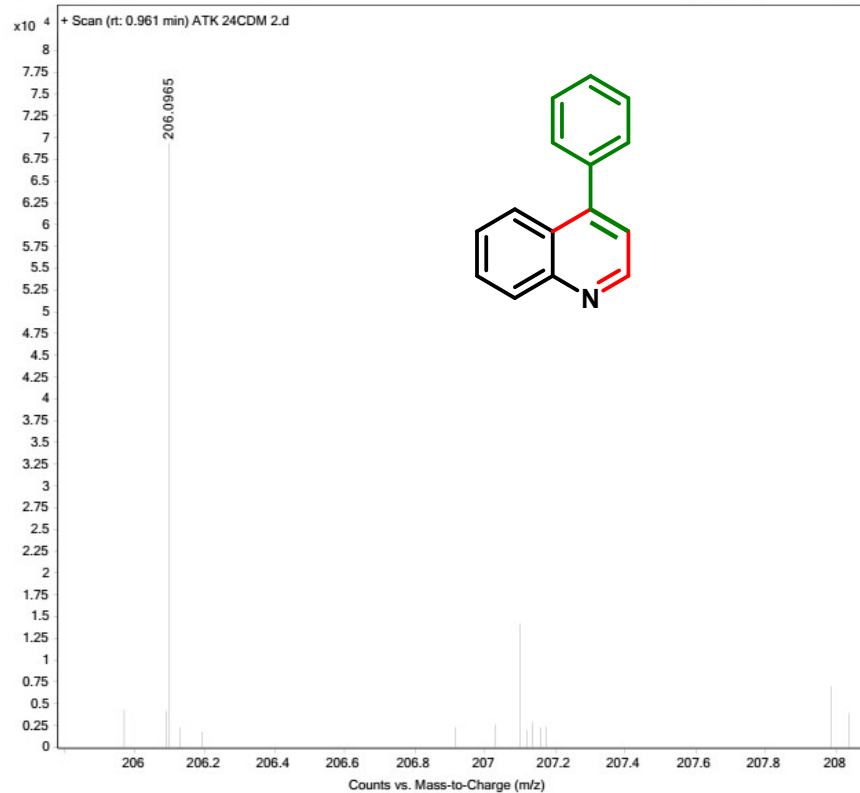
¹H NMR Spectrum of 4-Phenylquinoline(3o)

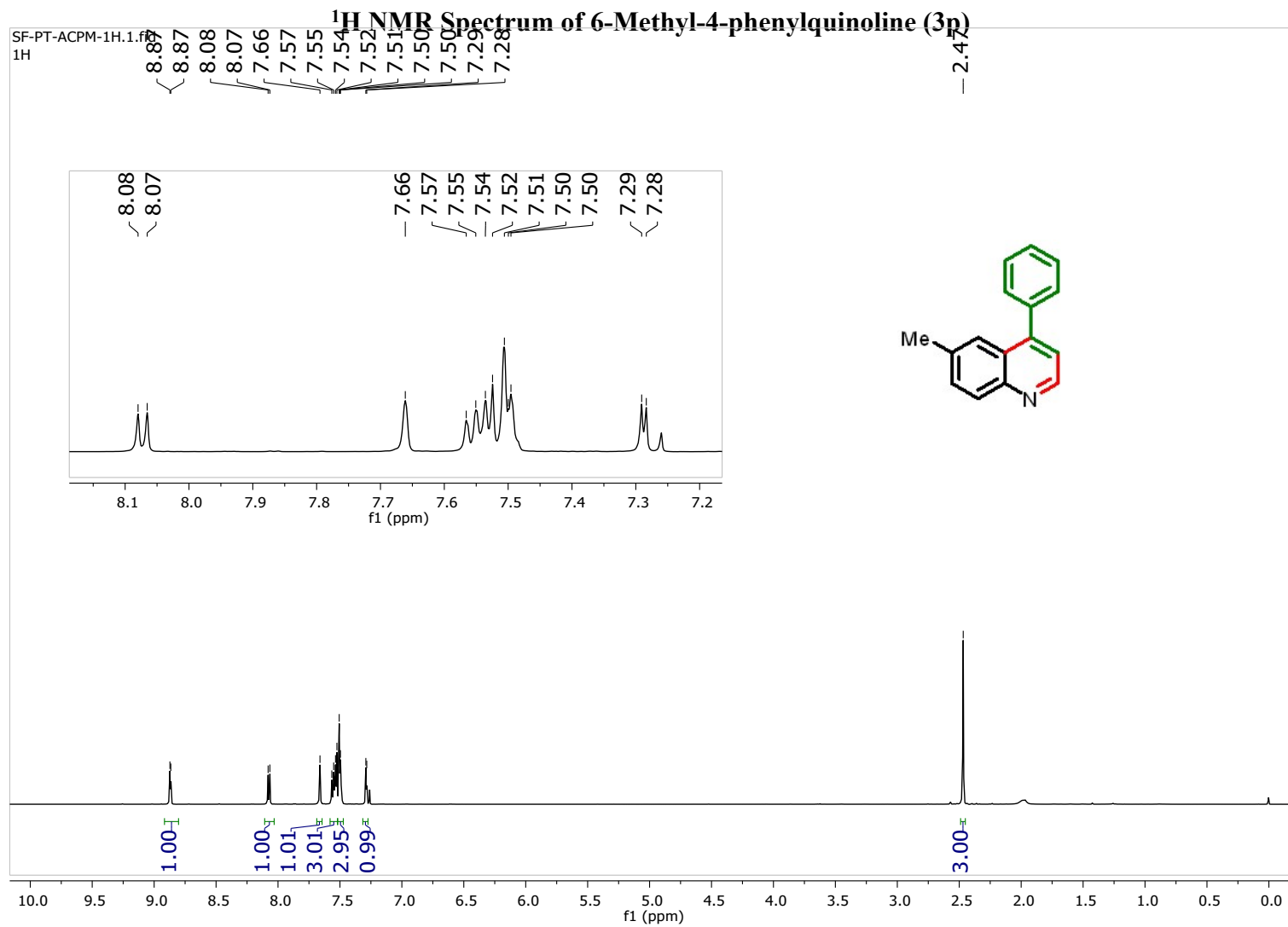


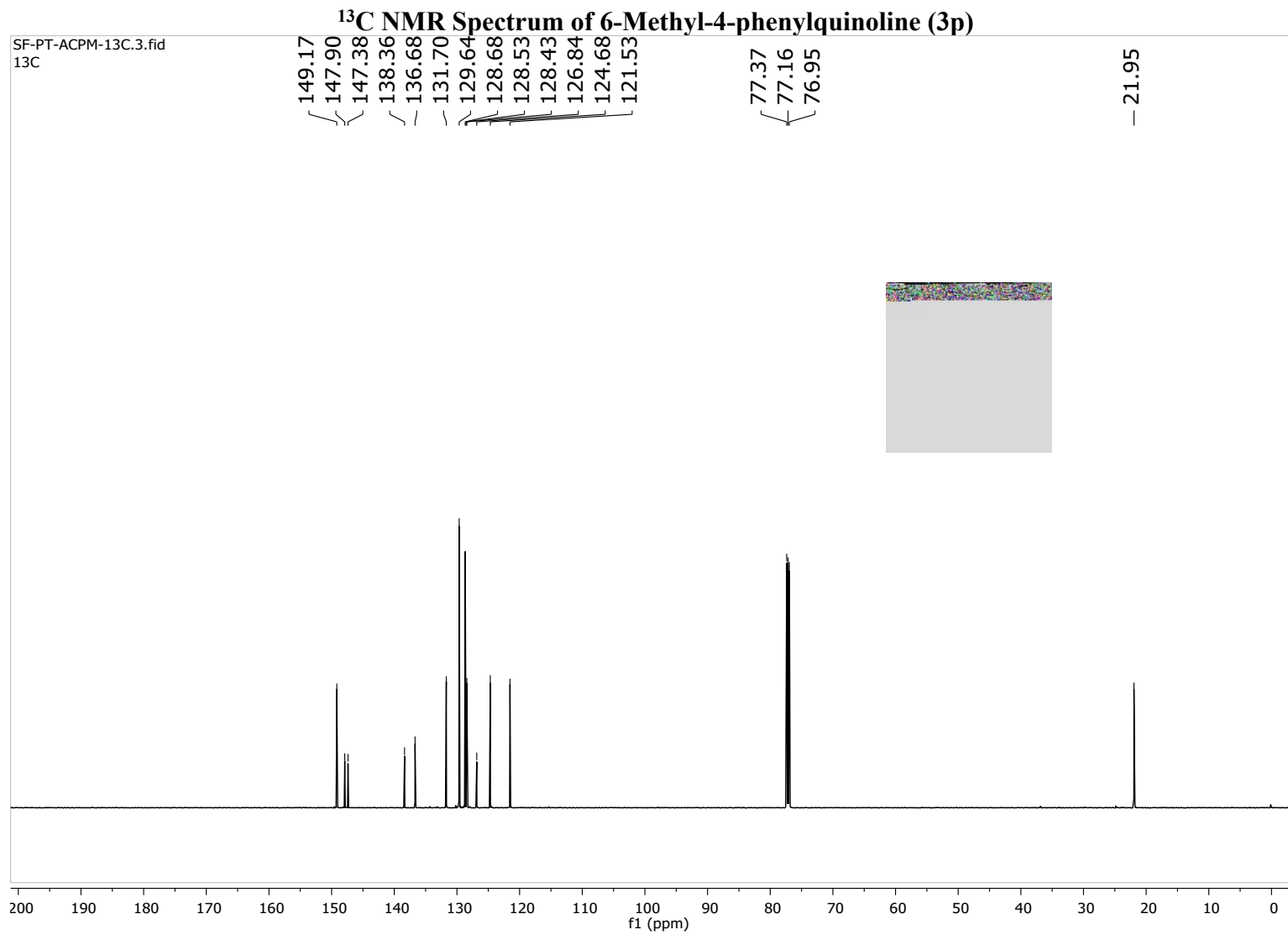


HRMS Spectrum of 4-Phenylquinoline(3o)

Sample Name	Sample10	Position	P1-A10	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK 24CDM 2.d
ACQ Method	DIRECT MASS_POSITIVE_01.m	Comment		Acquired Time	19-04-2023 15:20:20 (UTC+05:30)

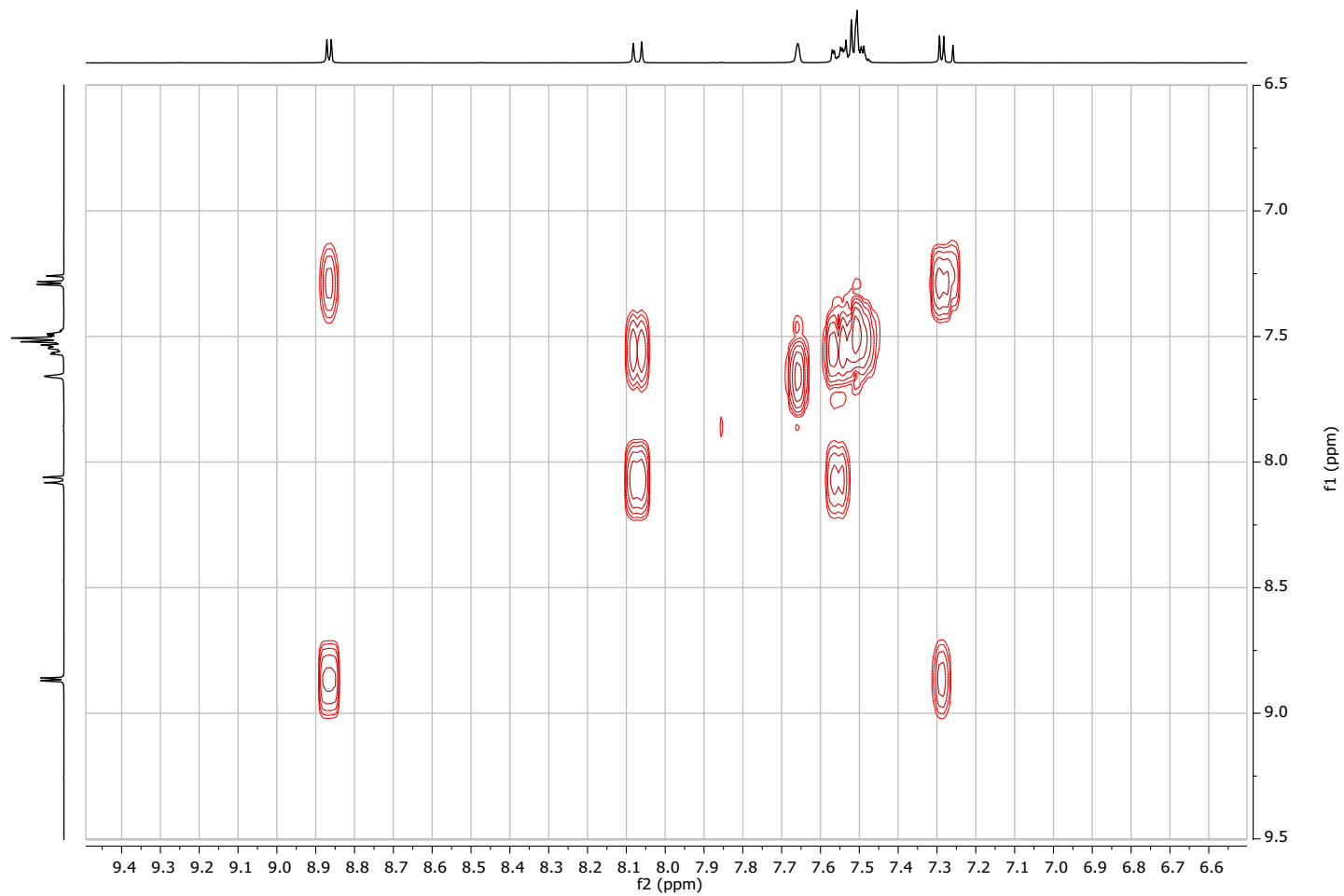






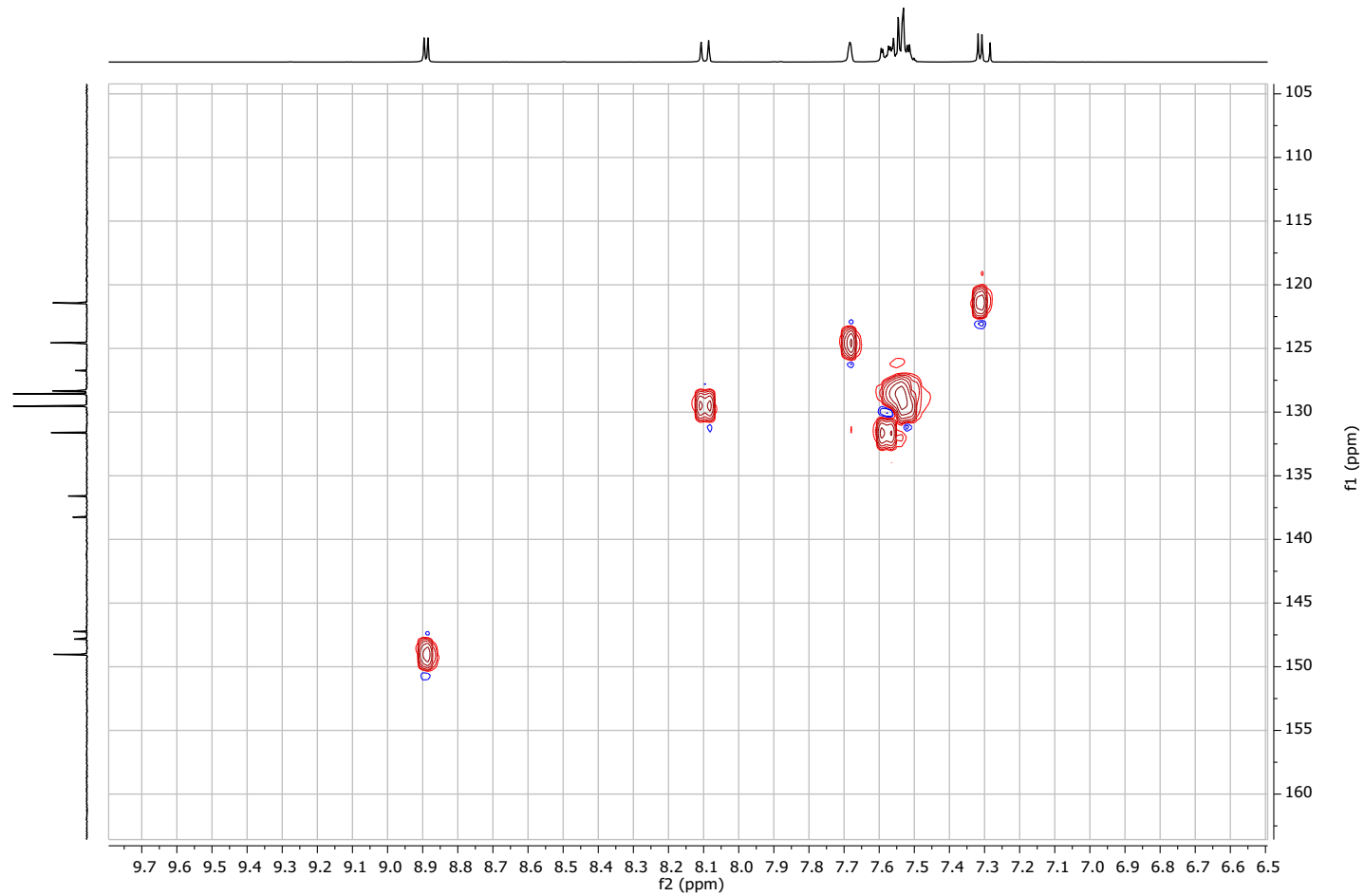
¹H-¹H- COSY Spectrum of 6-Methyl-4-phenylquinoline (3p)

SF-PT-DM-4-2_COSY.17.ser — SF-PT-DM-4-2_COSY



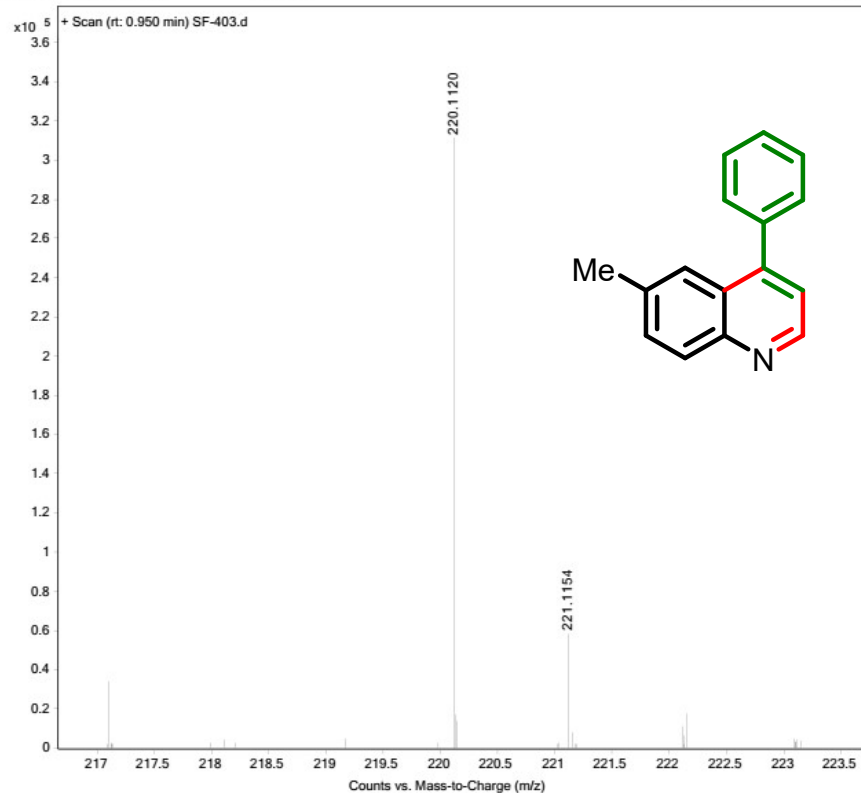
^1H - ^{13}C - COSY Spectrum of 6-Methyl-4-phenylquinoline (3p)

SF-PT-DM-4-2_HSQC.15.ser — SF-PT-DM-4-2_HSQC

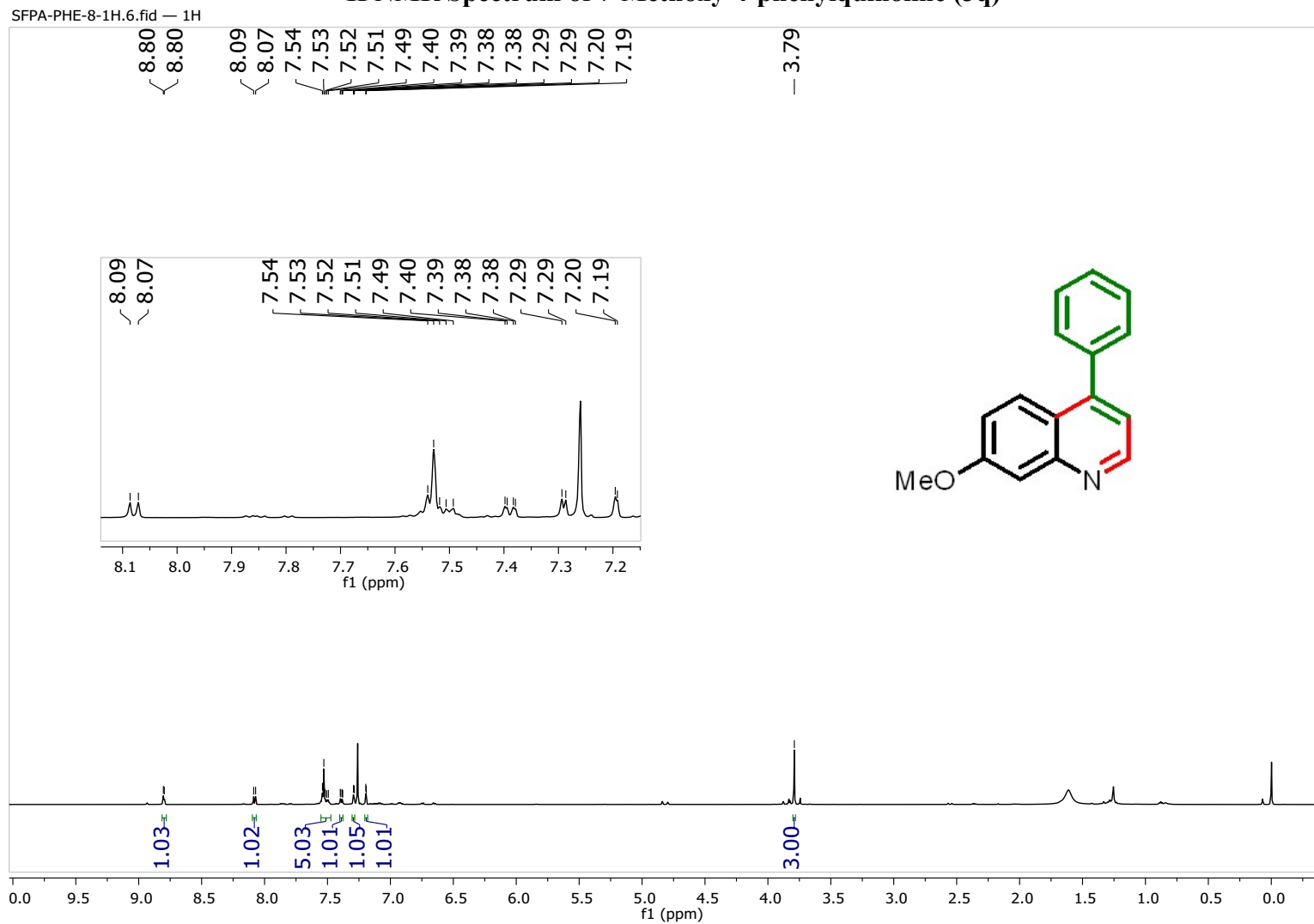


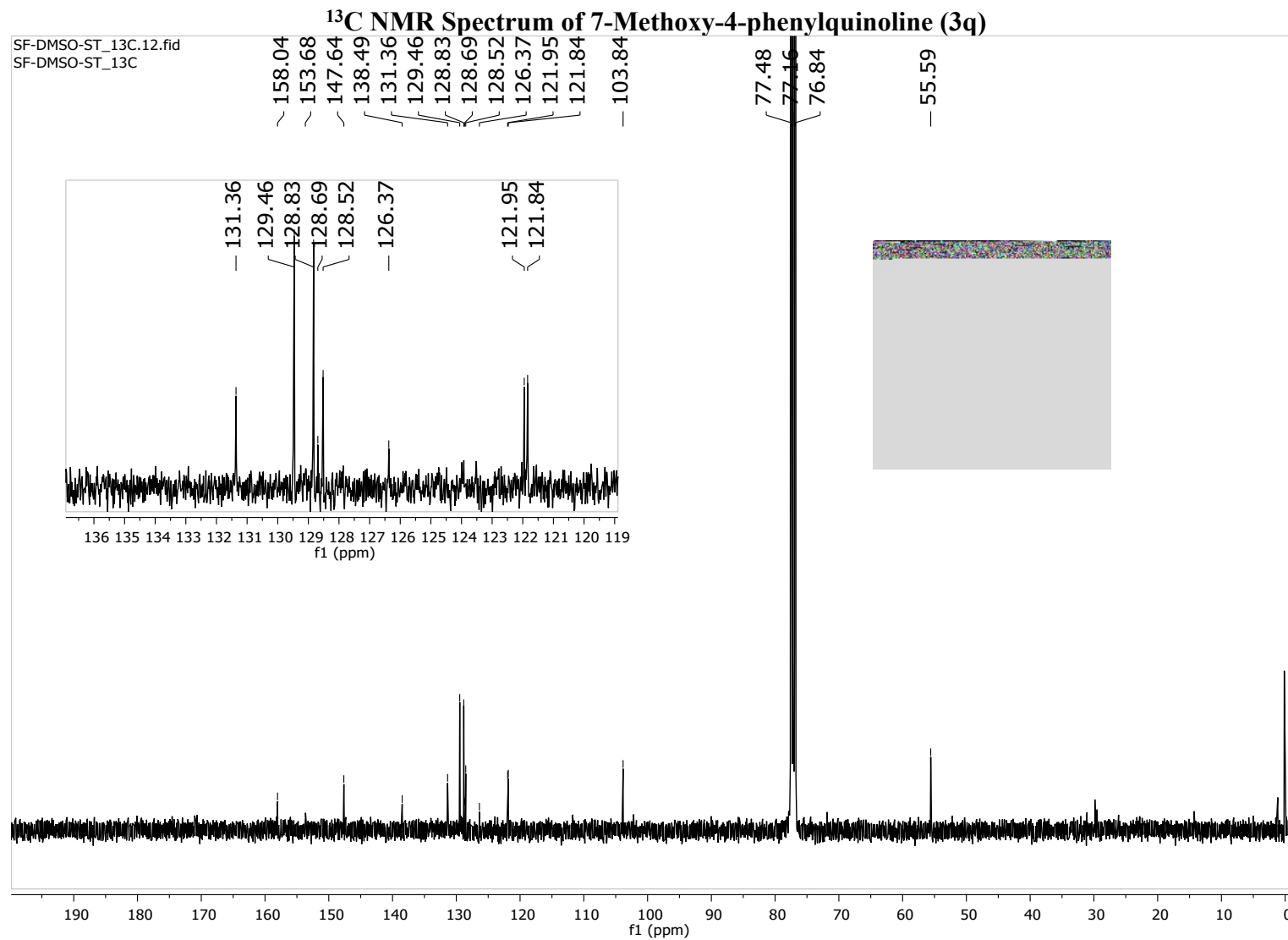
HRMS Spectrum of 6-Methyl-4-phenylquinoline (3p)

Sample Name	Sample18	Position	P1-B7	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF-403.d
ACQ Method	DIRECT MASS_POSITIVE_01_1.m	Comment		Acquired Time	02-05-2023 11:04:37 (UTC+05:30)



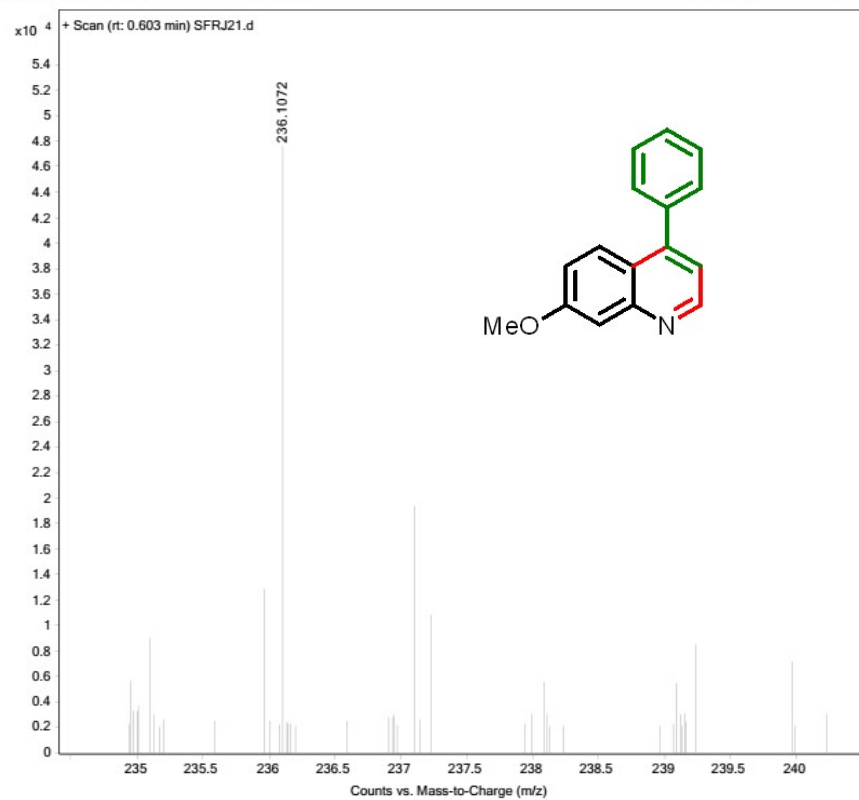
¹H NMR Spectrum of 7-Methoxy-4-phenylquinoline (3q)

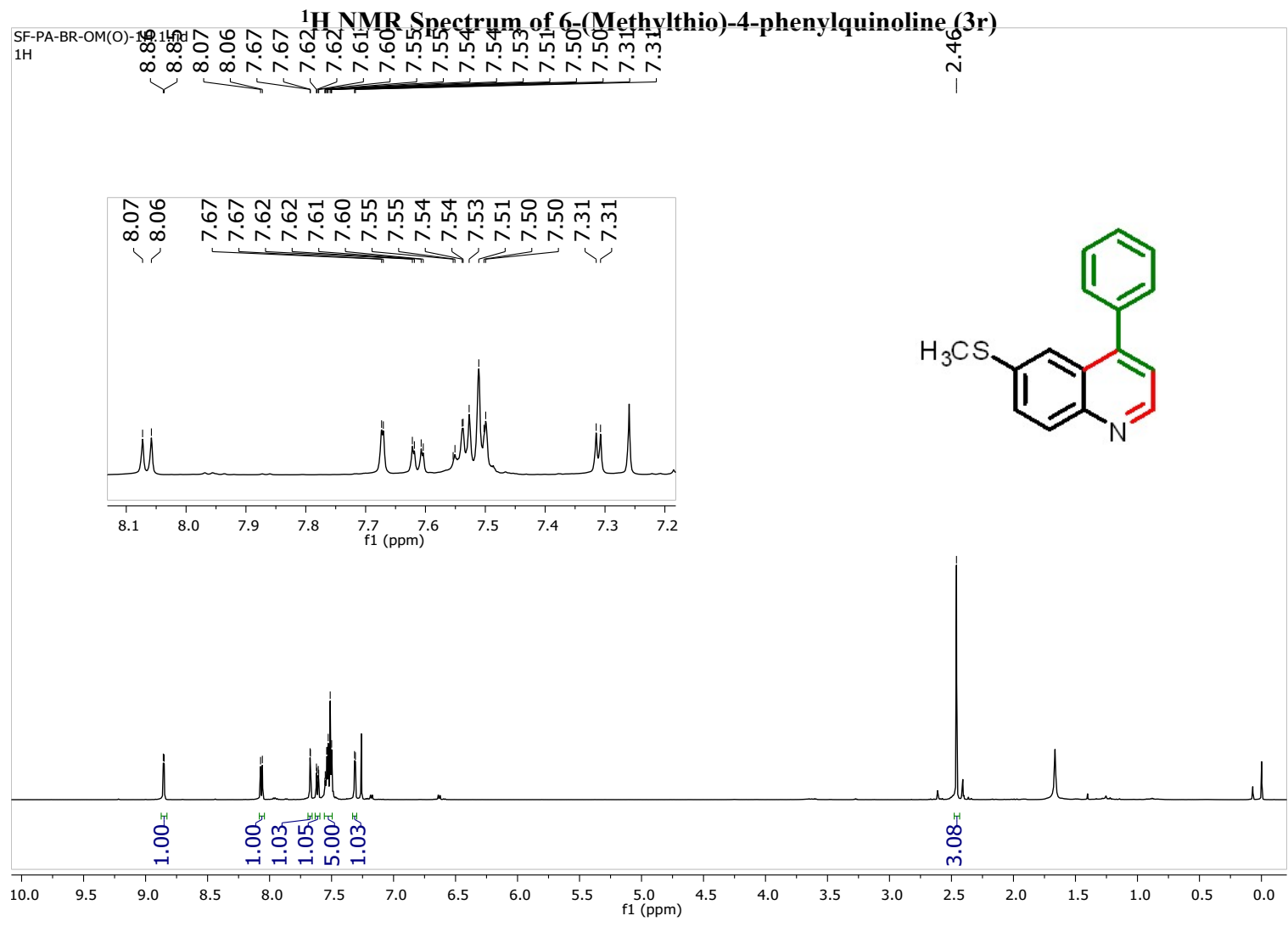


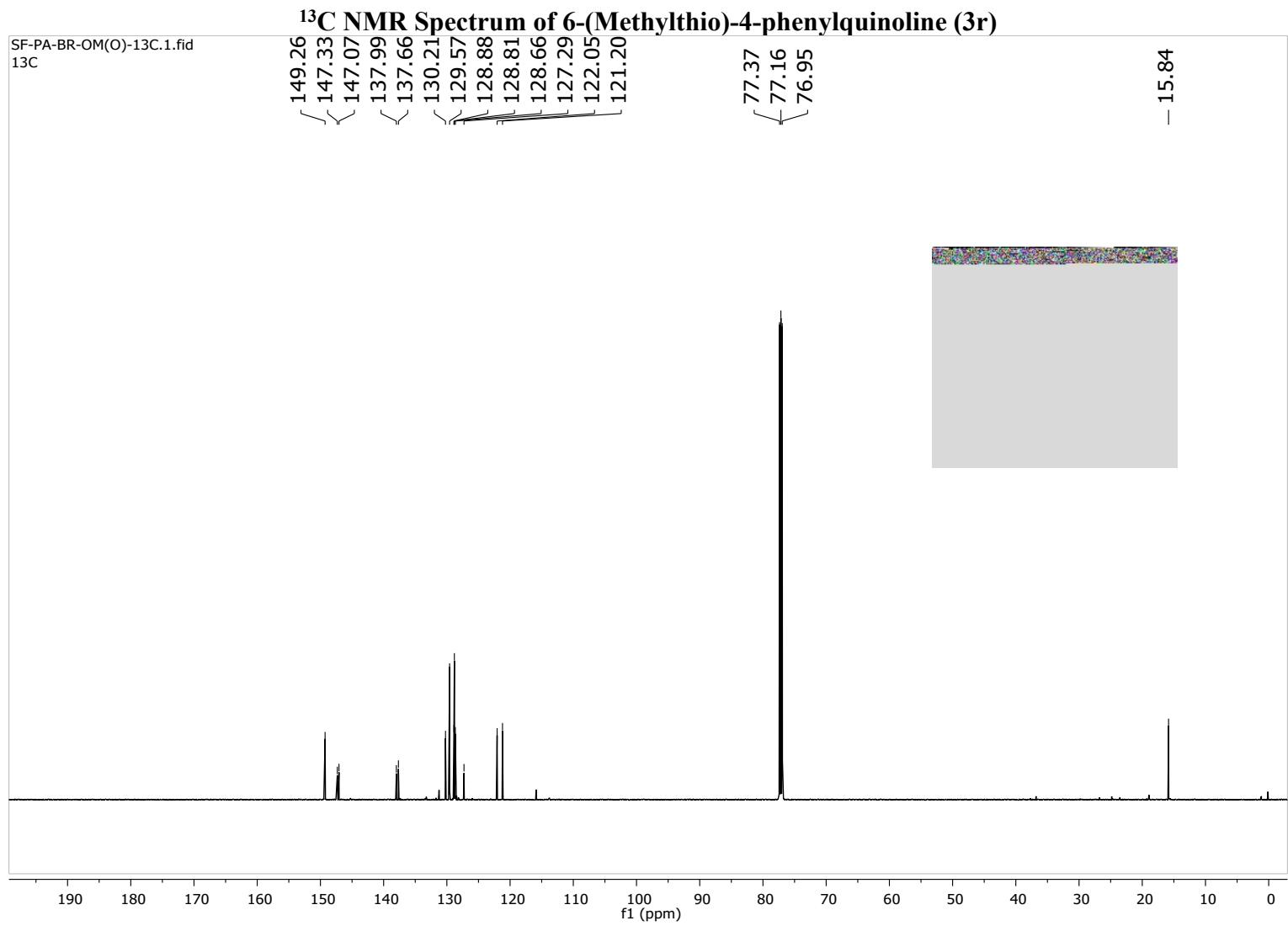


HRMS Spectrum of 7-Methoxy-4-phenylquinoline (3q)

Sample Name	Sample13	Position	P1-B2	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SFRJ21.d
ACQ Method	DIRECT MASS_POSITIVE_01.m	Comment		Acquired Time	06-04-2023 16:23:46 (UTC+05:30)

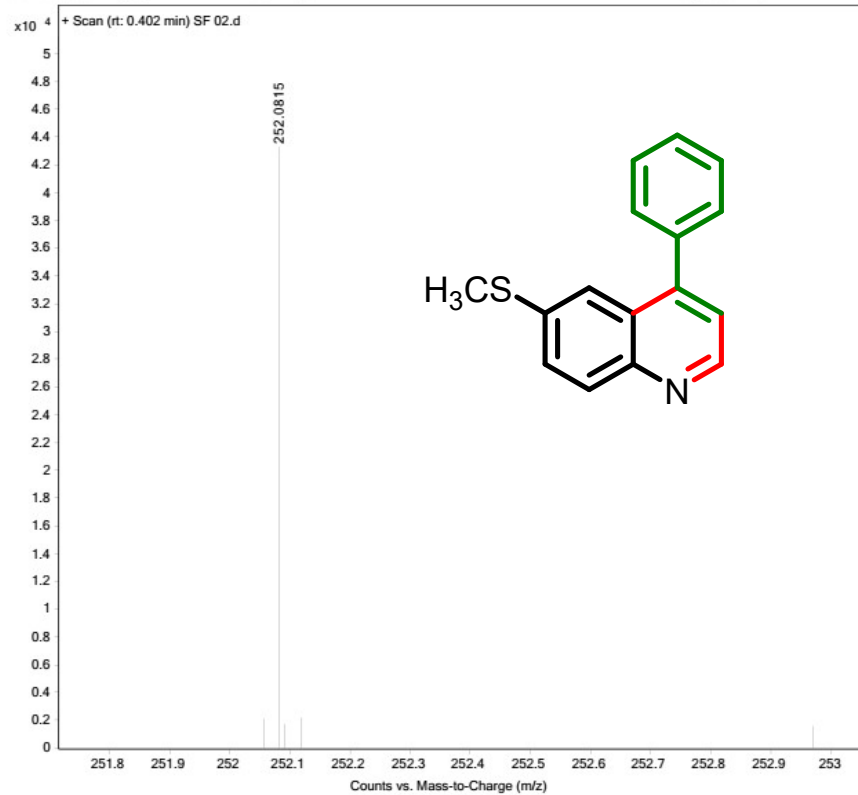






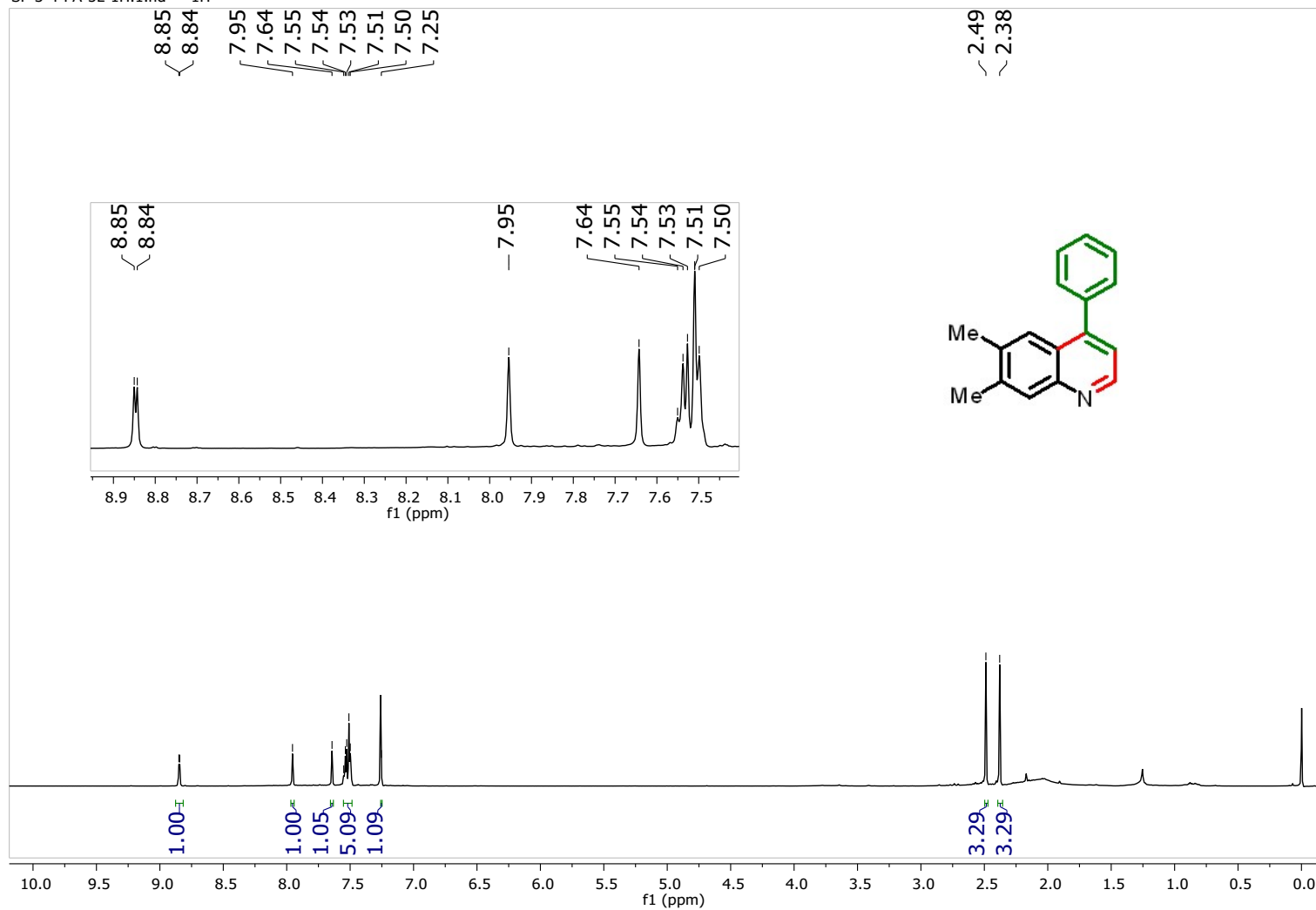
HRMS Spectrum of 6-(Methylthio)-4-phenylquinoline (3r)

Sample Name	Sample20	Position	P1-B8	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF 02.d
ACQ Method	DIRECT MASS_POSITIVE_01_1.m	Comment		Acquired Time	22-05-2023 10:48:01 (UTC+05:30)



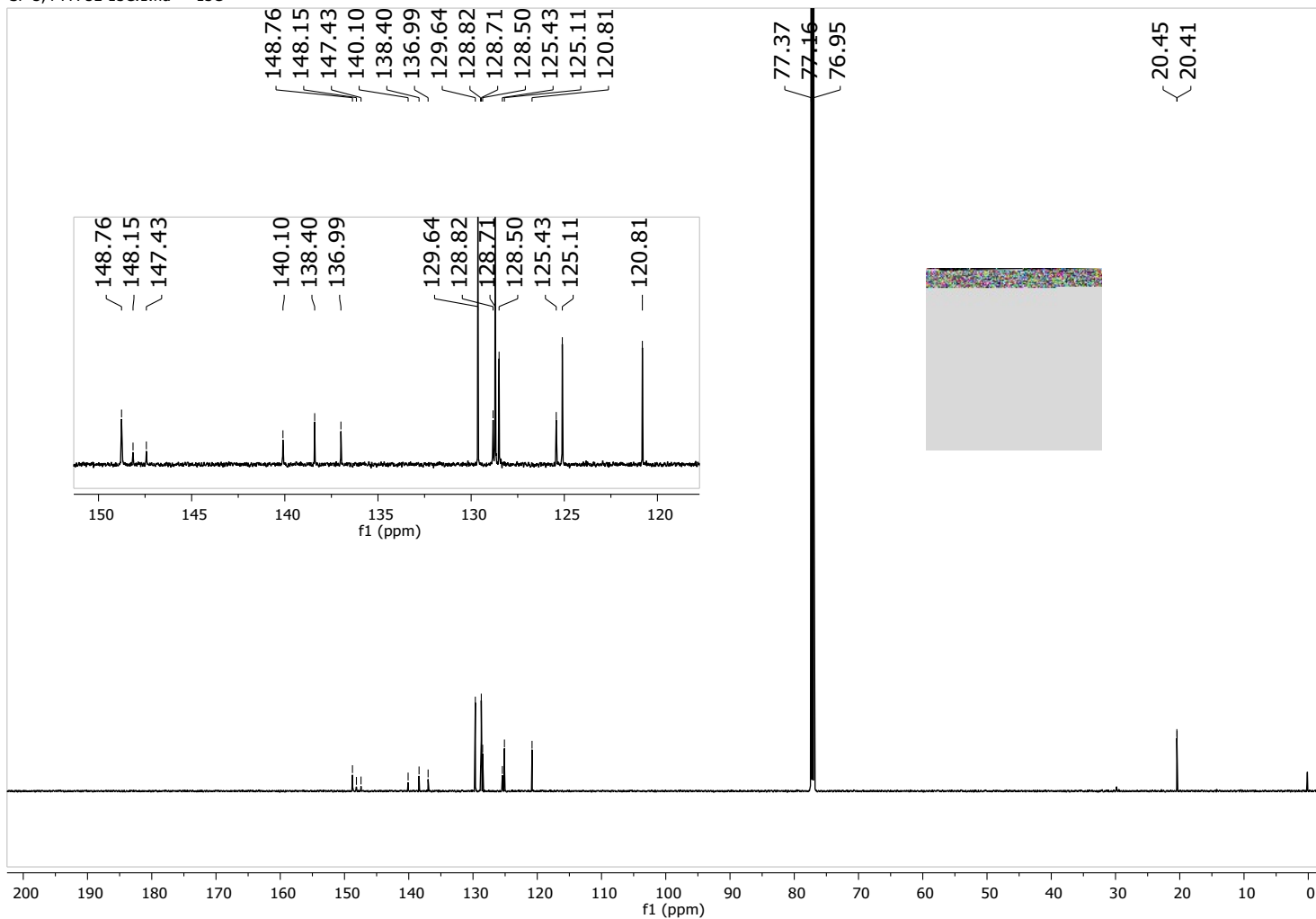
¹H NMR Spectrum of 6,7-Dimethyl-4-phenylquinoline (3s)

SF-3-4-PA-5L-1H.1.fid — 1H



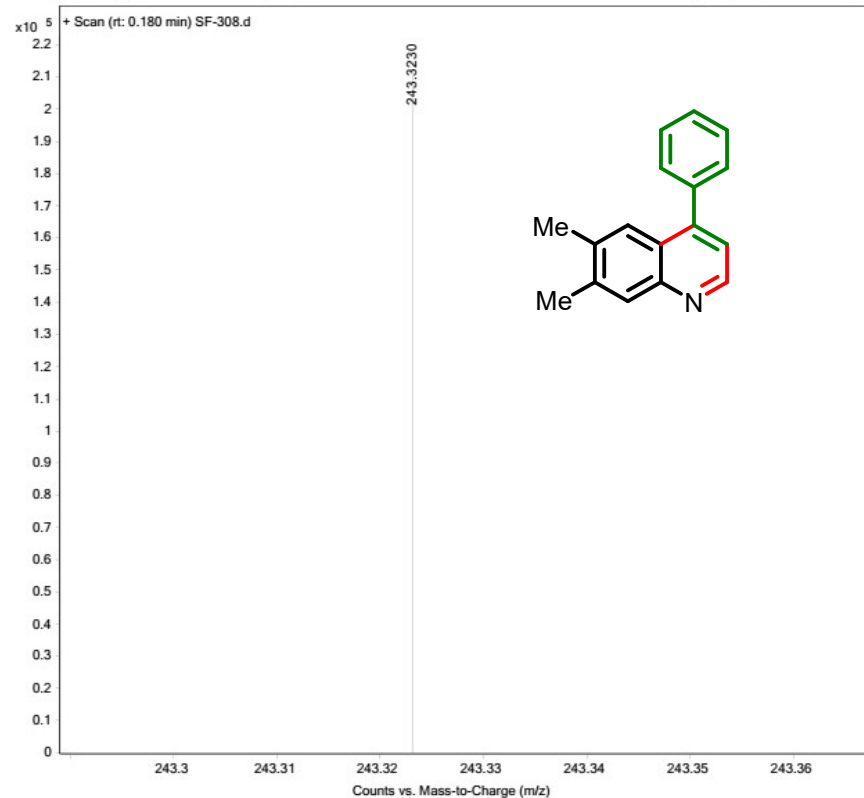
¹³C NMR Spectrum of 6,7-Dimethyl-4-phenylquinoline (3s)

SF-3,4-PA-5L-13C.1.fid — 13C



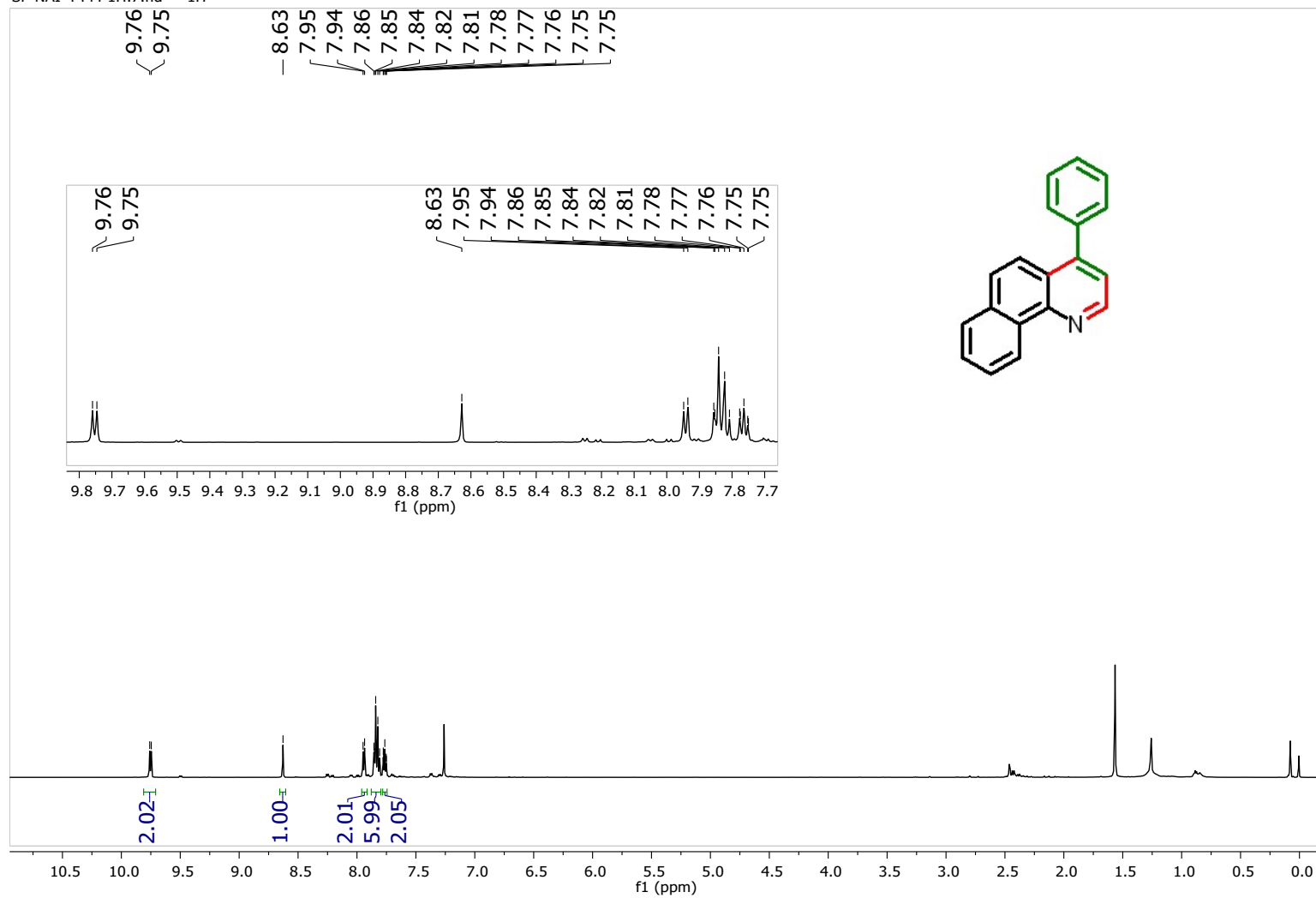
HRMS Spectrum of 6,7-Dimethyl-4-phenylquinoline (3s)

Sample Name	Sample10	Position	P1-A9	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF-308.d
ACQ Method	DIRECT MASS_POSITIVE_D1_1.m	Comment		Acquired Time	26-04-2023 11:34:06 (UTC+05:30)



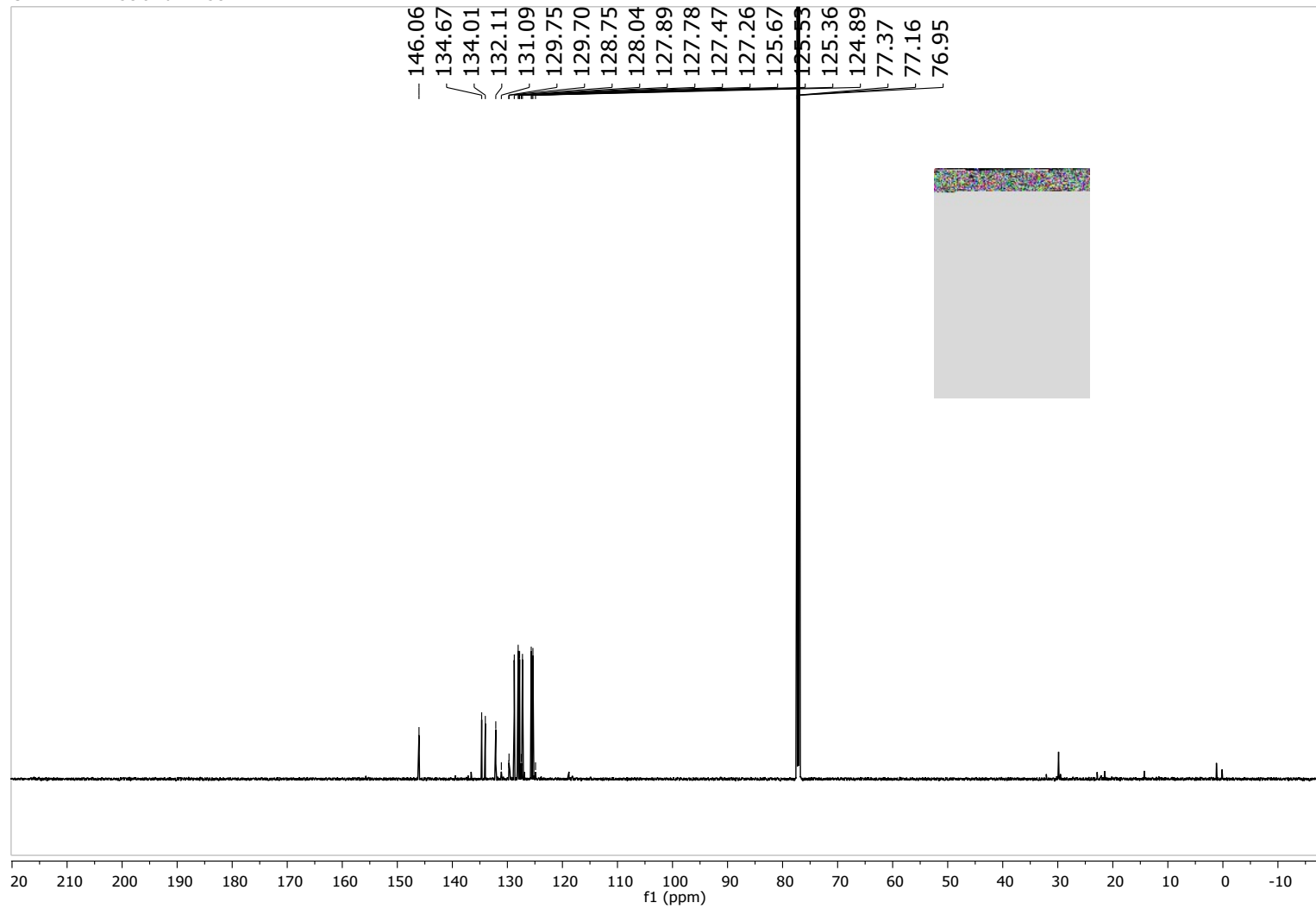
¹H NMR Spectrum of 4-Phenylbenzo[*h*]quinoline(3t)

SF-NAI-4-PM-1H.7.fid — 1H



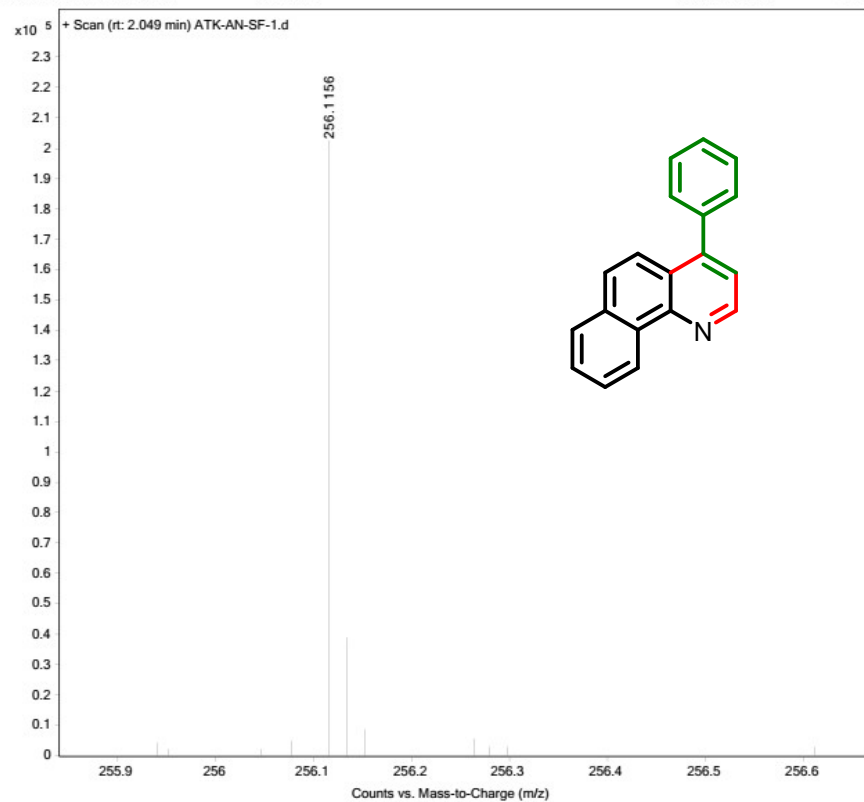
¹³C NMR Spectrum of 4-Phenylbenzo[*h*]quinoline(3t)

SF-NAI-4-PM-13C.8.fid — 13C

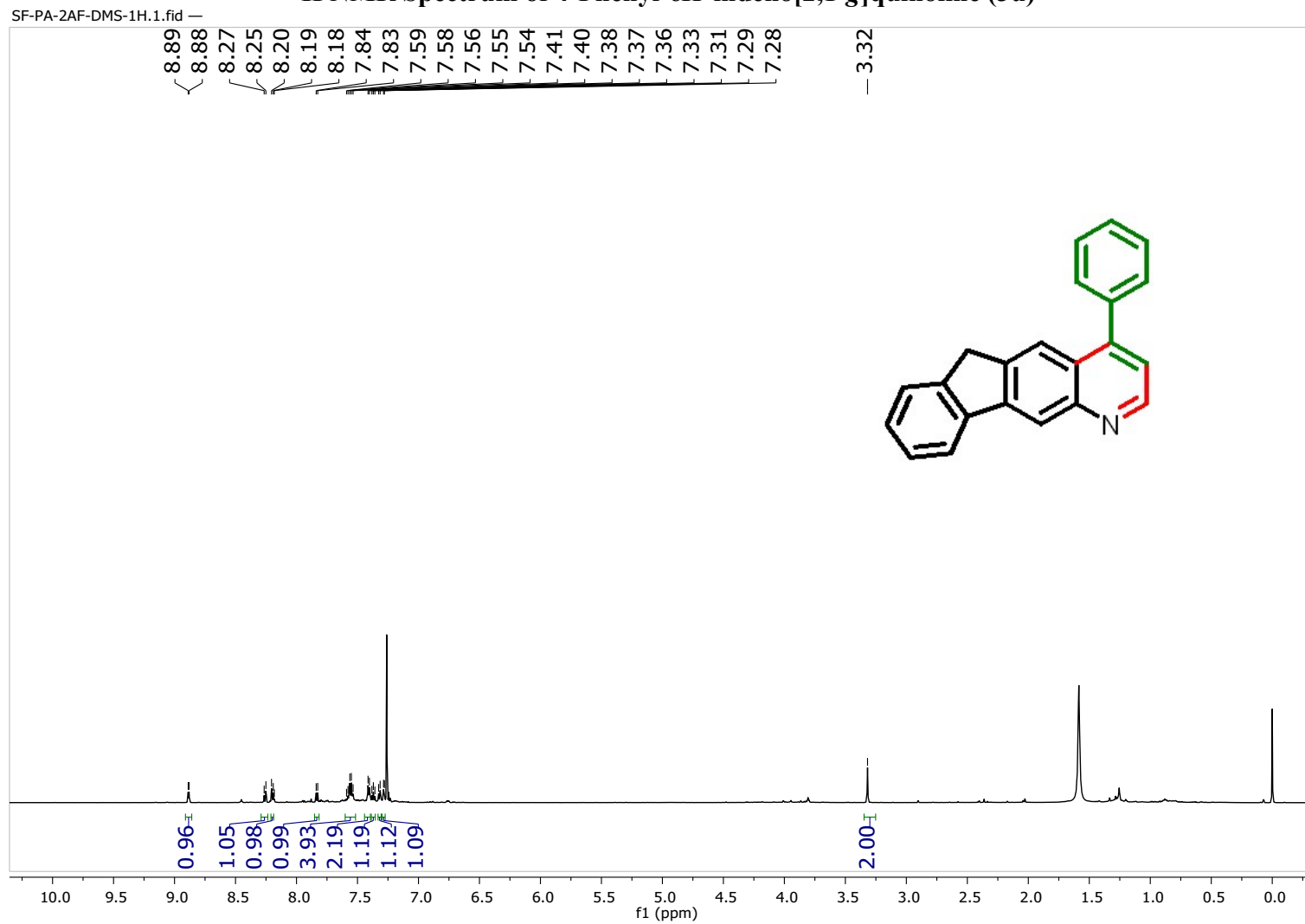


HRMS Spectrum of 4-Phenylbenzo[h]quinoline(3t)

Sample Name	Sample92	Position	P1-E2	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATK-AN-SF-1.d
ACQ Method	LC-COLUMN-TRAINING-METHOD.m	Comment		Acquired Time	11-04-2023 03:47:28 (UTC+05:30)

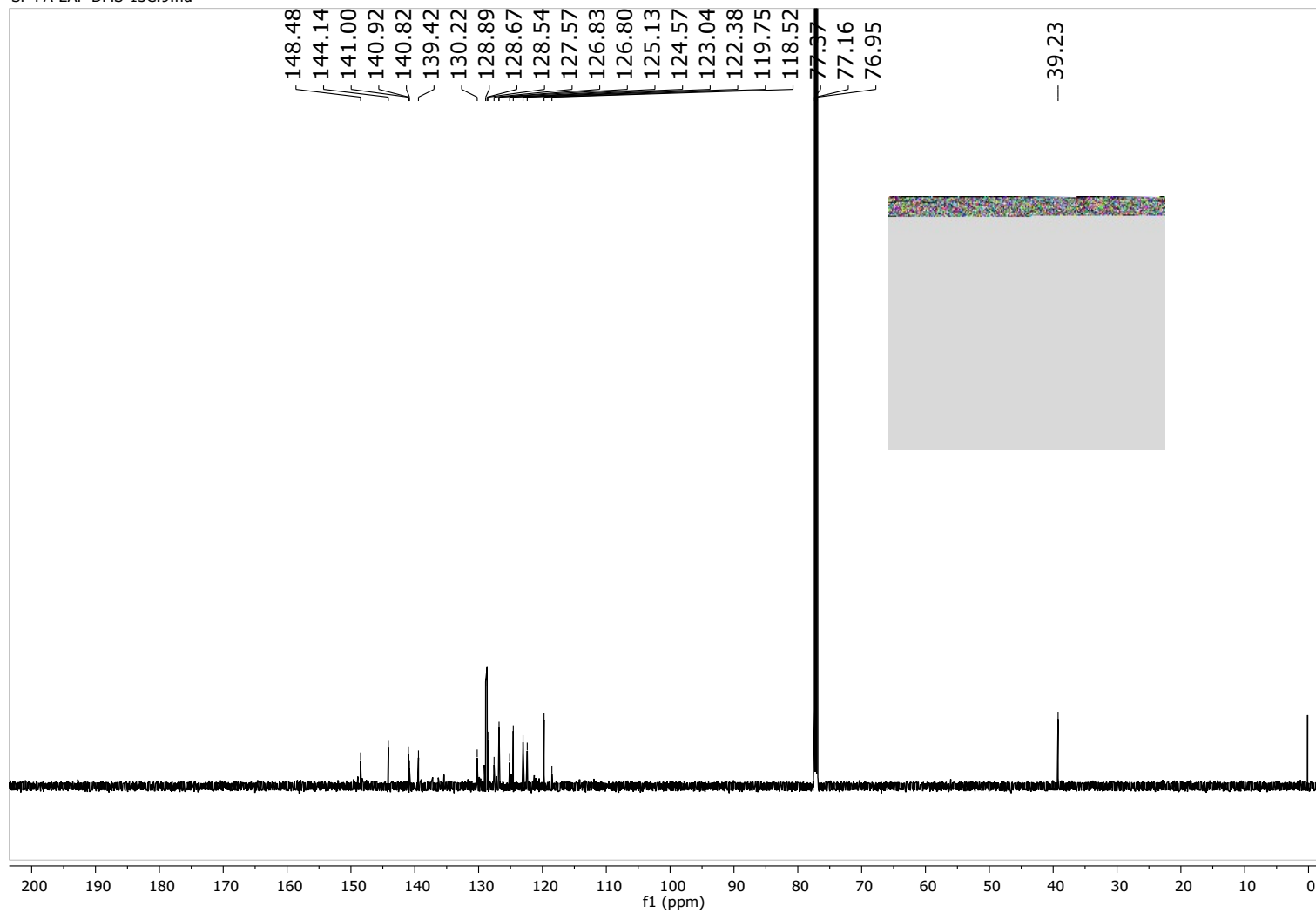


¹H NMR Spectrum of 4-Phenyl-6H-indeno[2,1-g]quinoline (3u)



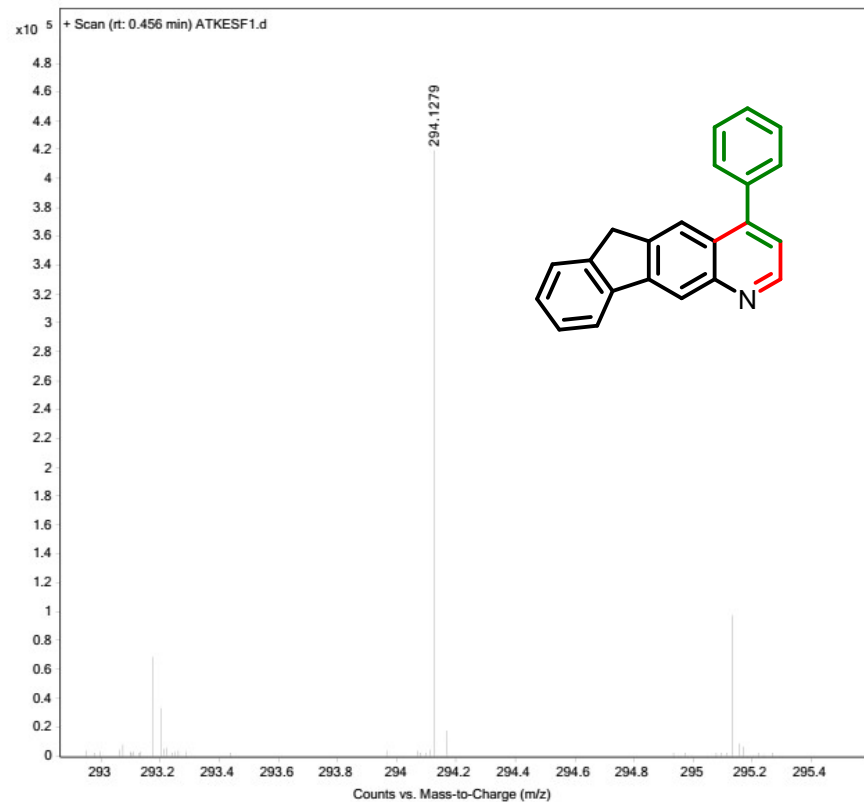
¹³C NMR Spectrum of 4-Phenyl-6*H*-indeno[2,1-*g*]quinoline (3u)

SF-PA-2AF-DMS-13C.9.fid —

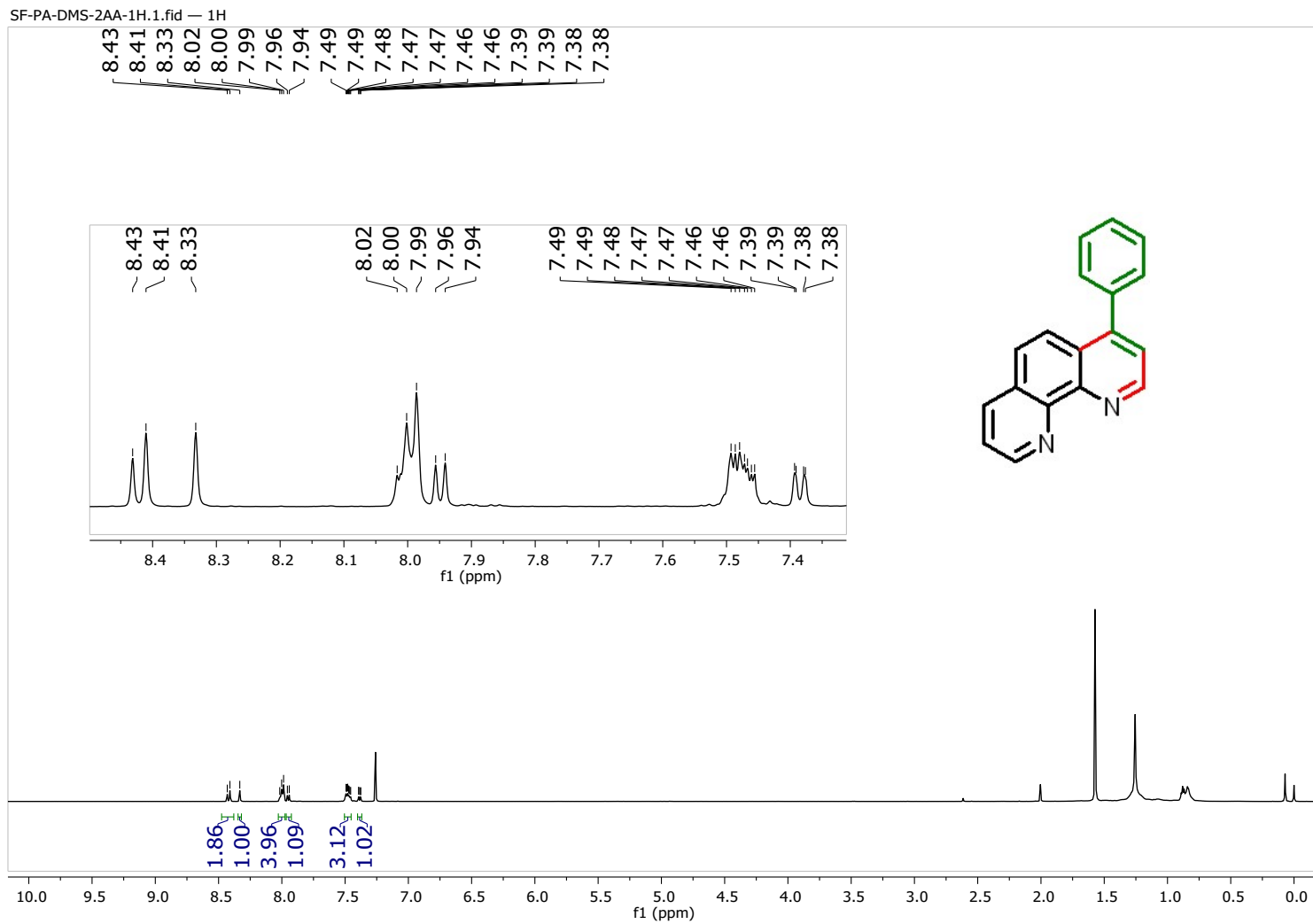


HRMS Spectrum of 4-Phenyl-6*H*-indeno[2,1-*g*]quinoline (3u)

Sample Name	Sample14	Position	P1-B3	Instrument Name	QTOF
User Name	SYSTEM (SYSTEM)	Inj Vol	5	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	ATKESF1.d
ACQ Method	DIRECT MASS_POSITIVE_01.m	Comment		Acquired Time	17-04-2023 12:13:47 (UTC+05:30)

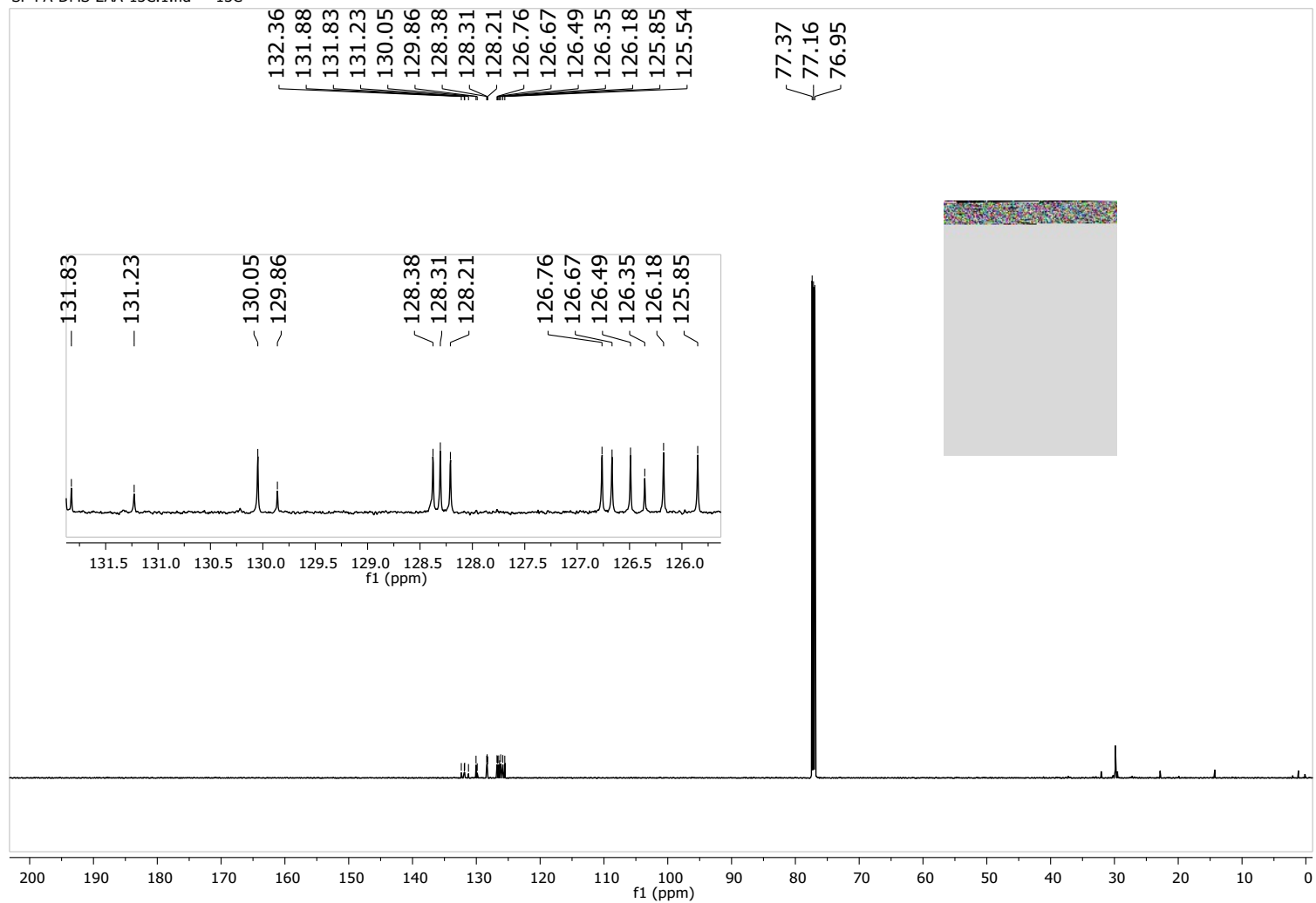


¹H NMR Spectrum of 4-Phenyl-1,10-phenanthroline(3v)



¹³C NMR Spectrum of 4-Phenyl-1,10-phenanthroline(3v)

SF-PA-DMS-2AA-13C.1.fid — 13C



HRMS Spectrum of 4-Phenyl-1,10-phenanthroline(3v)

Sample Name	SF-PA-STBR-NEG	Position	P1-E3	Instrument Name	Instrument 1
User Name		Inj Vol	10	InjPosition	
Sample Type	Sample	IRM Calibration Status	Success	Data Filename	SF-PA-STBR-NEG_064.d
ACQ Method	FULL SCAN-NEG.m	Comment		Acquired Time	27-01-2023 19:53:45 (UTC+05:30)

