Alkynylation and Cyanation of Alkenes Using Diverse Properties of a Nitro Group

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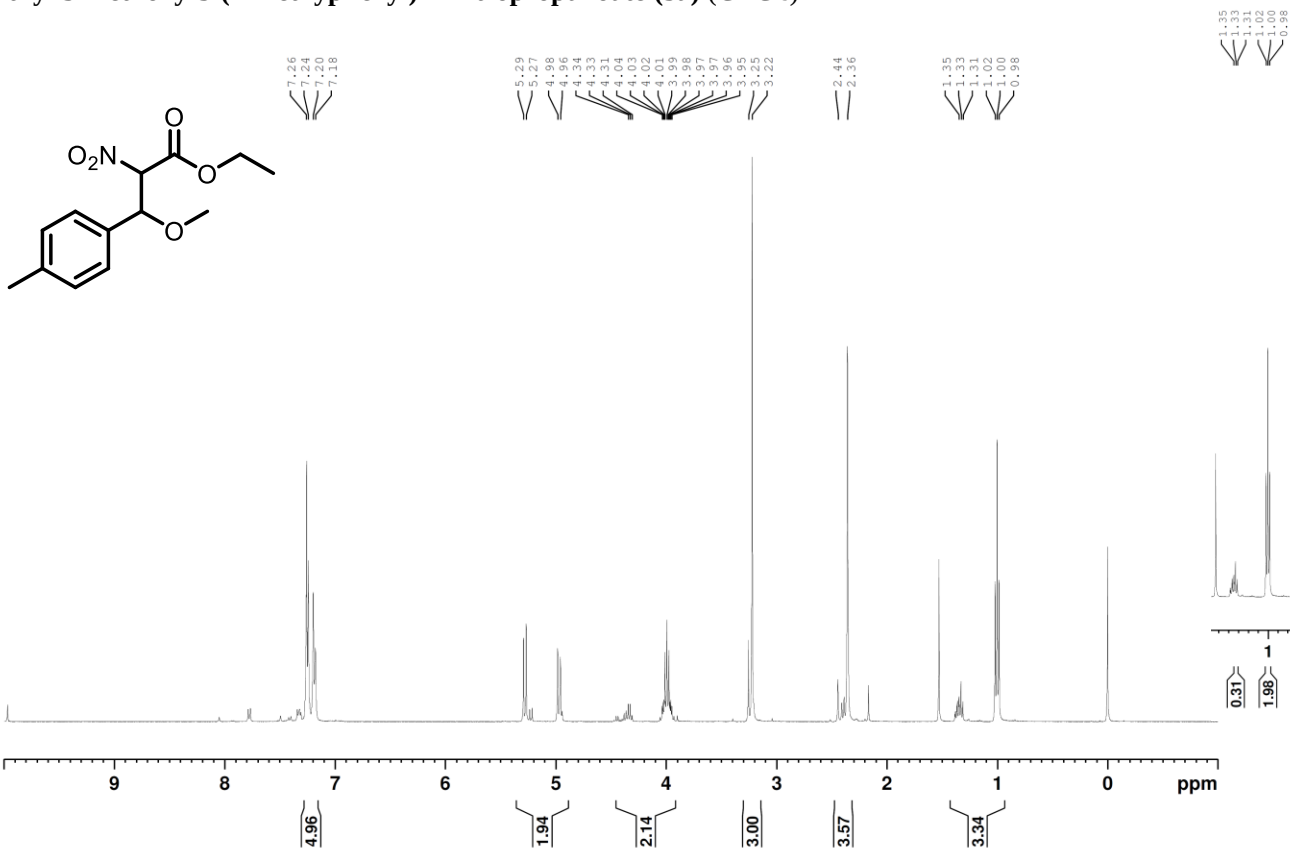
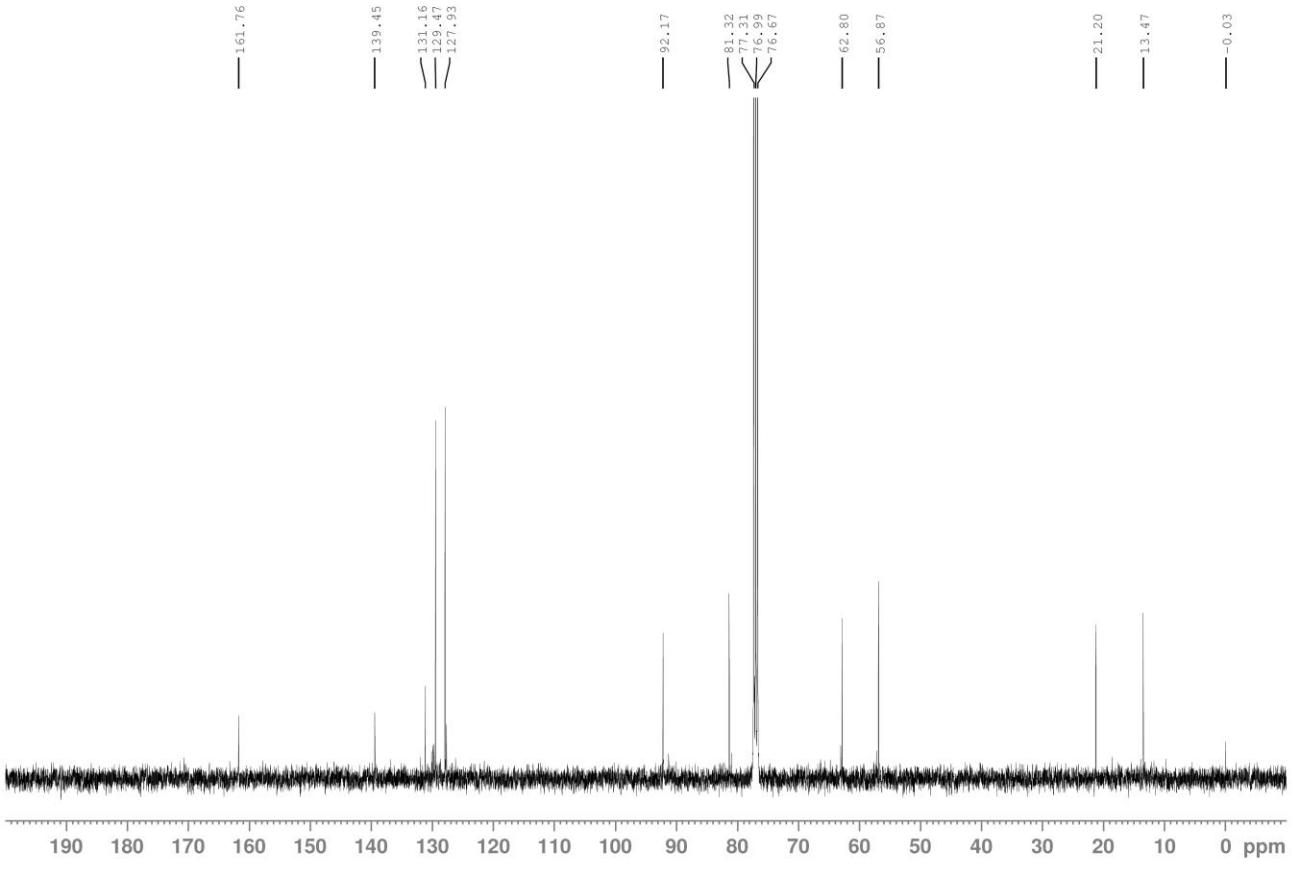
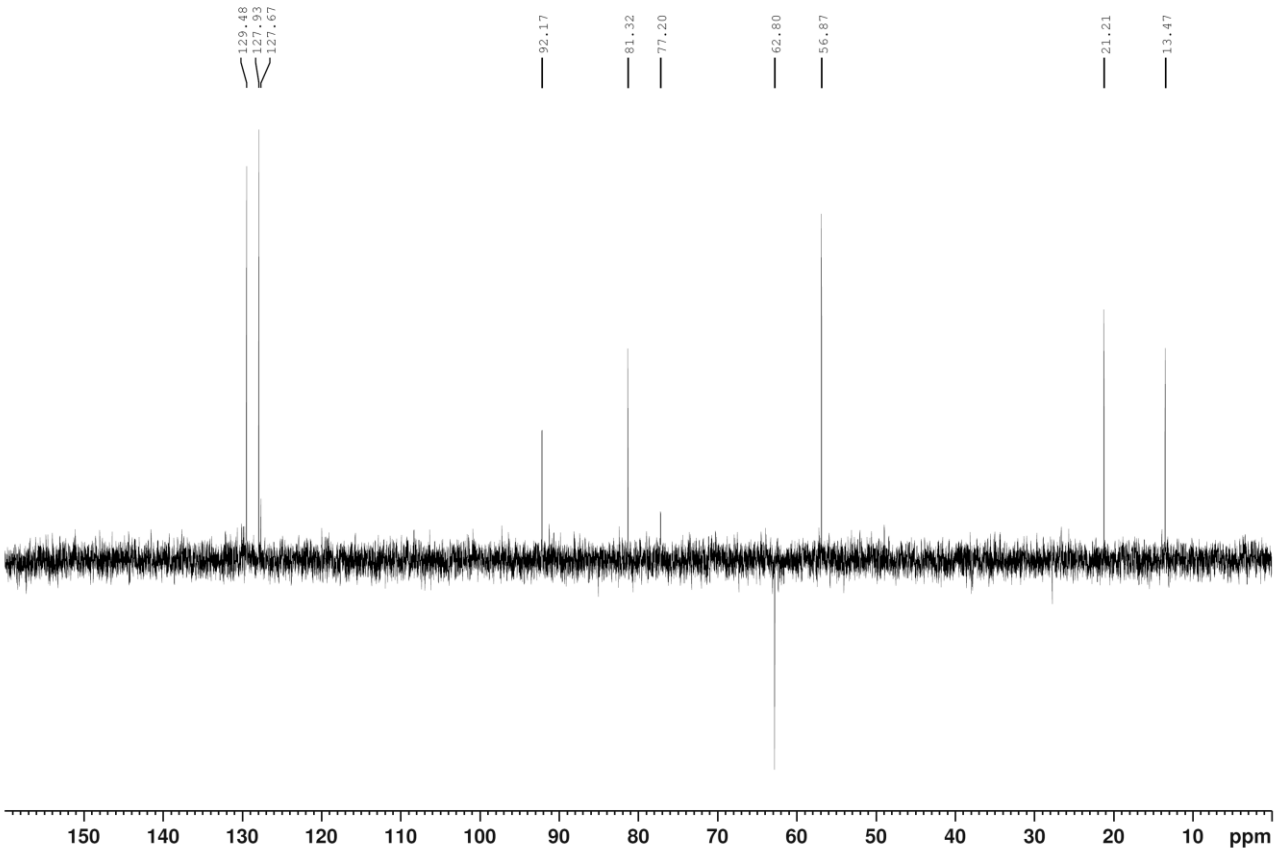
Ethyl 3-methoxy-3-(4-methyphenyl)-2-nitropropanoate (3a) ($CDCl_3$)



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56.87
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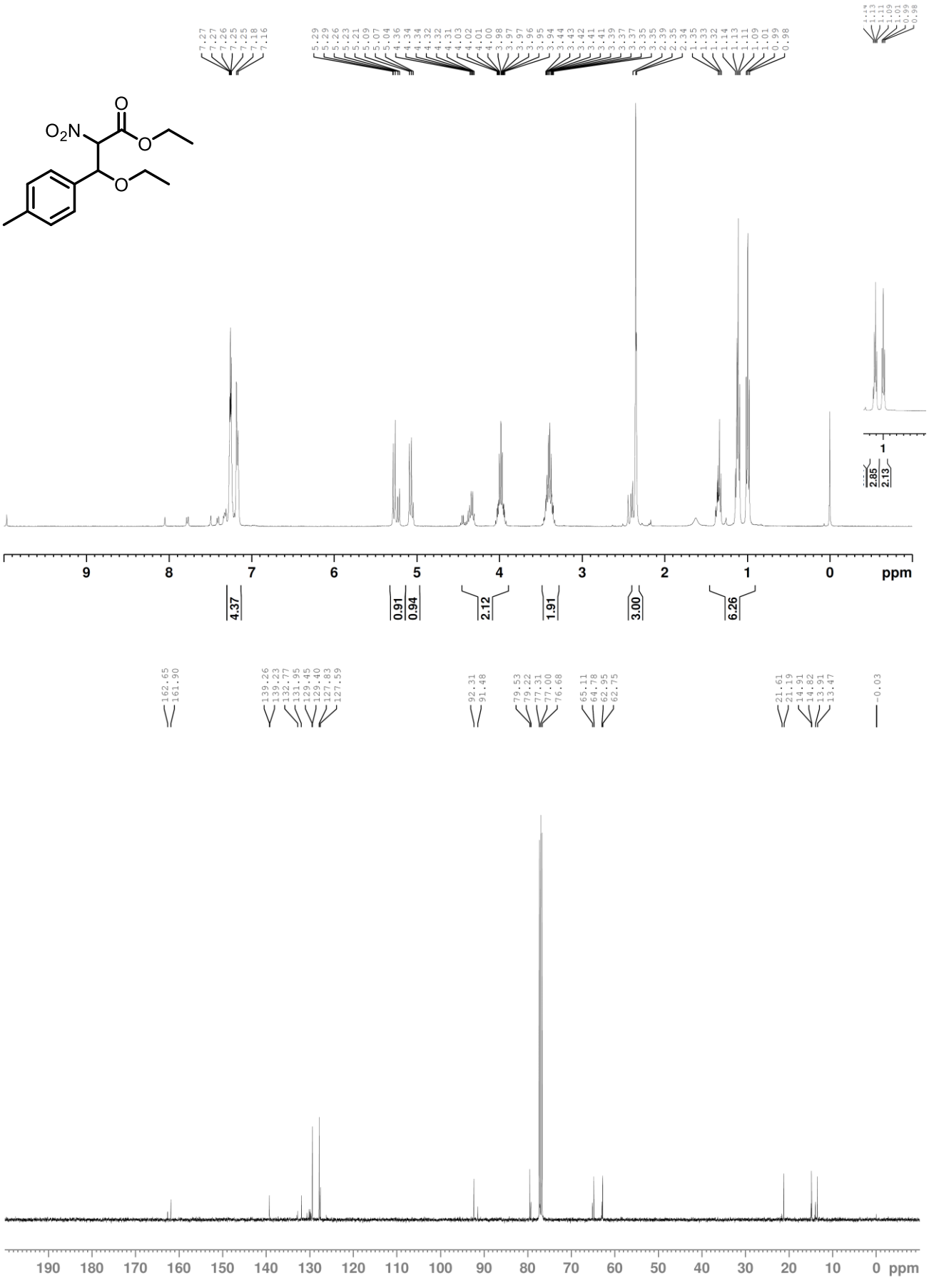
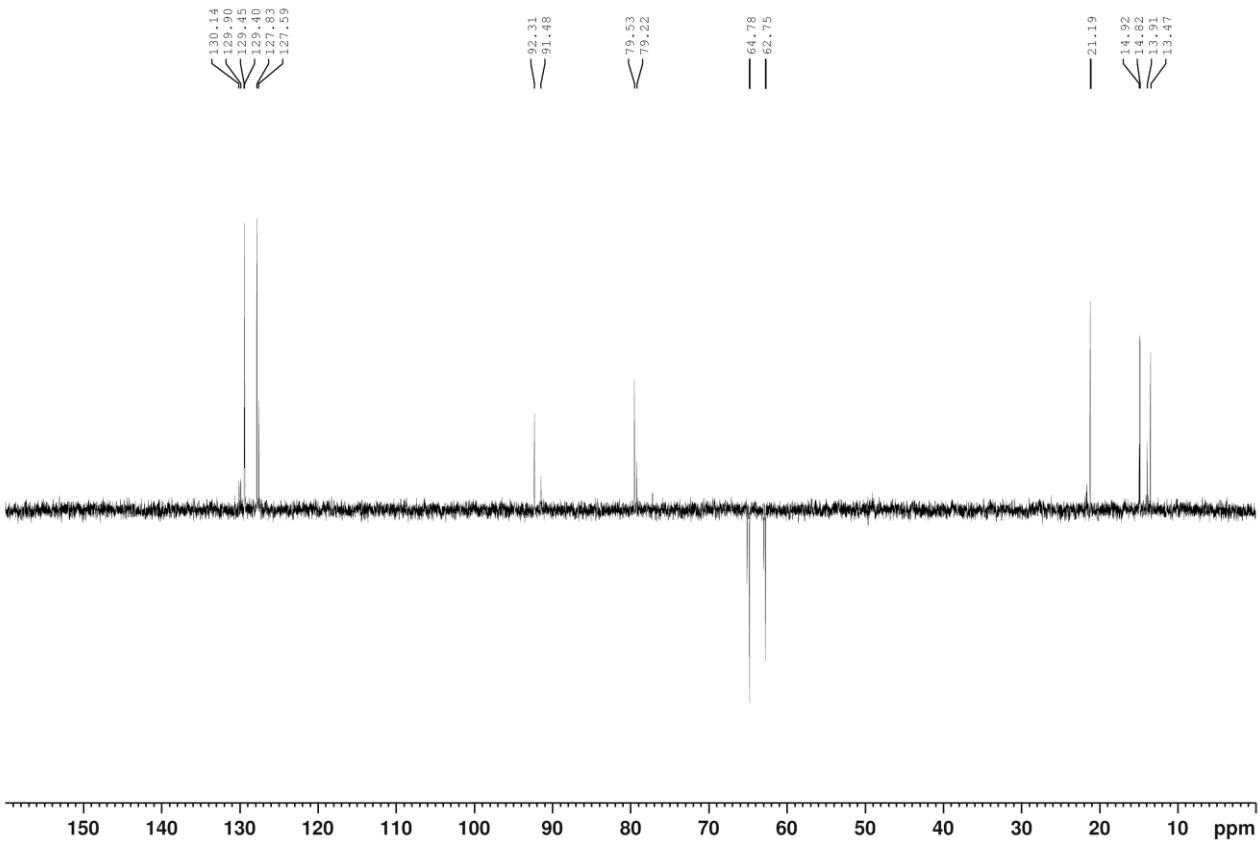
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-ethoxy-3-(4-methyphenyl)-2-nitropropanoate (3b) ($CDCl_3$)

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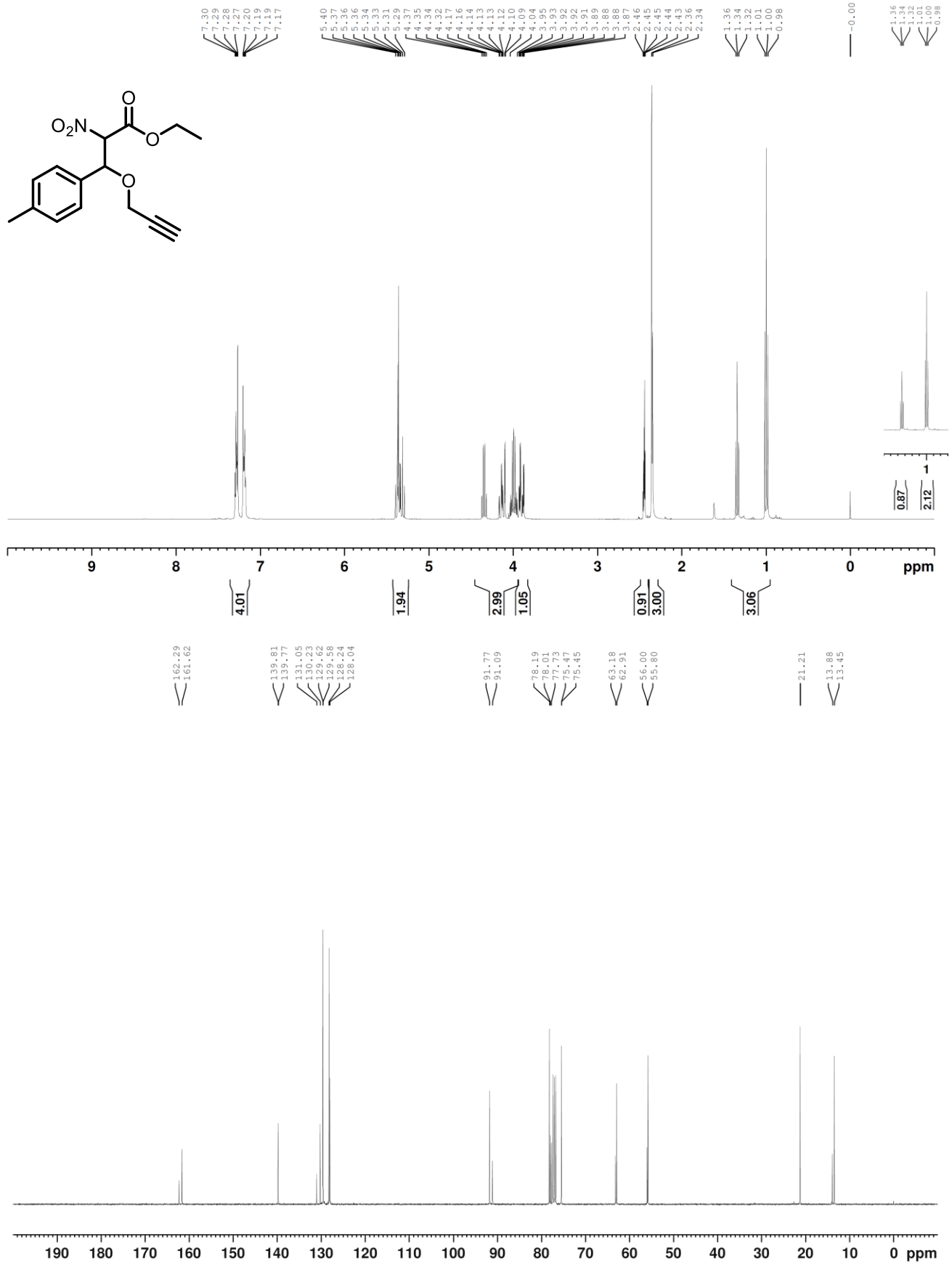
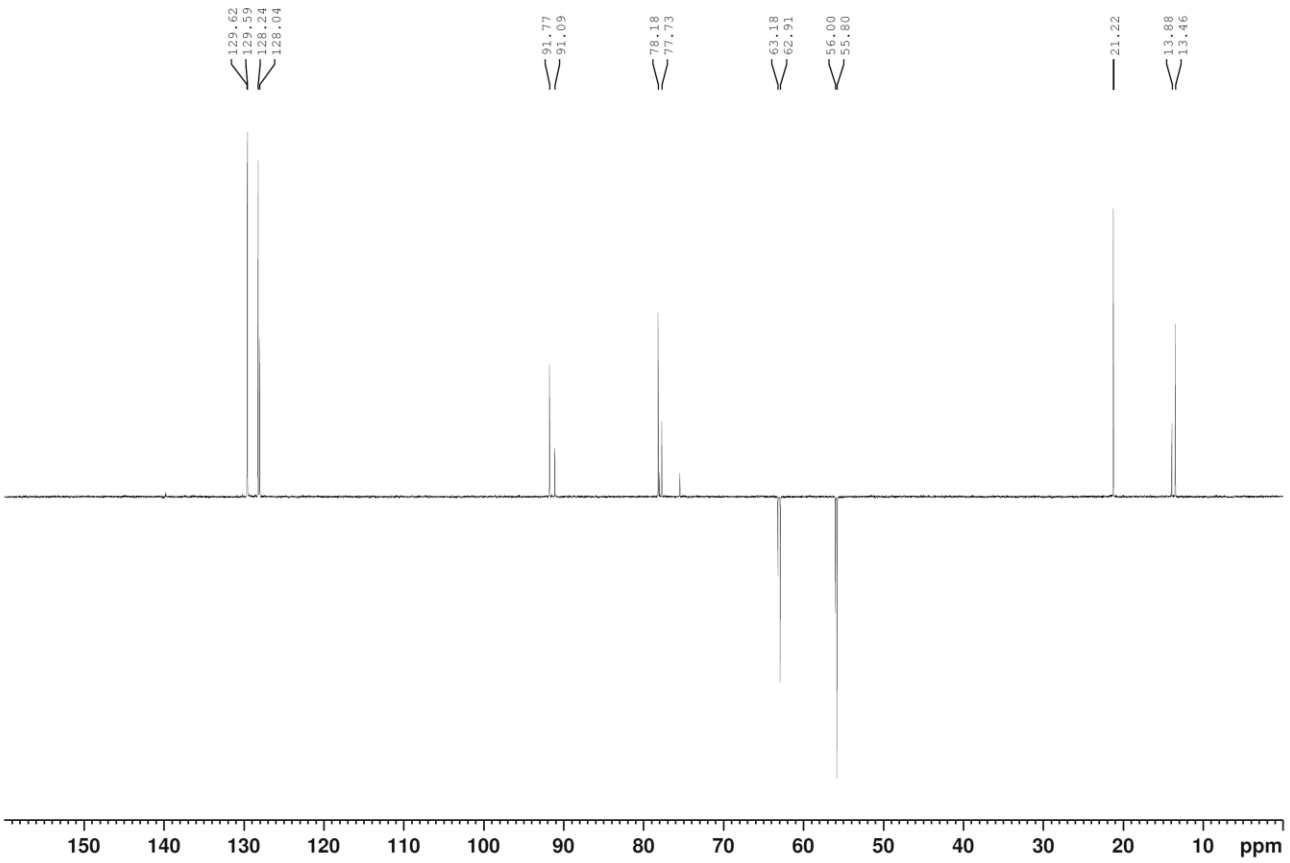
14.92
14.82
13.91
13.47
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-methyphenyl)-2-nitro-3-(prop-2-yn-1-yloxy)propanoate (3c) ($CDCl_3$)

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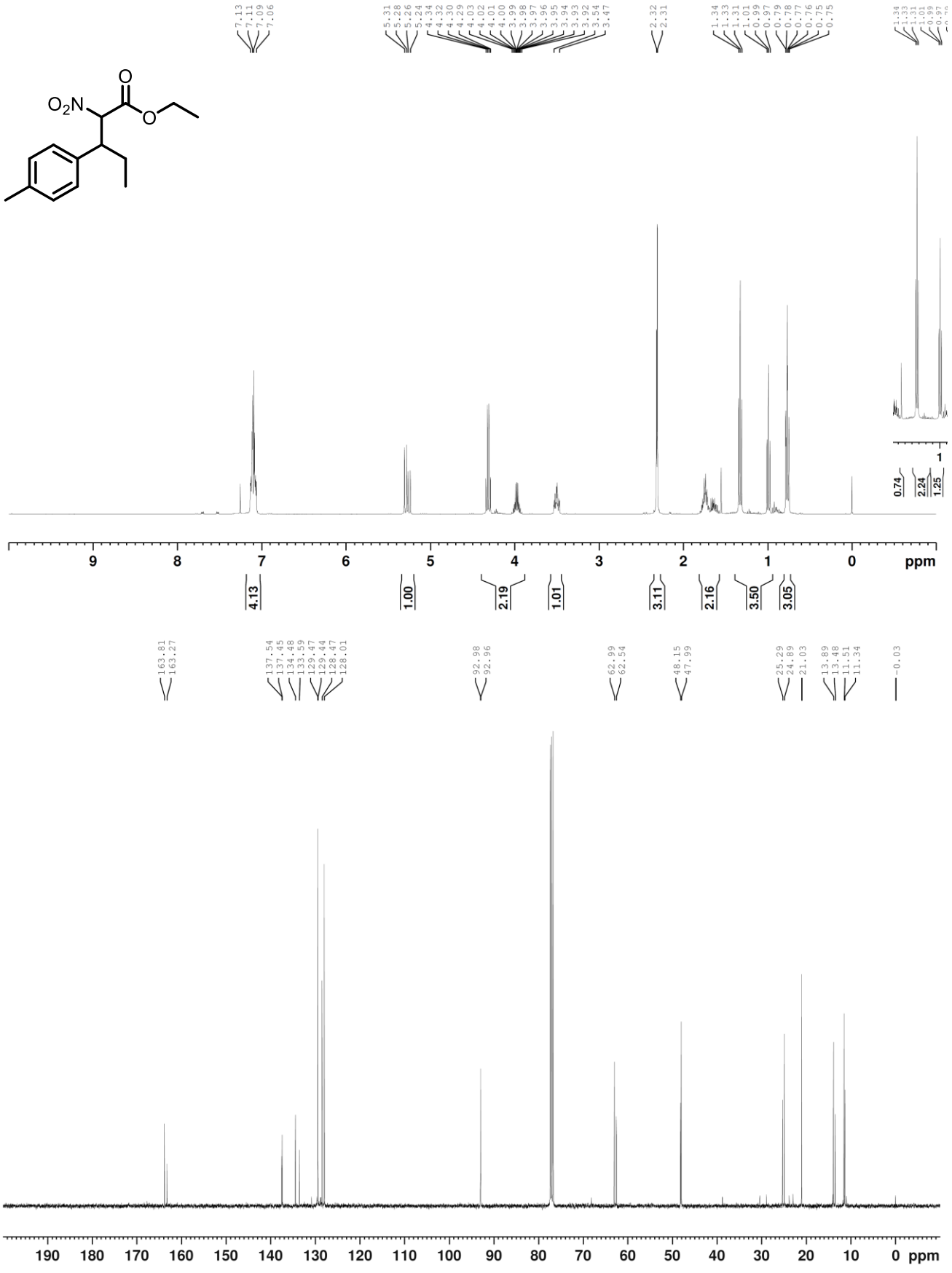
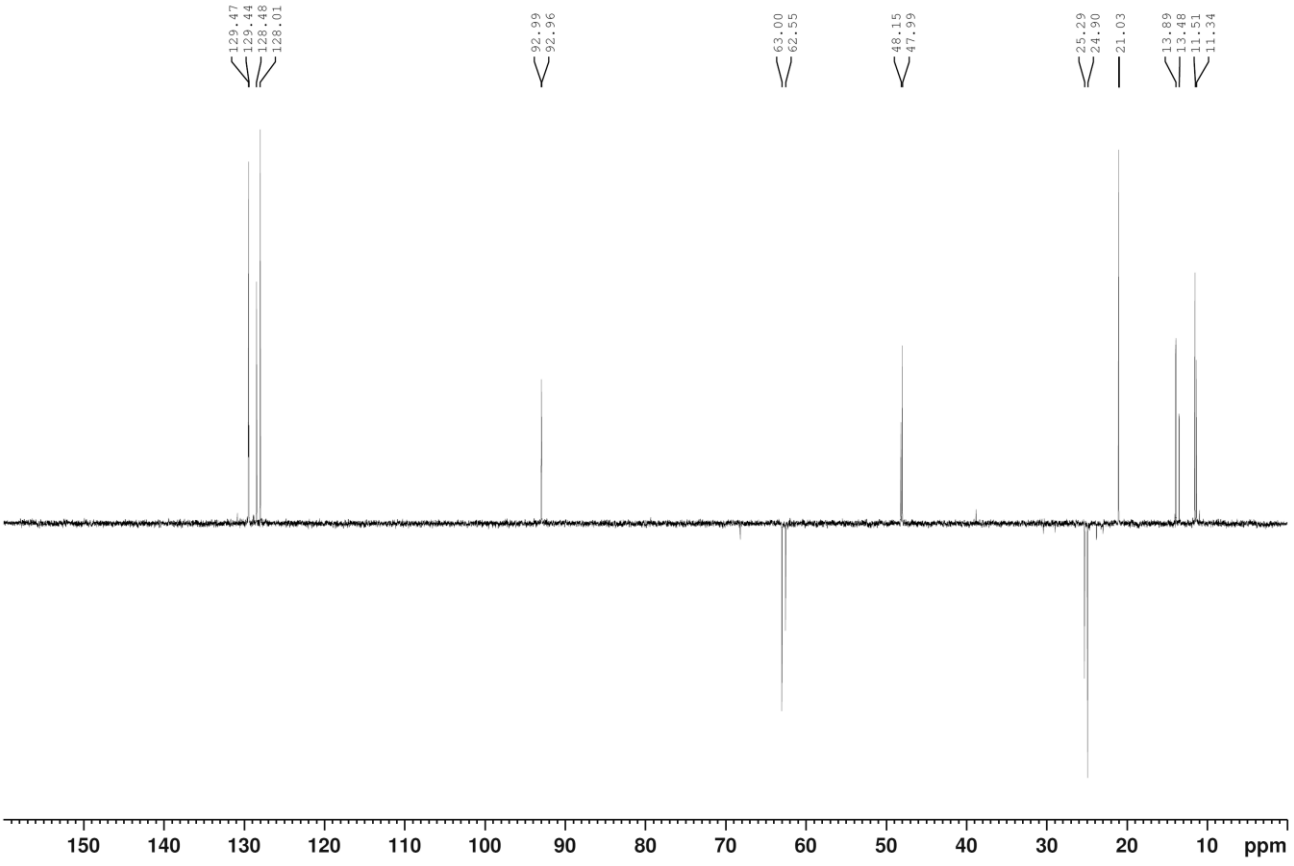
21.22
13.88
13.46
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-methyphenyl)-2-nitropentanoate (6a) ($CDCl_3$)

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47.99
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24.90
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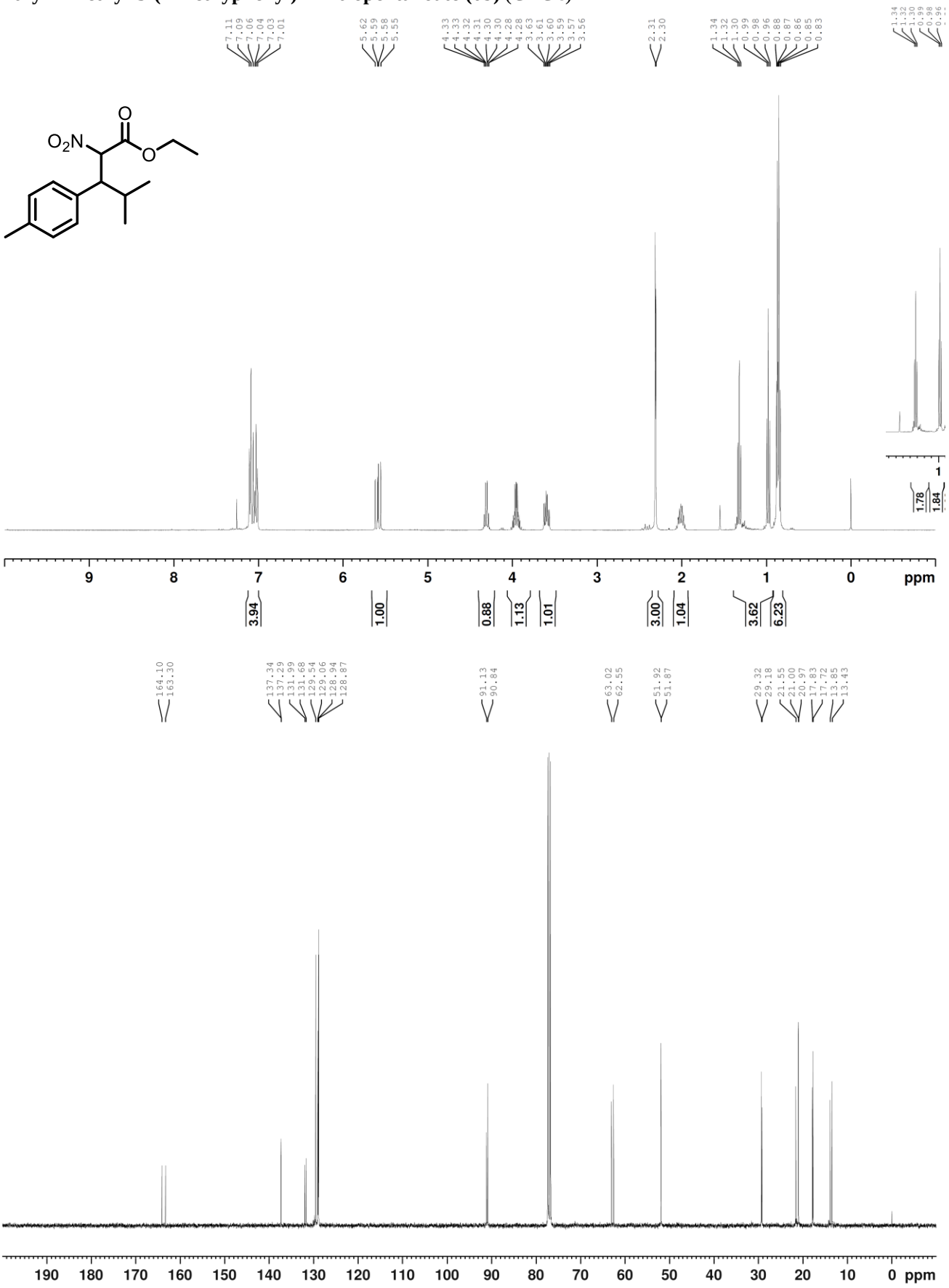
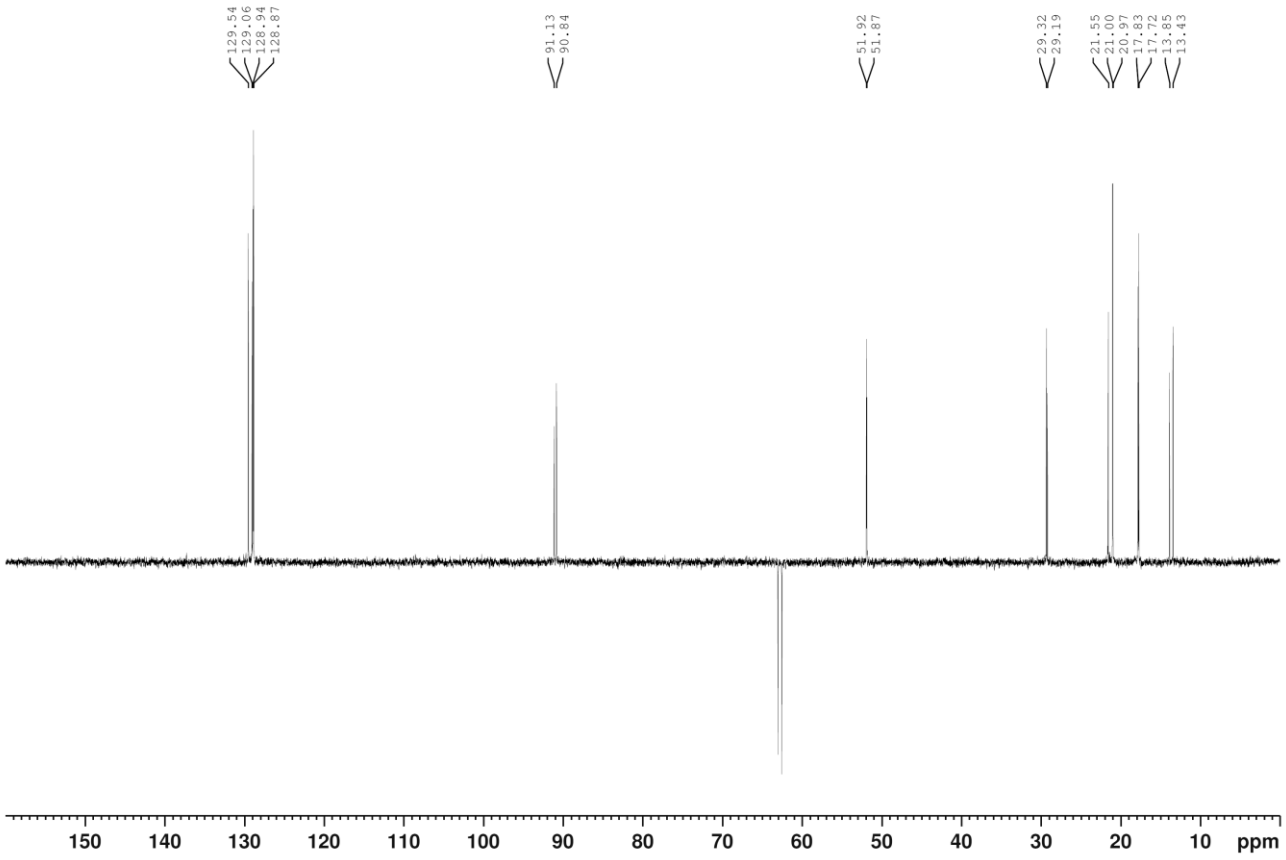
13.89
13.48
11.51
11.34
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 4-methyl-3-(4-methyphenyl)-2-nitropentanoate (6b) ($CDCl_3$)

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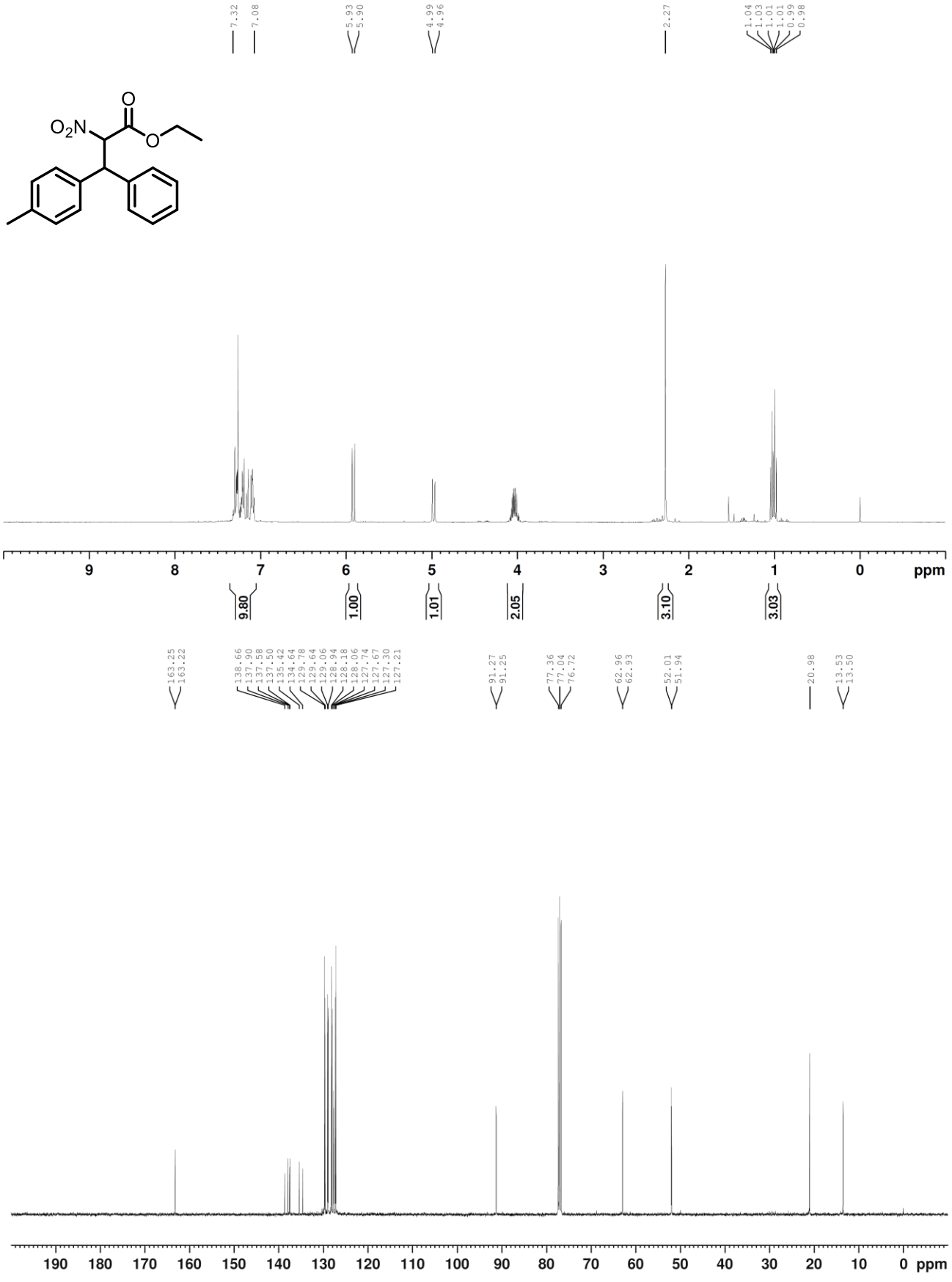
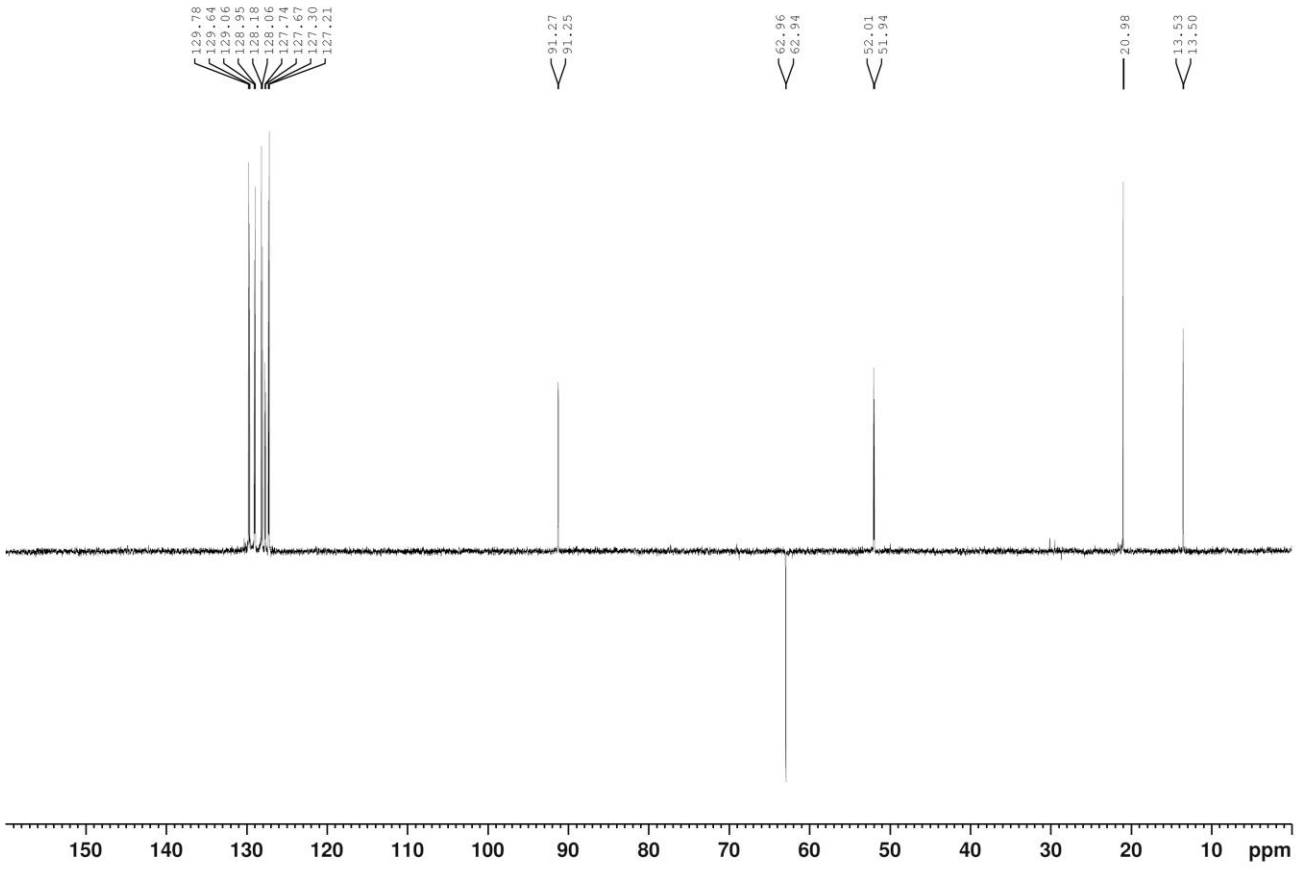
29.19
21.55
21.00
20.97
17.83
17.72
13.85
13.43
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-methyphenyl)-2-nitro-3-phenylpropanoate (6c) ($CDCl_3$)

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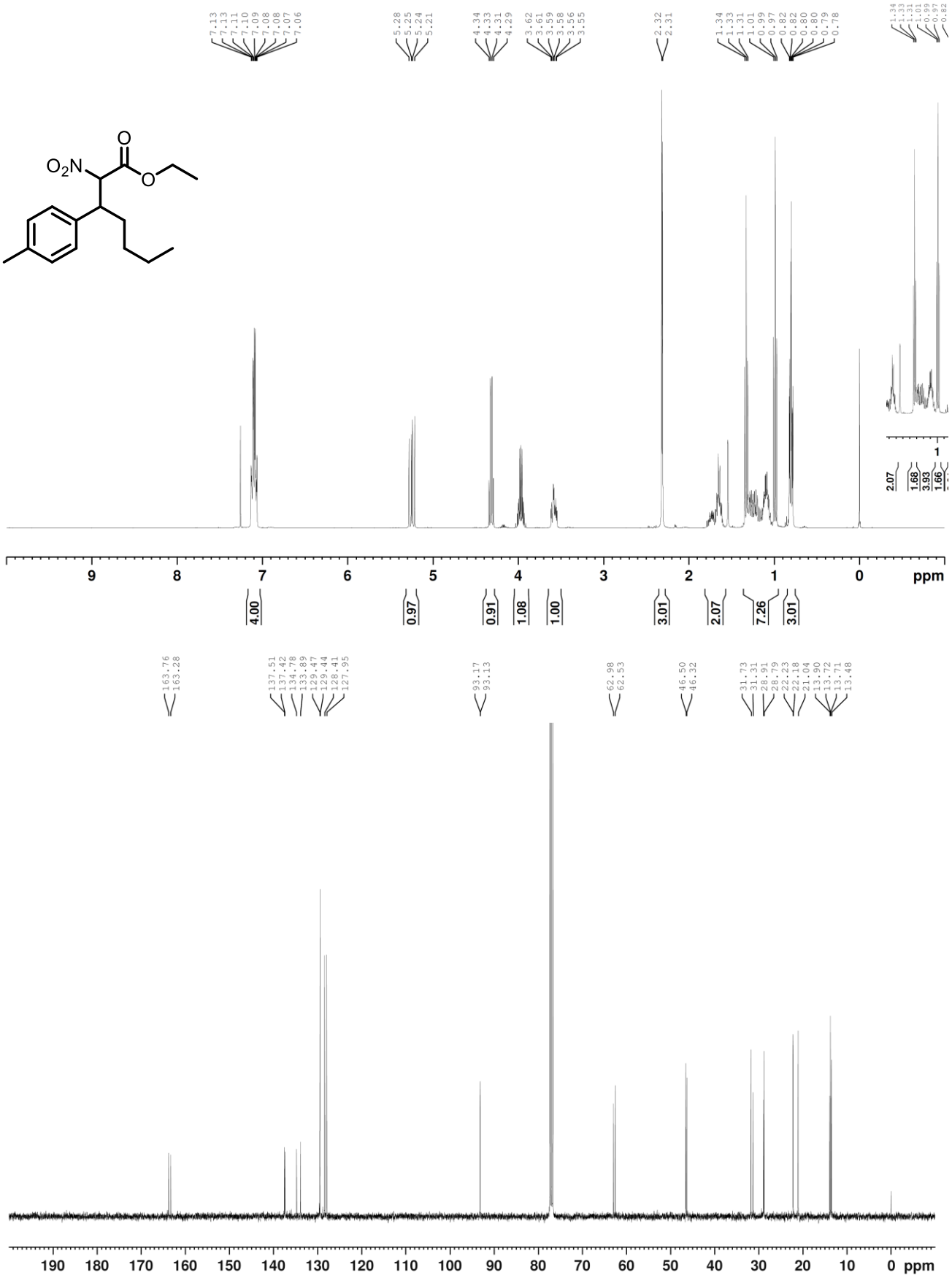
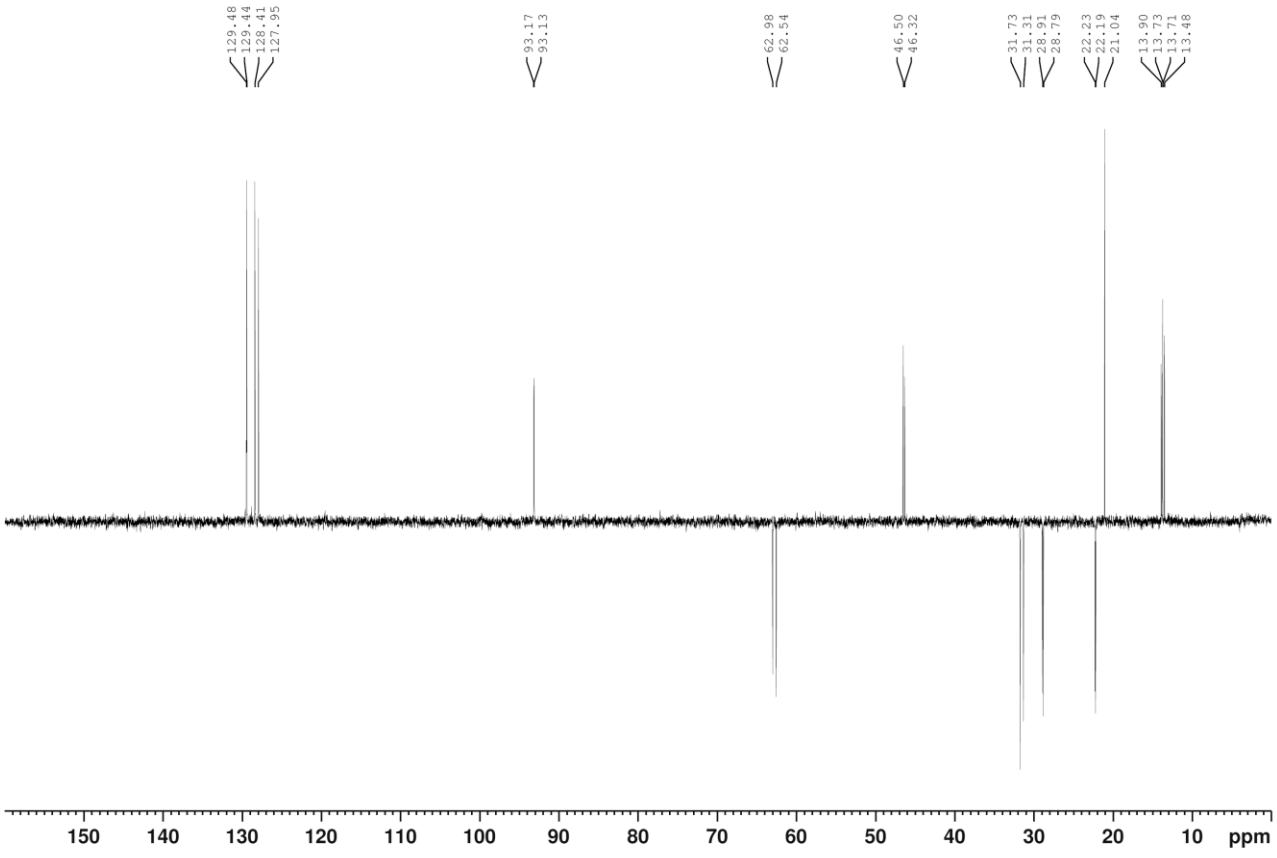
62.94
52.01
51.94
20.98
13.53
13.50
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-methyphenyl)-2-nitroheptanoate (6d) ($CDCl_3$)

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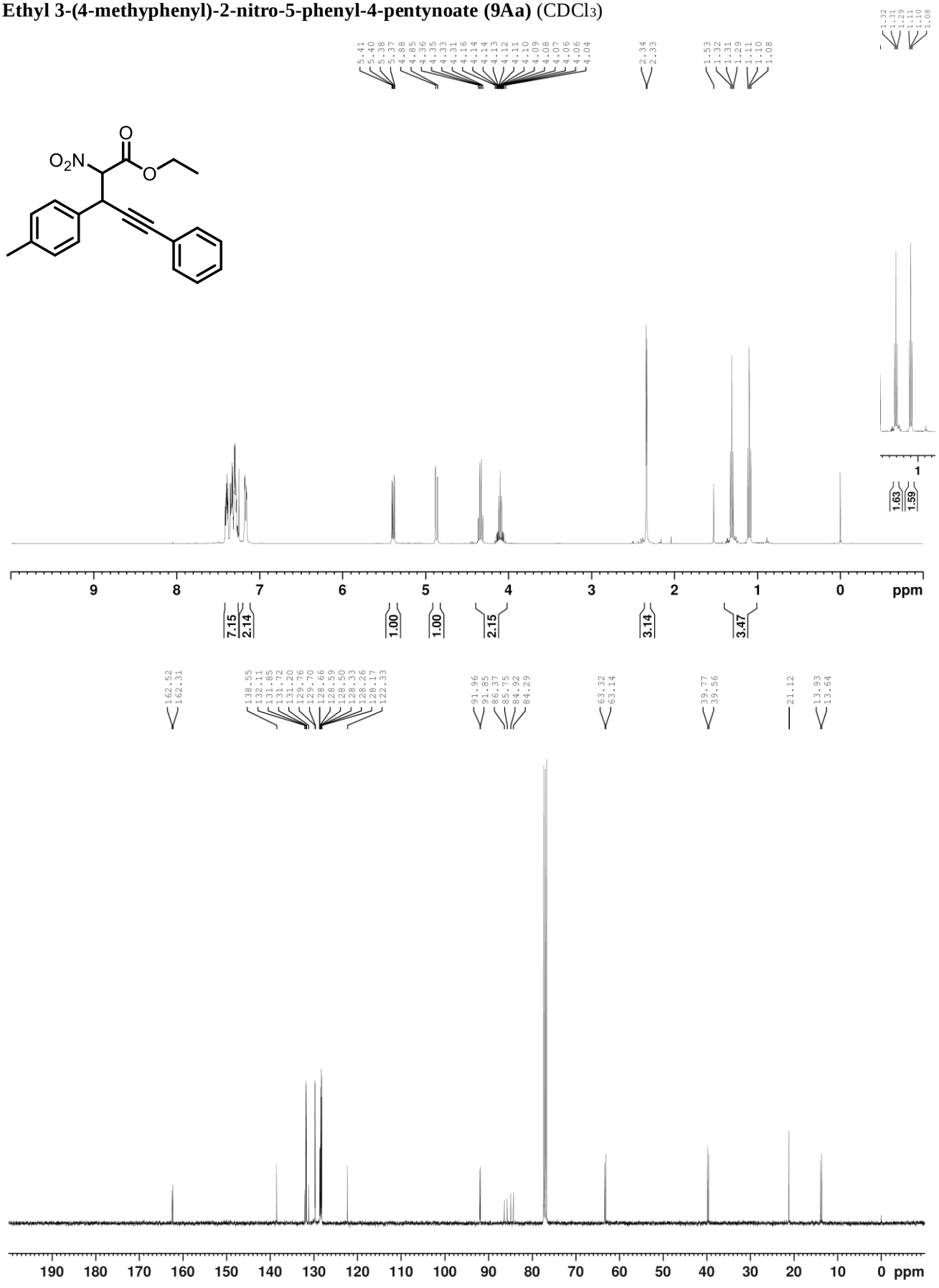
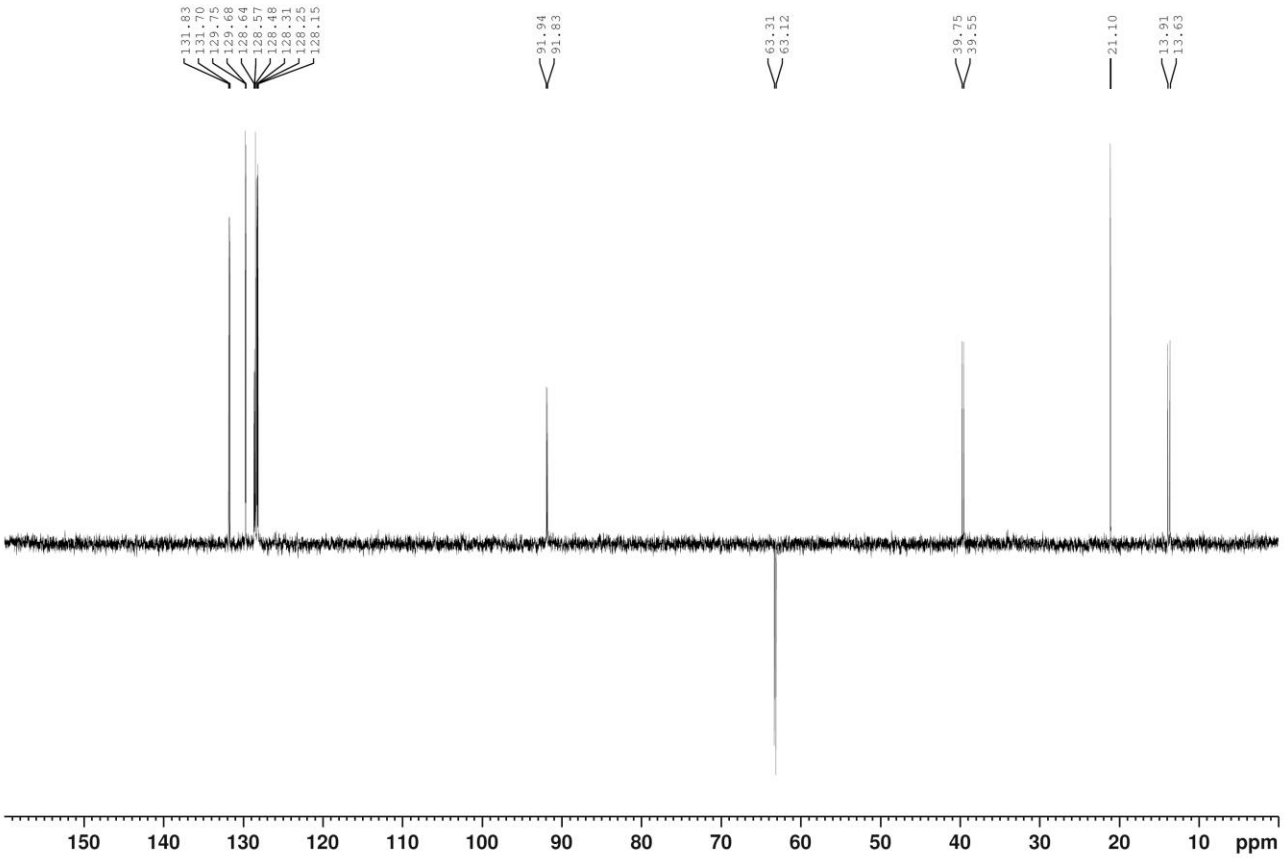
22.23
22.19
21.04
13.90
13.73
13.71
13.48
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-methyphenyl)-2-nitro-5-phenyl-4-pentynoate (9Aa) ($CDCl_3$)

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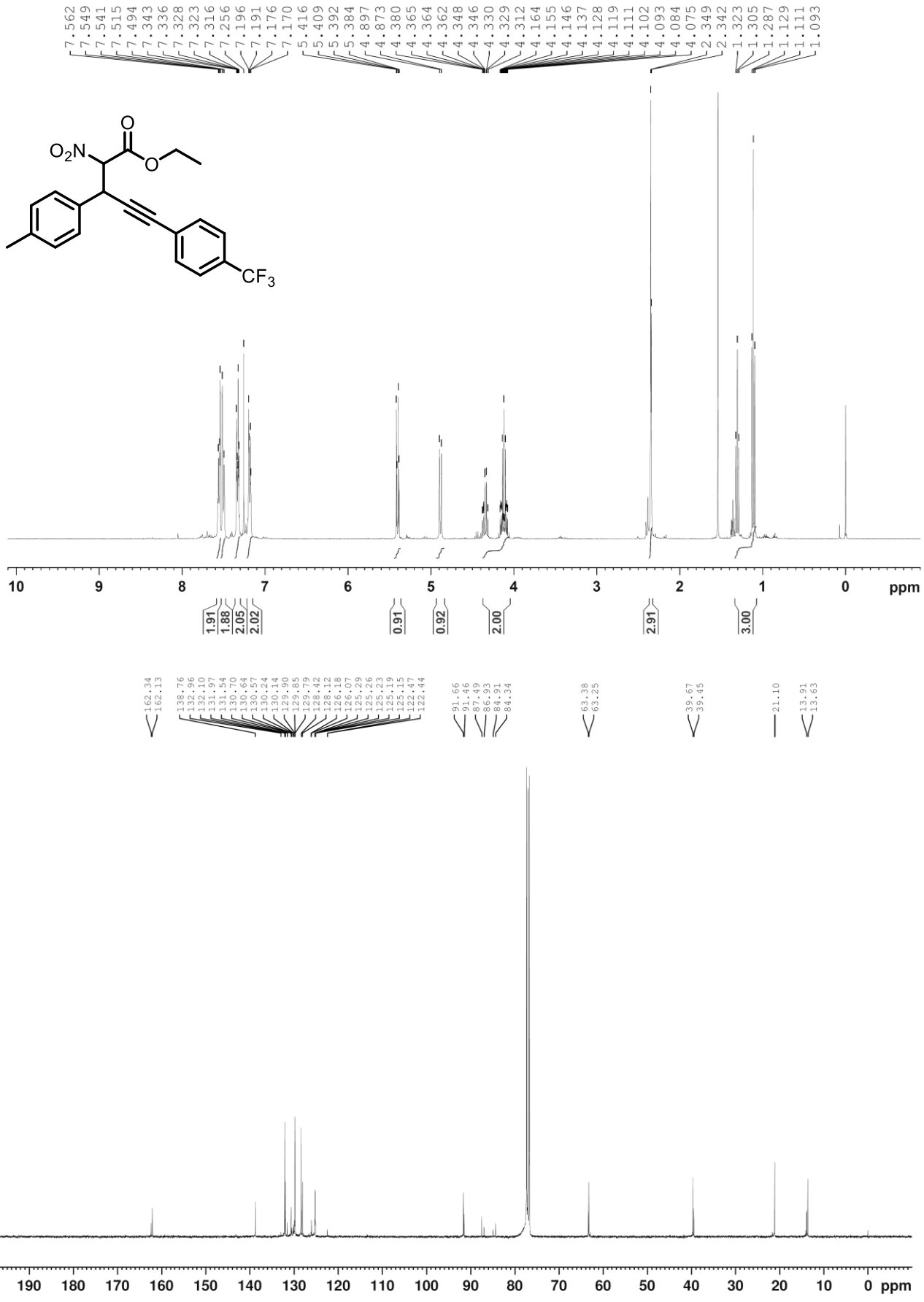
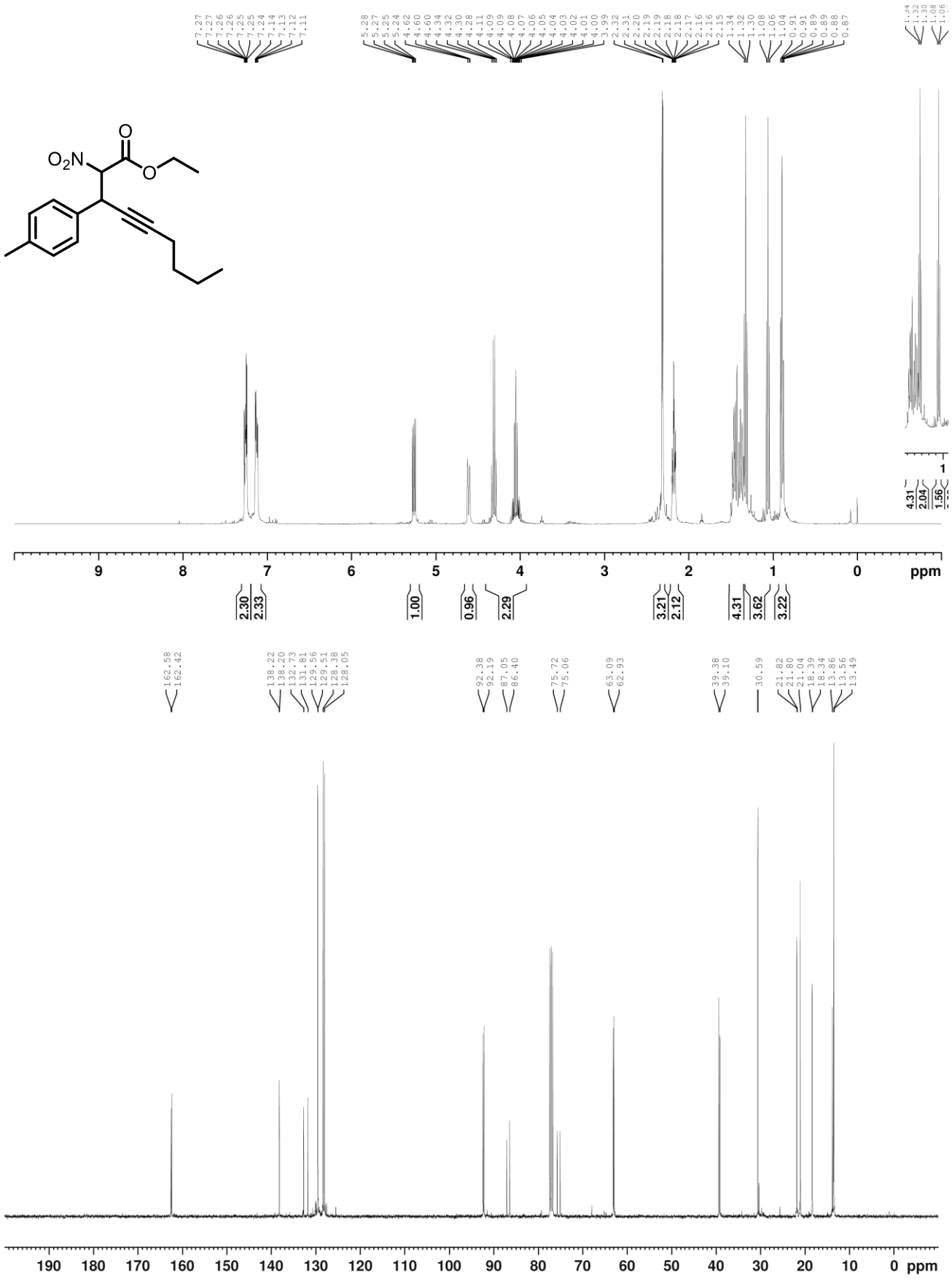
63.12
39.75
39.55
21.10
13.91
13.63
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-methyphenyl)-2-nitro-5-(4-trifluoromethyl)phenyl-4-pentynoate (9Ab) ($CDCl_3$)



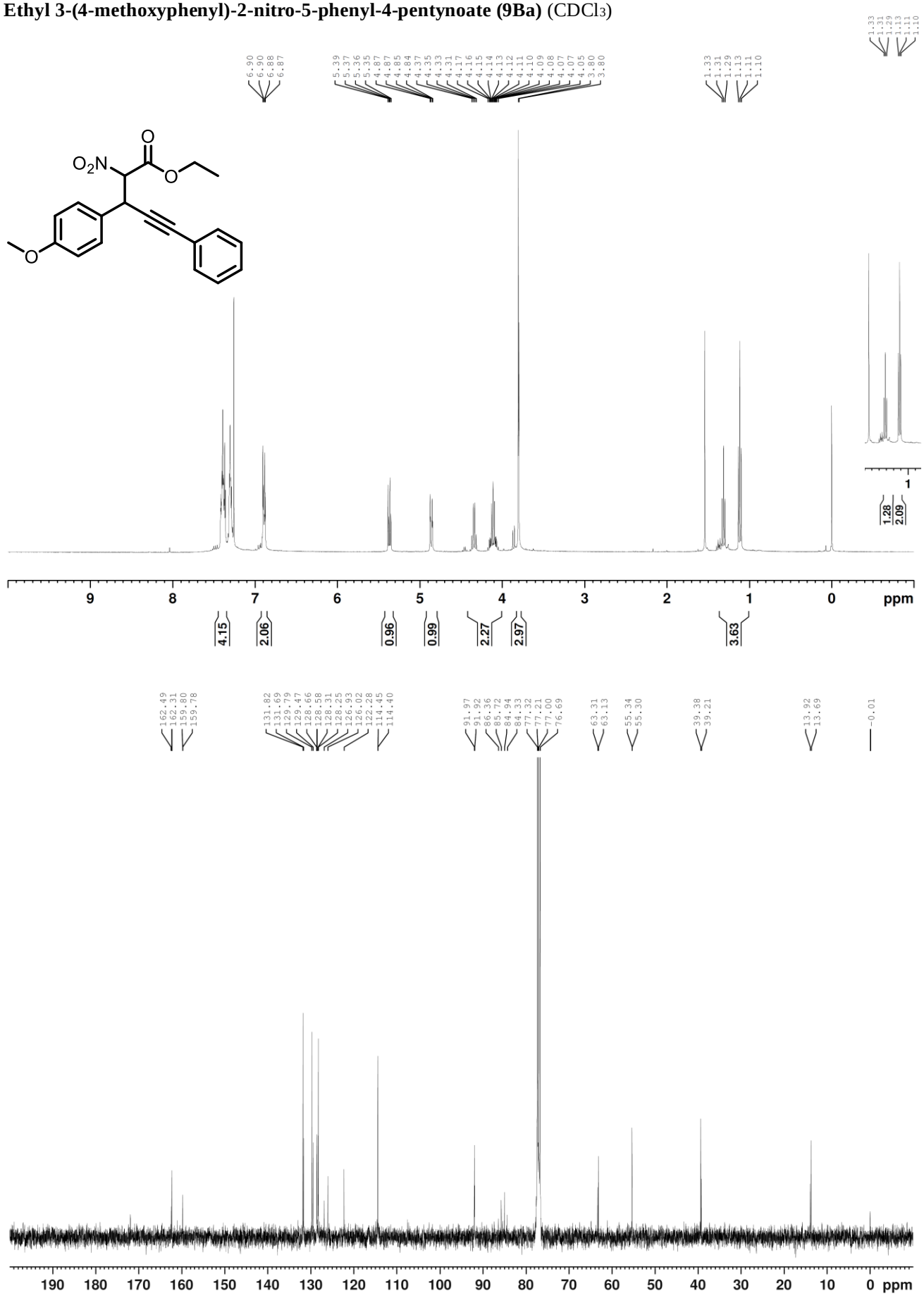
Ethyl 3-(4-methylphenyl)-2-nitro-4-nonynoate (9Ac) ($CDCl_3$)

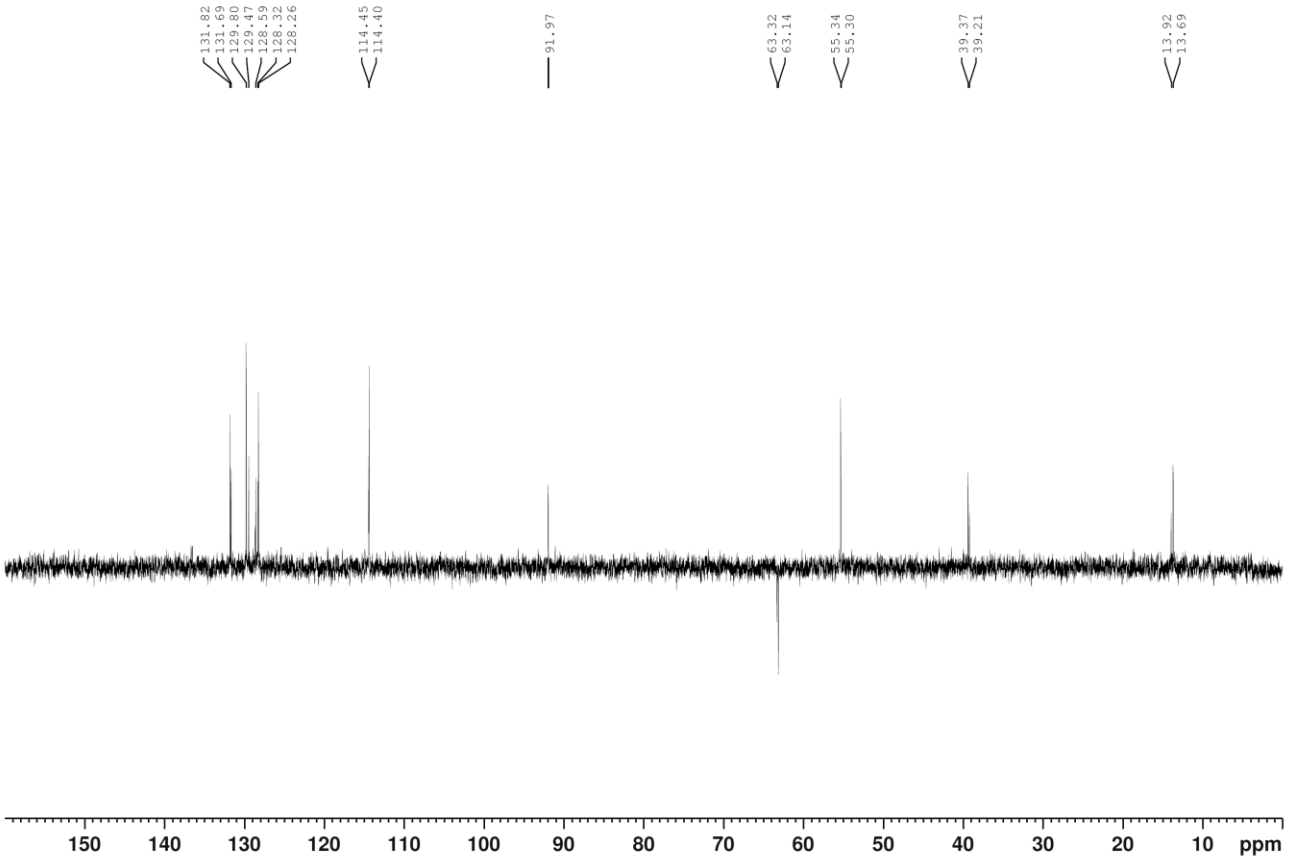


Ethyl 6,6-dimethyl-3-(4-methylphenyl)-2-nitro-4-heptynoate (9Ad) ($CDCl_3$)

Ethyl 3-(4-methylphenyl)-5-trimethylsilyl-2-nitro-4-pentynoate (9Ae) ($CDCl_3$)

Ethyl 3-(4-methoxyphenyl)-2-nitro-5-phenyl-4-pentynoate (9Ba) ($CDCl_3$)

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128.32
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114.40
91.97
63.32
63.14
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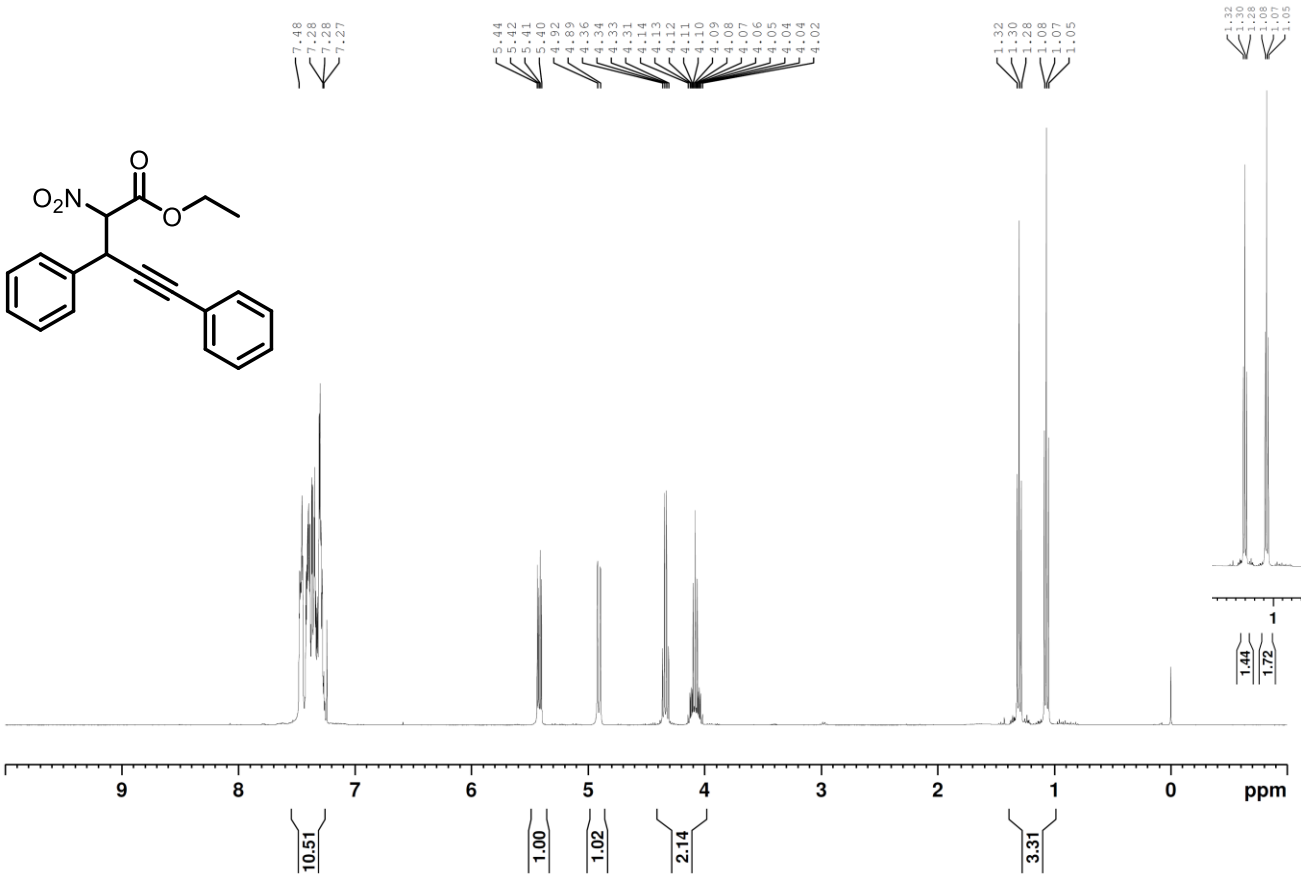
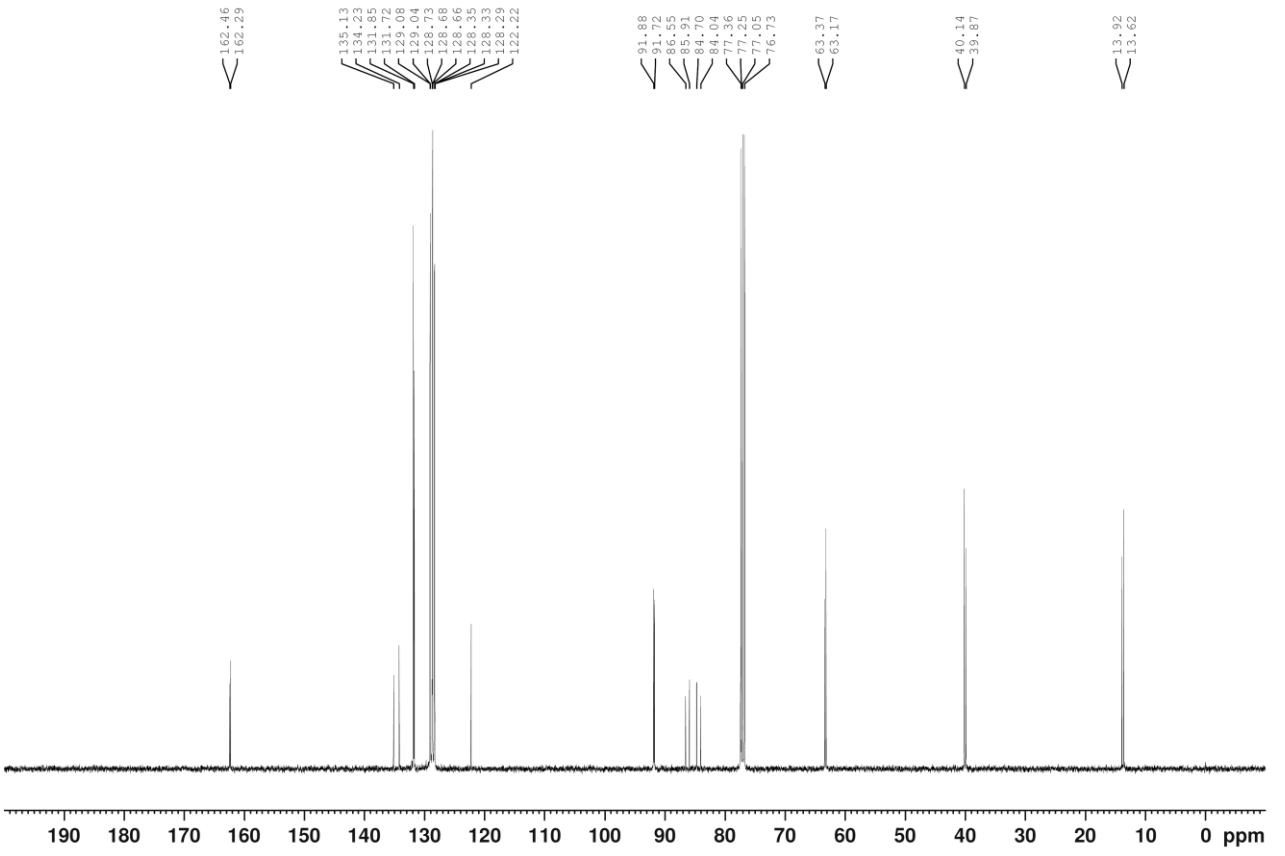
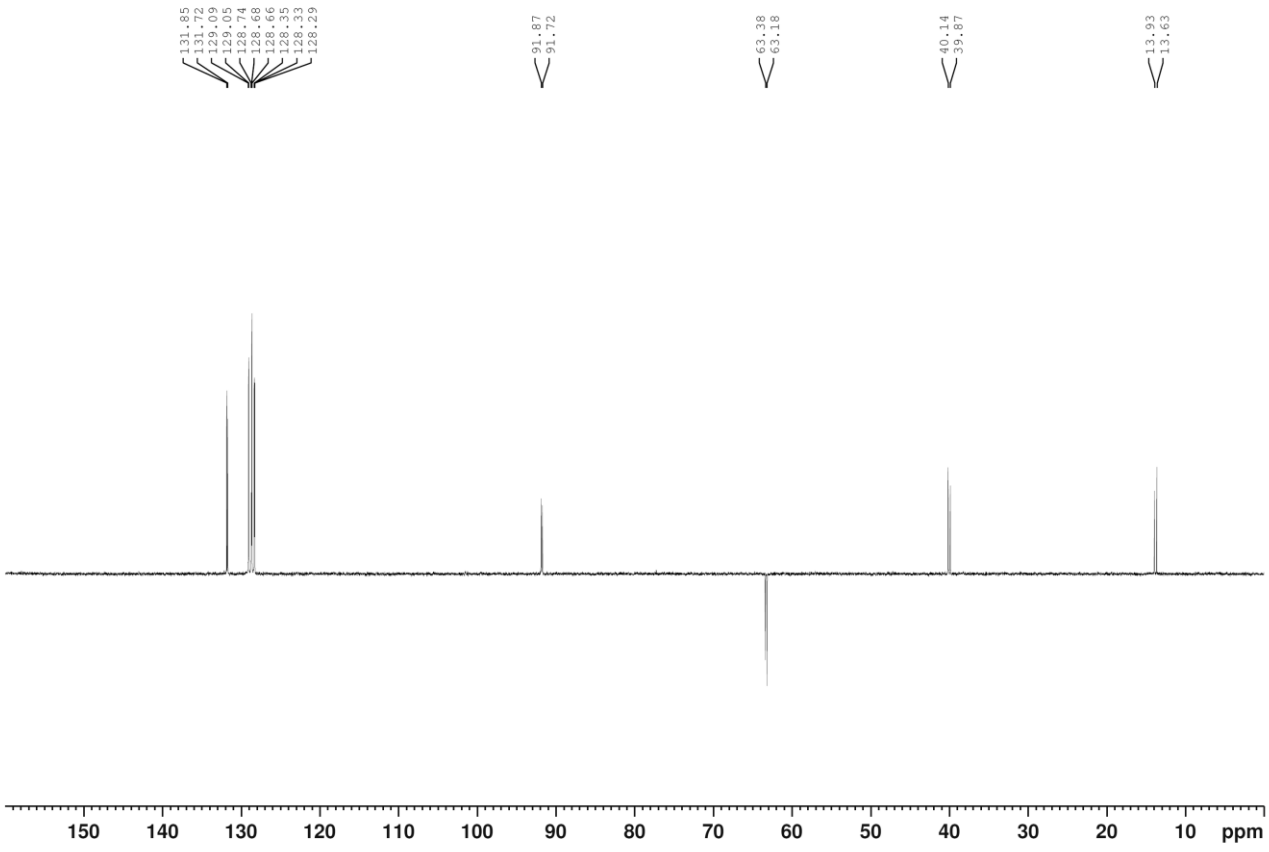
55.30
39.37
39.21
13.92
13.69
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl -2-nitro-3,5-diphenyl-4-pentynoate (9Ca) ($CDCl_3$)



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91.87
91.72
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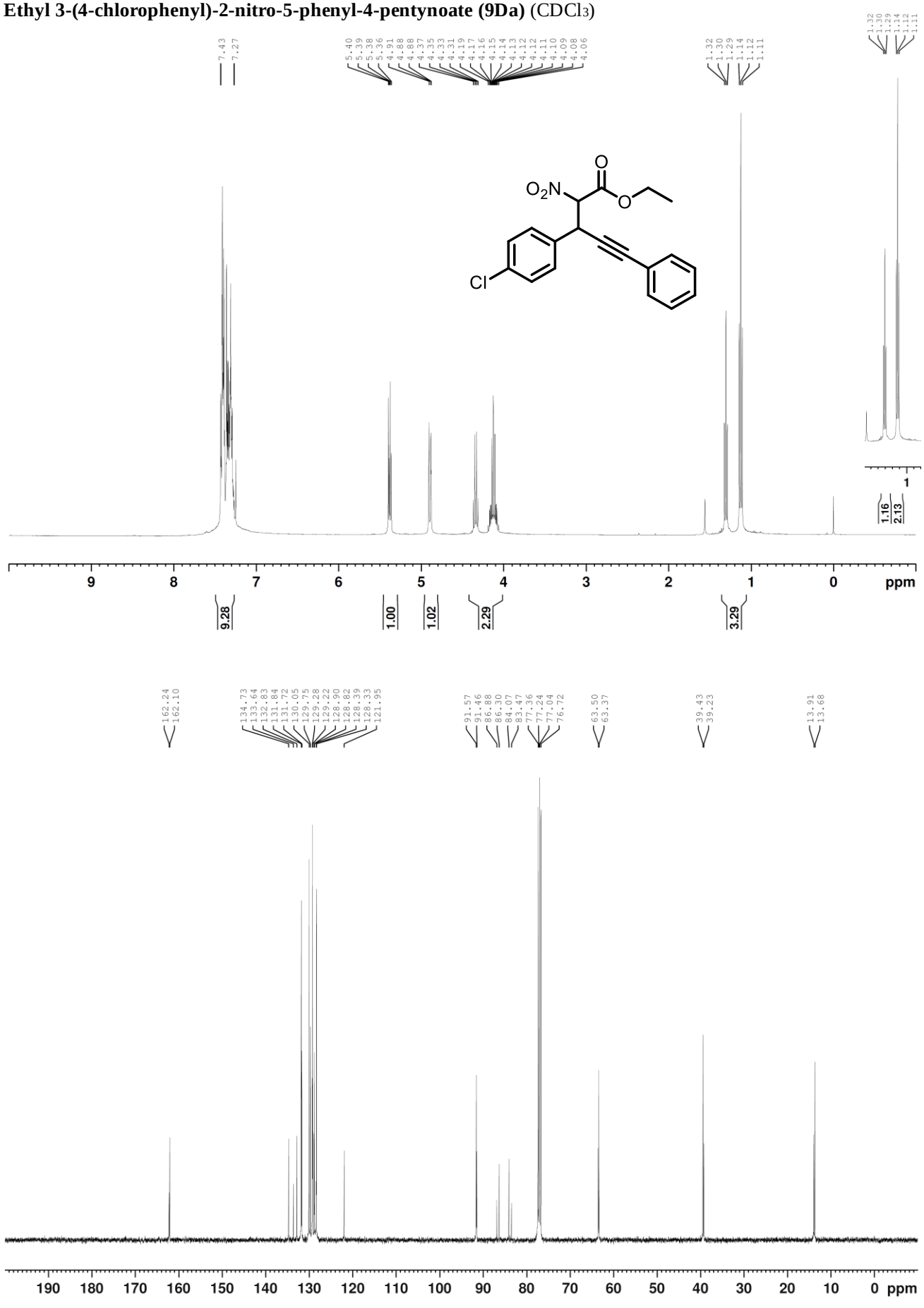
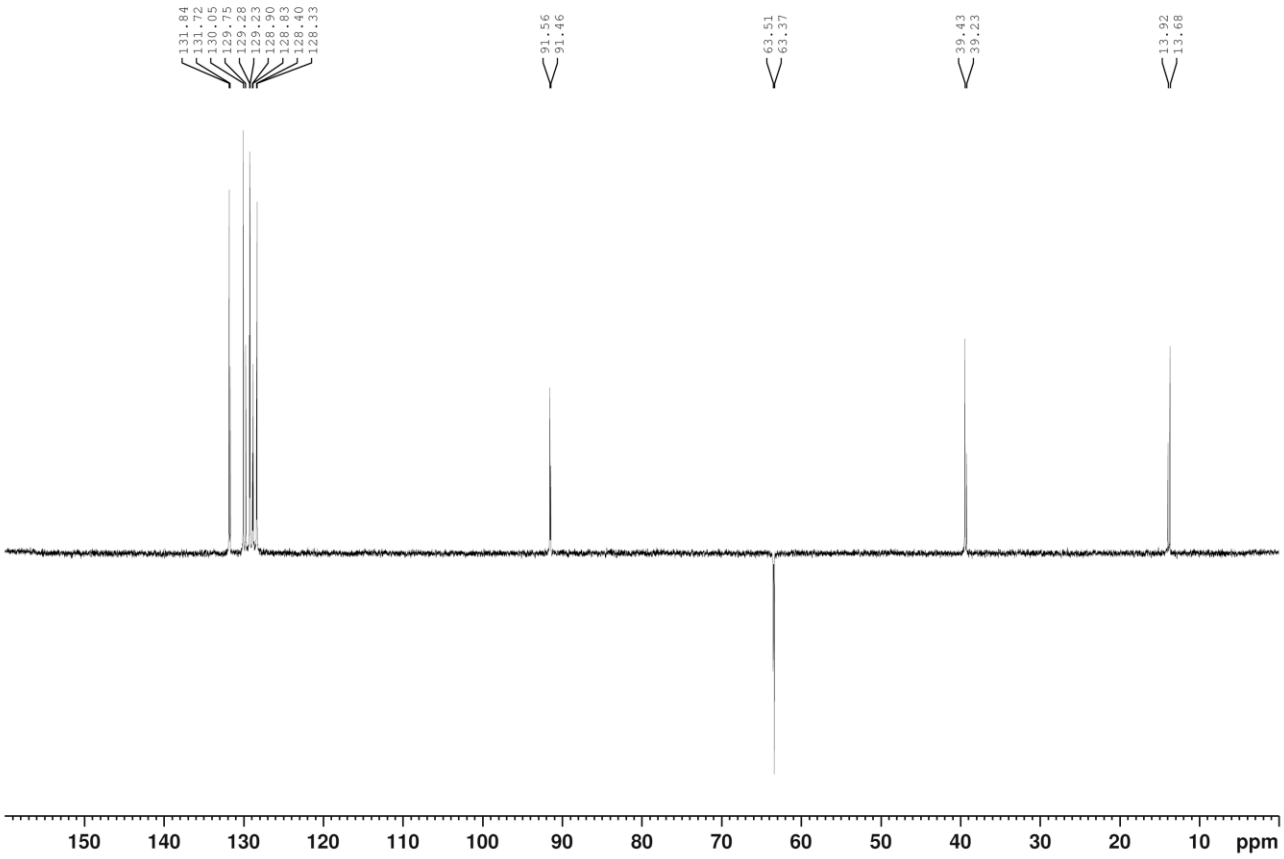
63.18
40.14
39.87
13.93
13.63
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(4-chlorophenyl)-2-nitro-5-phenyl-4-pentynoate (9Da) ($CDCl_3$)

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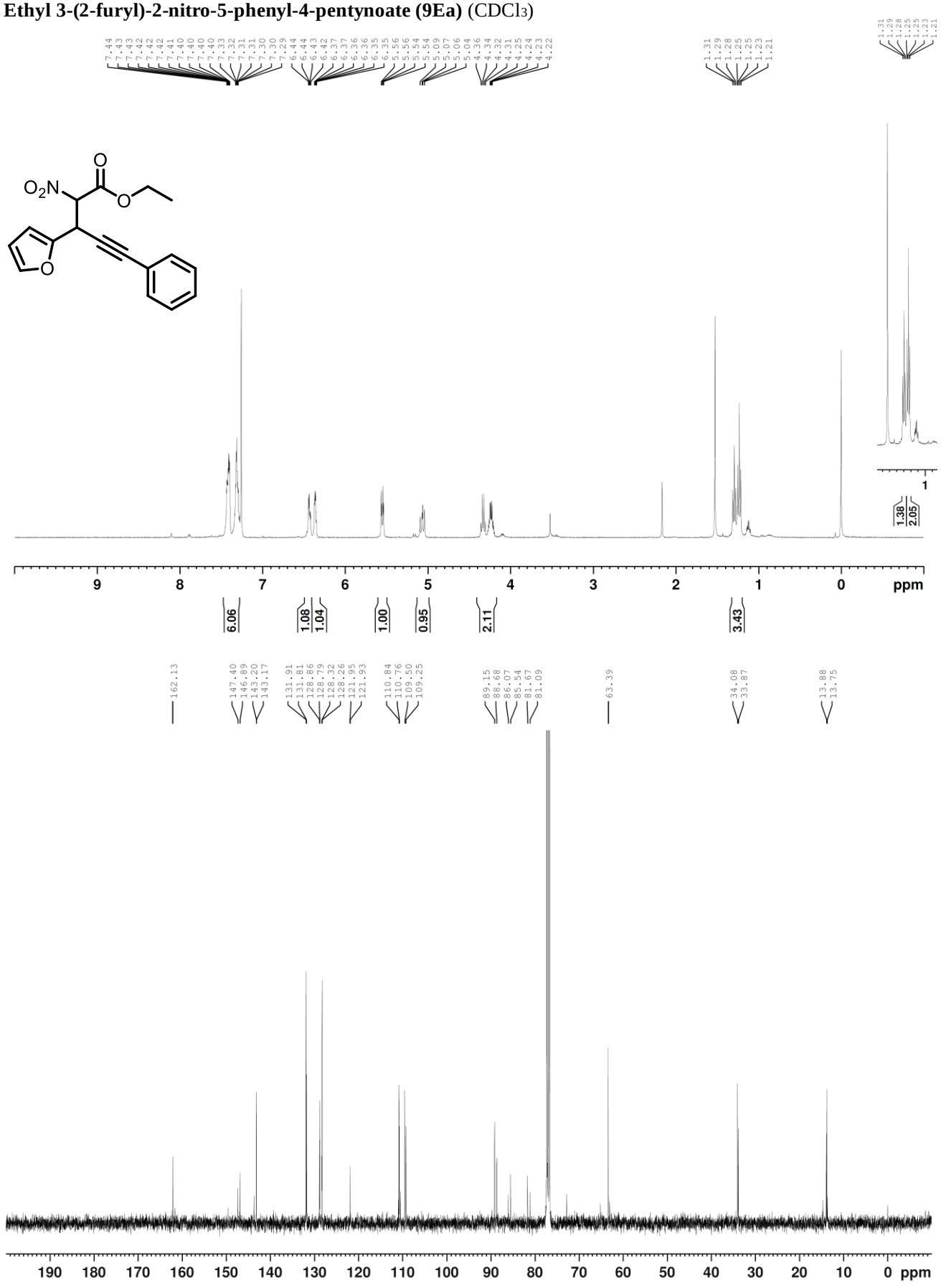
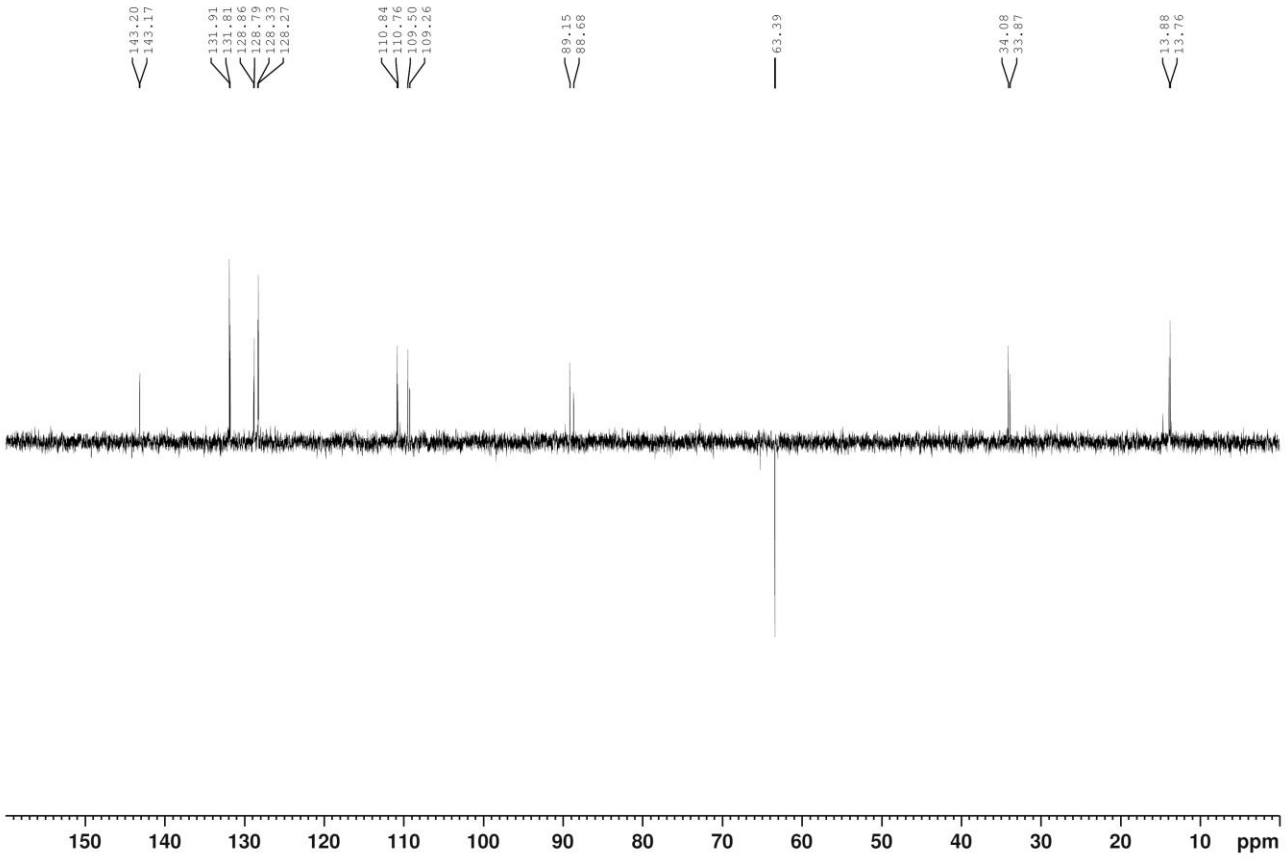
39.43
39.23
13.92
13.68
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

Ethyl 3-(2-furyl)-2-nitro-5-phenyl-4-pentynoate (9Ea) ($CDCl_3$)

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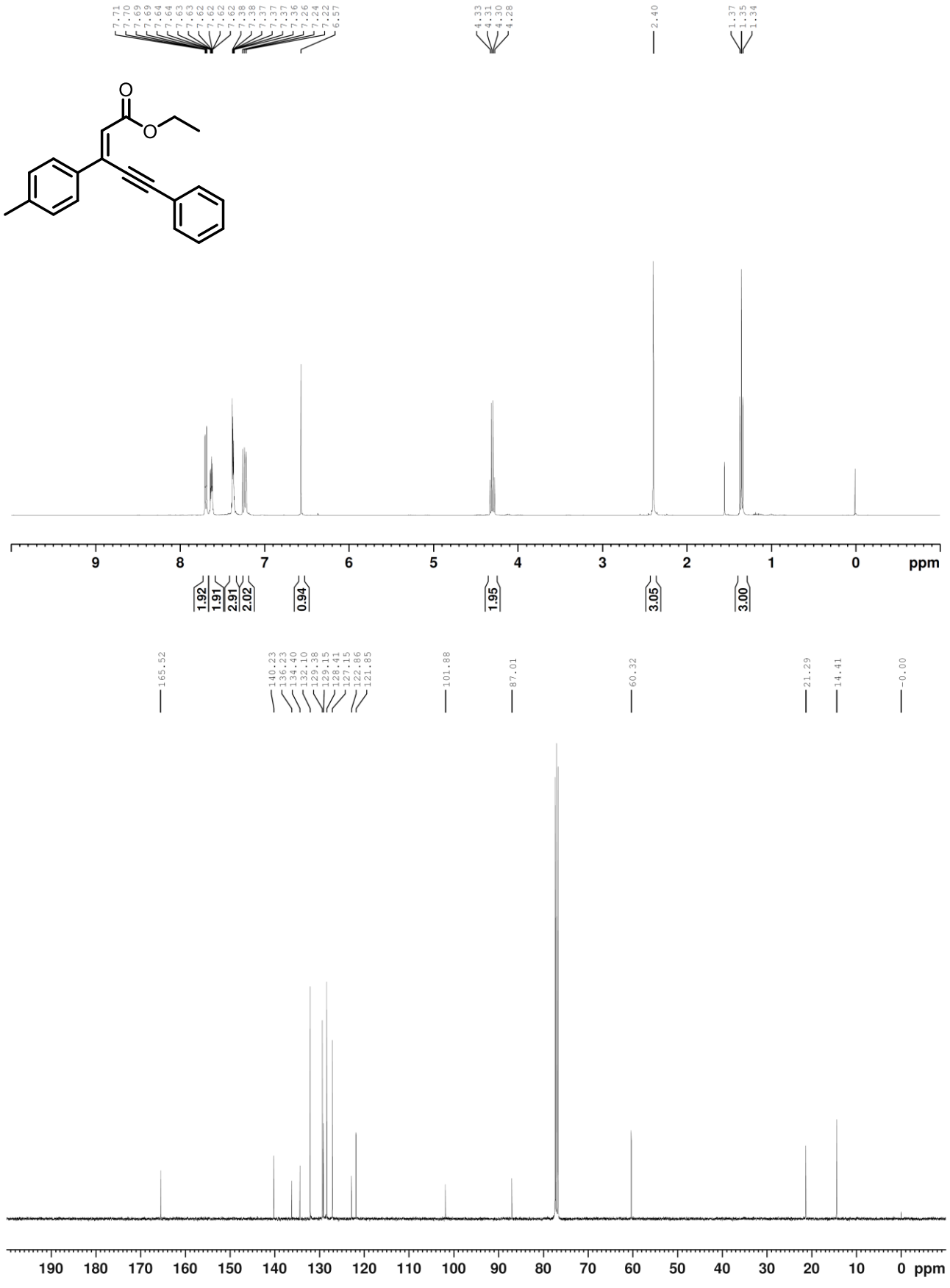
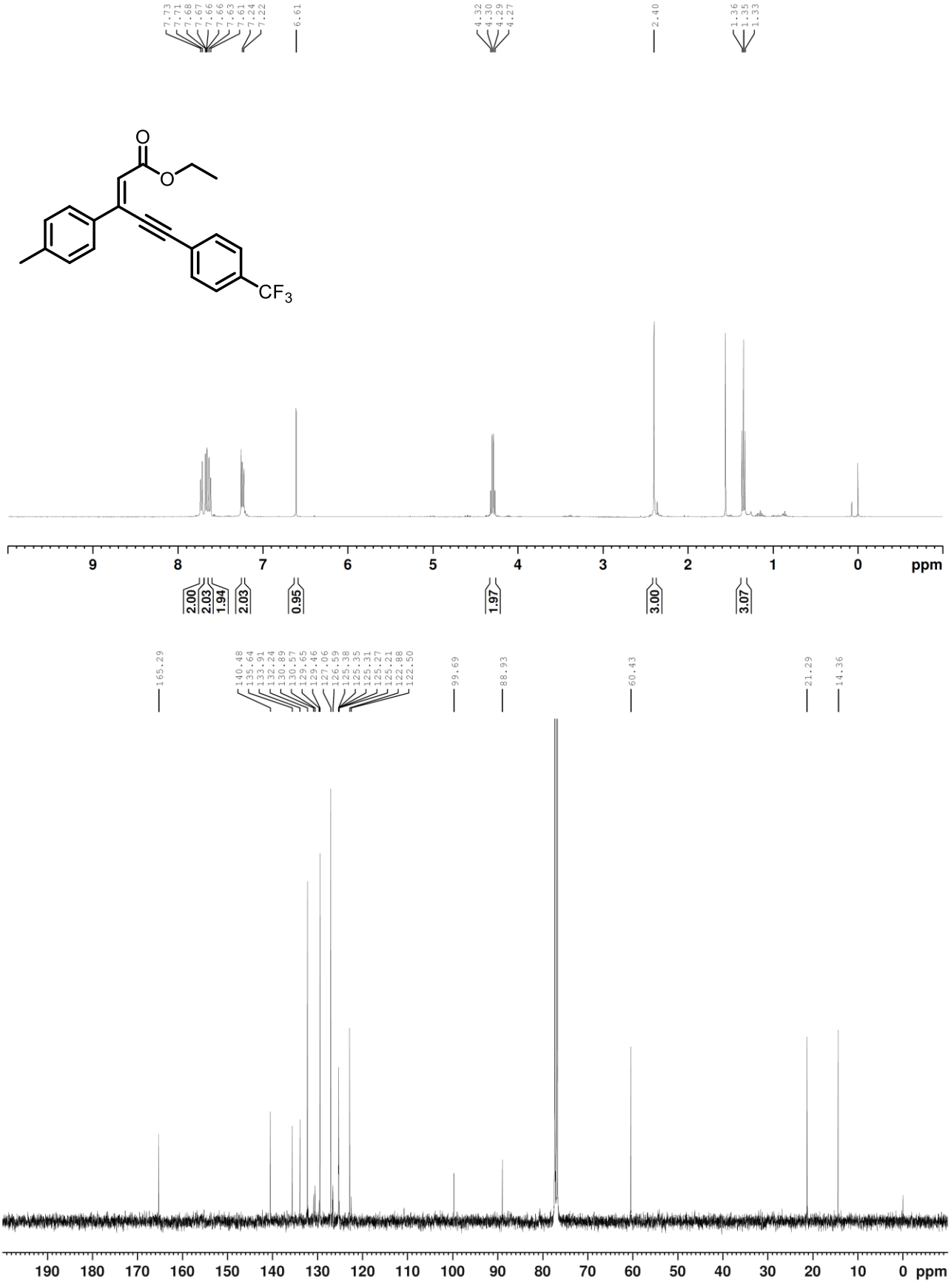
88.68
63.39
34.08
33.87
13.88
13.76
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

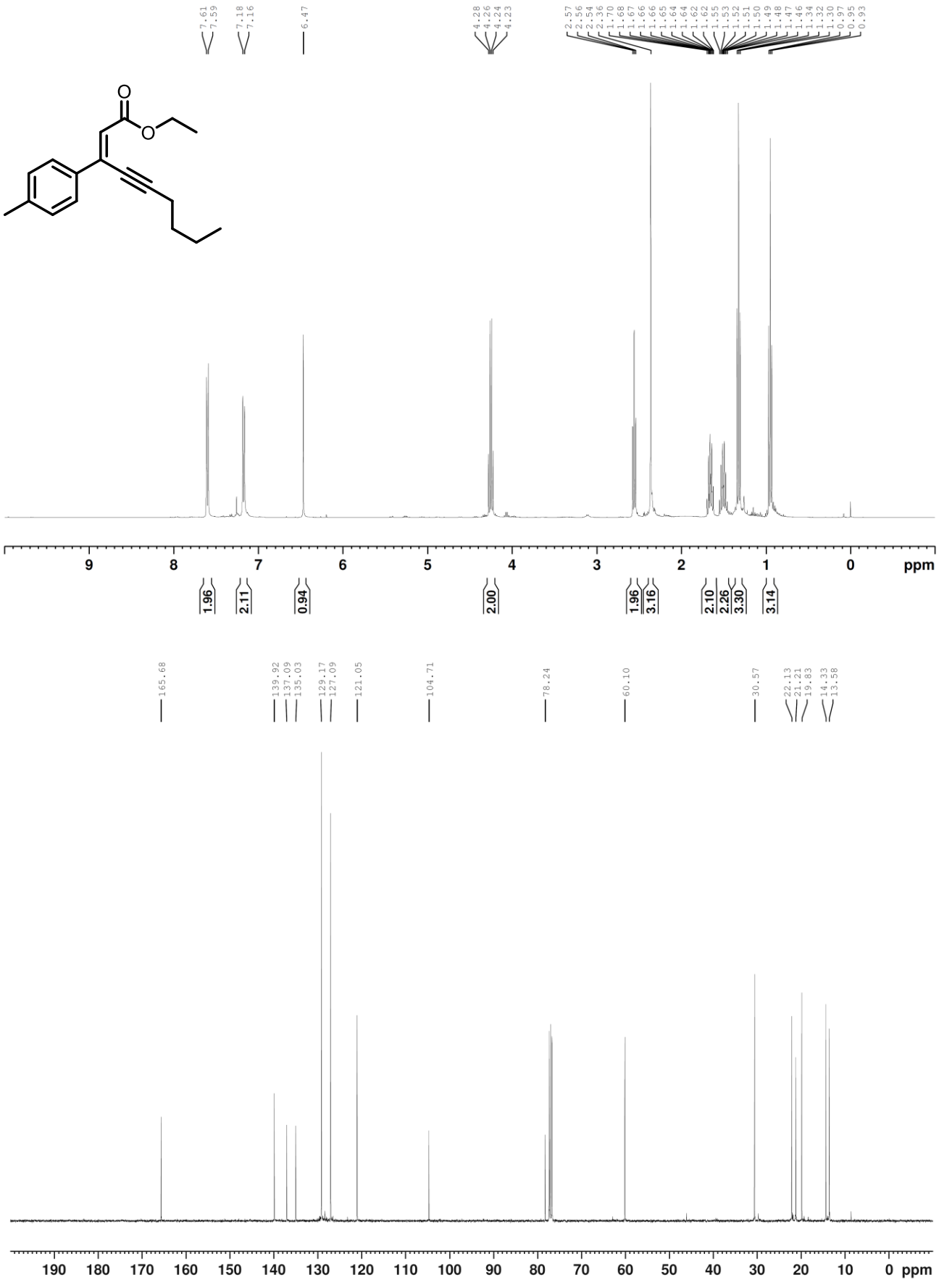
Ethyl (Z)-3-(4-methyphenyl)-5-phenyl-2-penten-4-ynoate (10Aa) ($CDCl_3$)



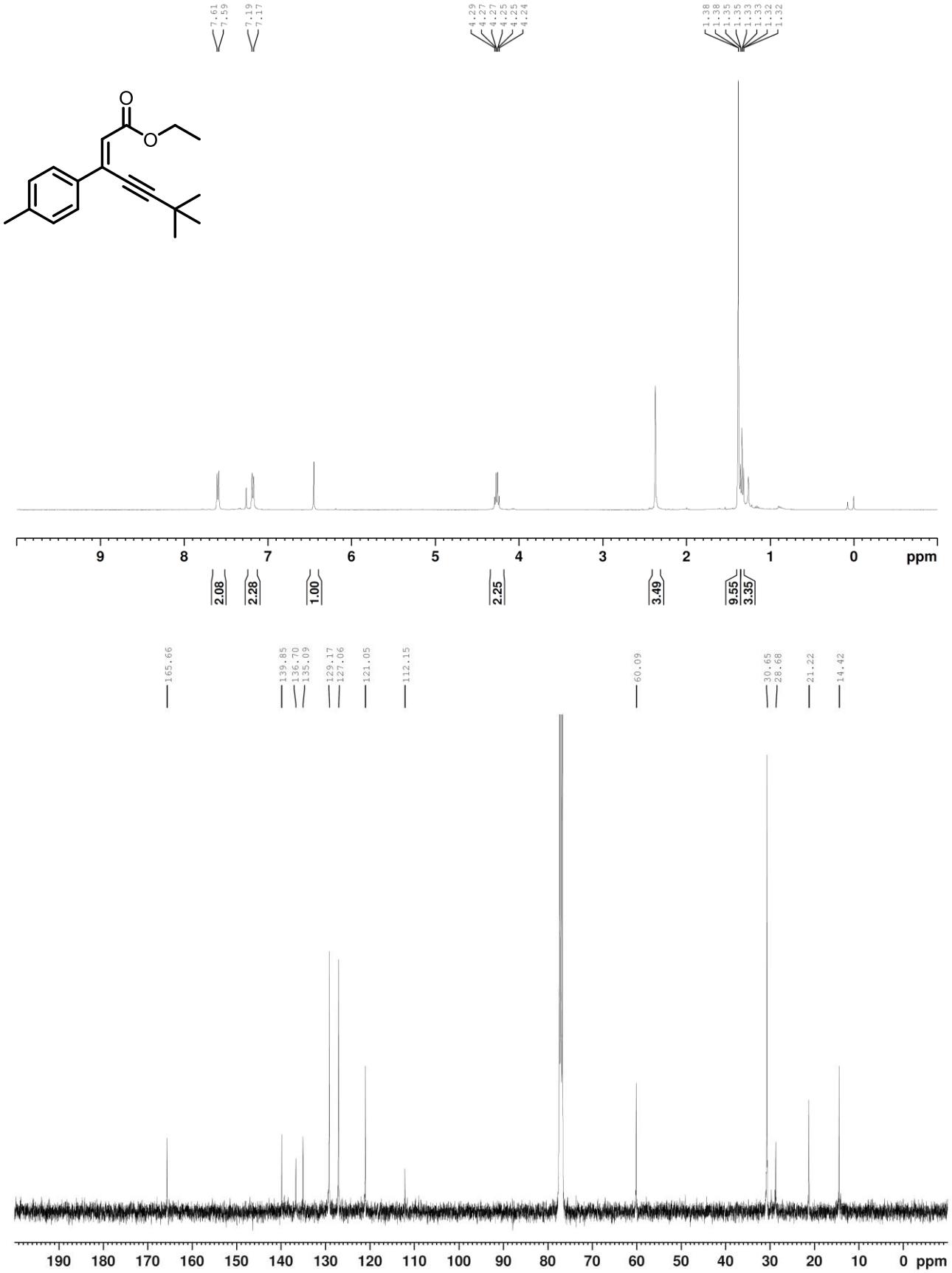
Ethyl (*Z*)-3-phenyl-5-(4-trifluoromethylphenyl)-2-penten-4-ynoate (10Ab) ($CDCl_3$)



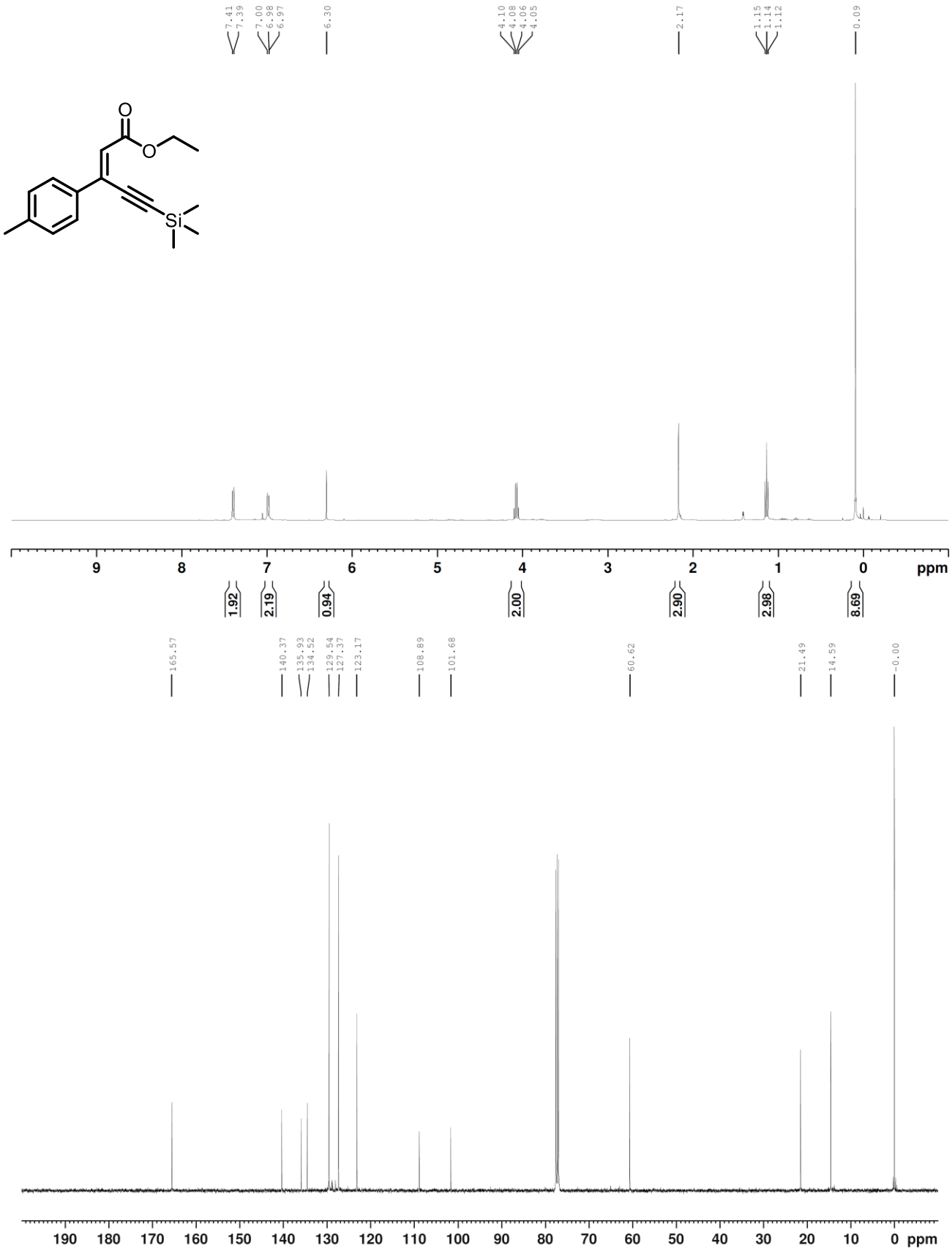
Ethyl (*Z*)-3-(4-methylphenyl)-2-nonen-4-ynoate (10Ac) ($CDCl_3$)



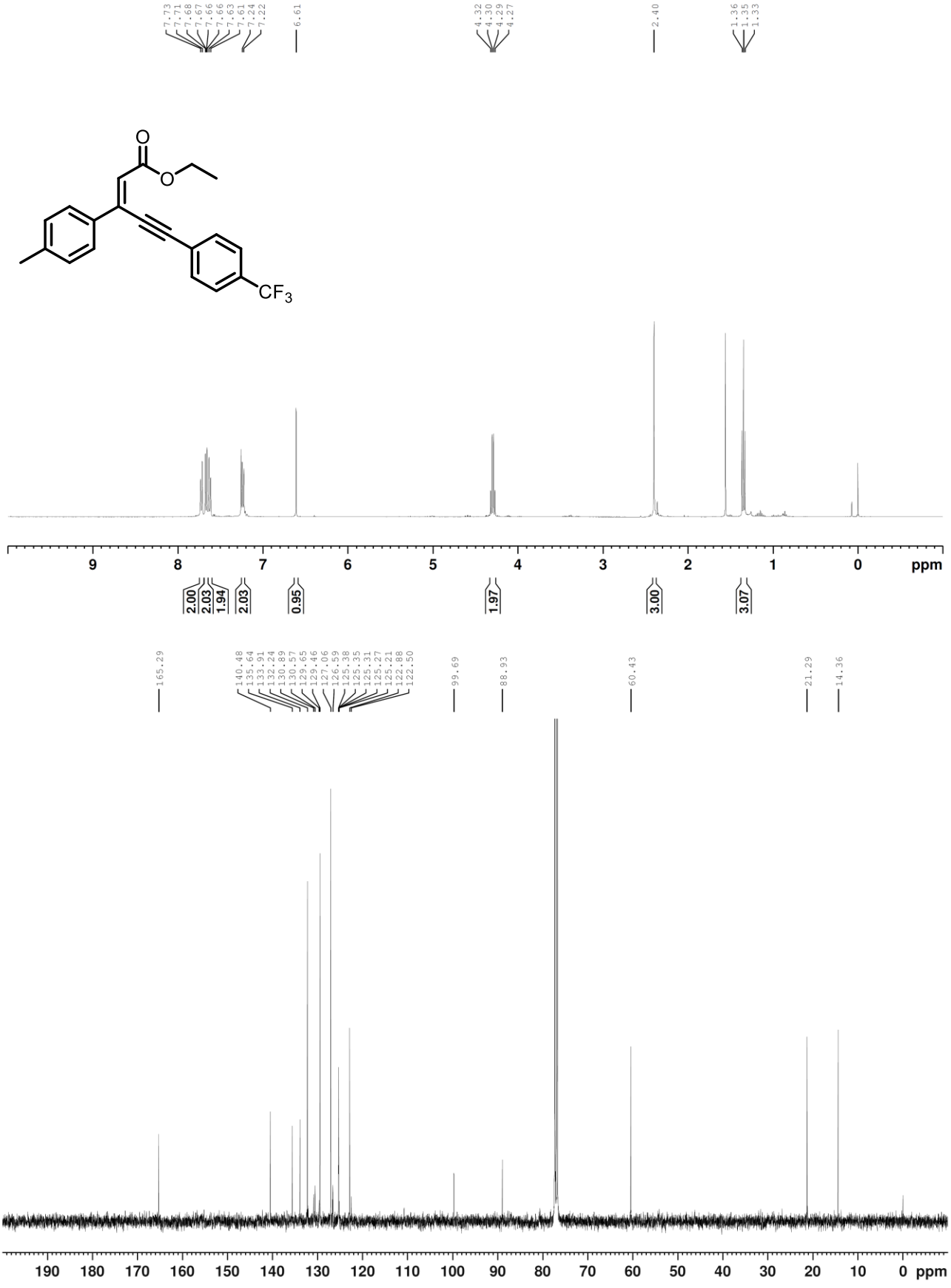
Ethyl (*Z*)-6,6-dimethyl-3-(4-methylphenyl)-2-hepten-4-ynoate (10Ad) ($CDCl_3$)



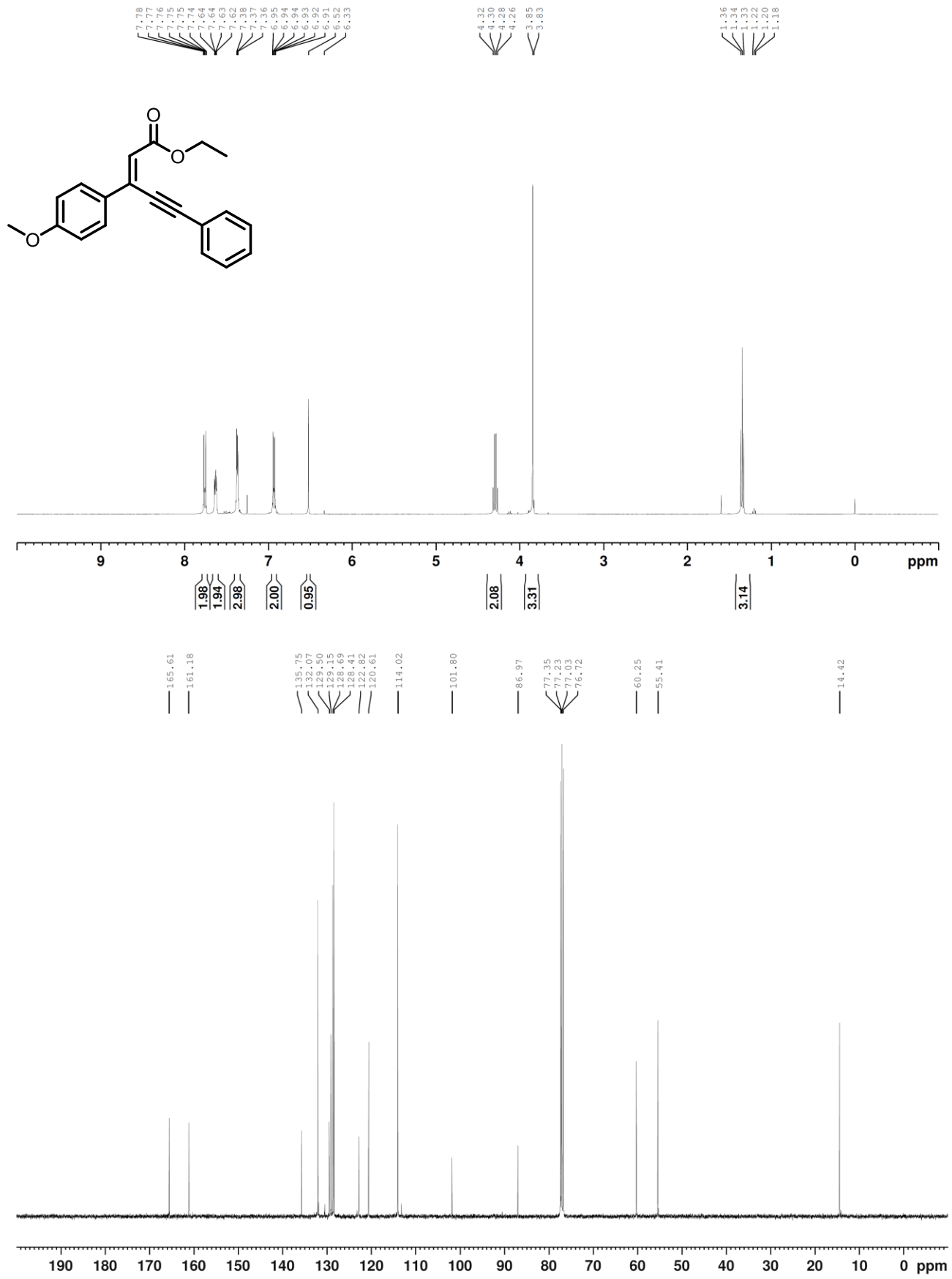
Ethyl (*Z*)-3-(4-methylphenyl)-5-trimethylsilyl-2-penten-4-ynoate (10Ae) ($CDCl_3$)



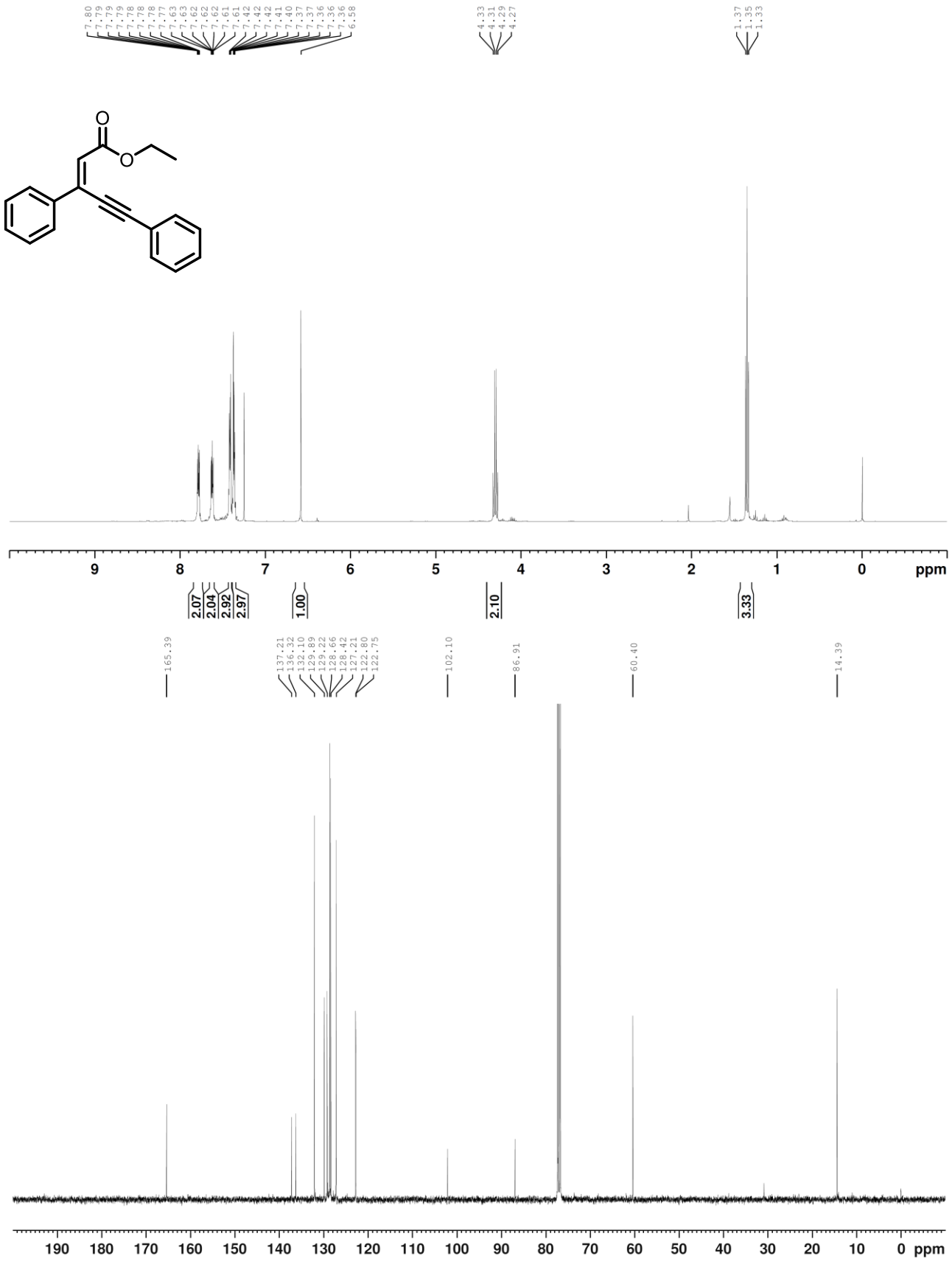
Ethyl (*Z*)-3-phenyl-5-(4-trifluoromethylphenyl)-2-penten-4-ynoate (10Ae) ($CDCl_3$)



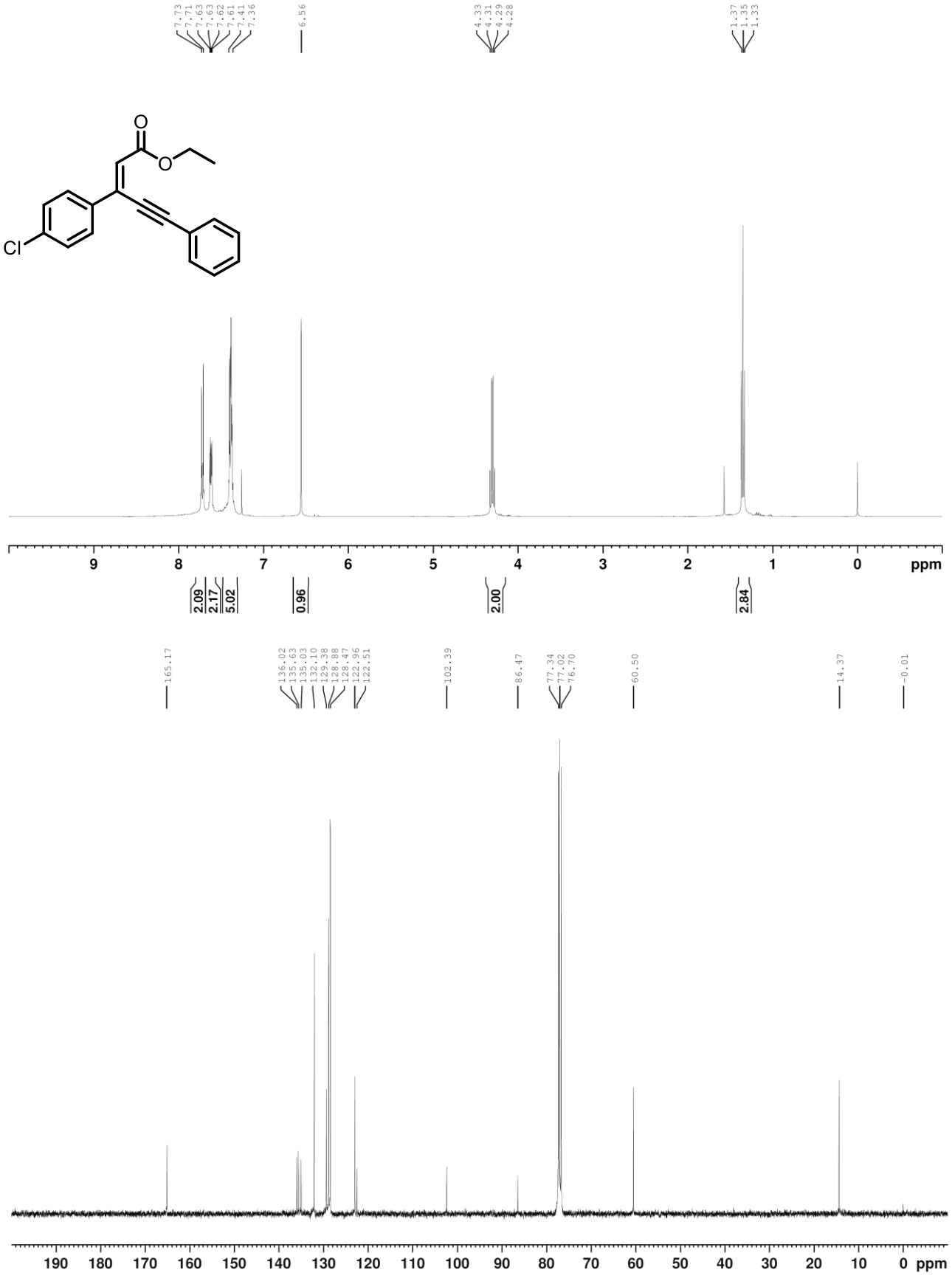
Ethyl (*Z*)-3-(4-metoxhyphenyl)-5-phenyl-2-penten-4-ynoate (10Ba) ($CDCl_3$)



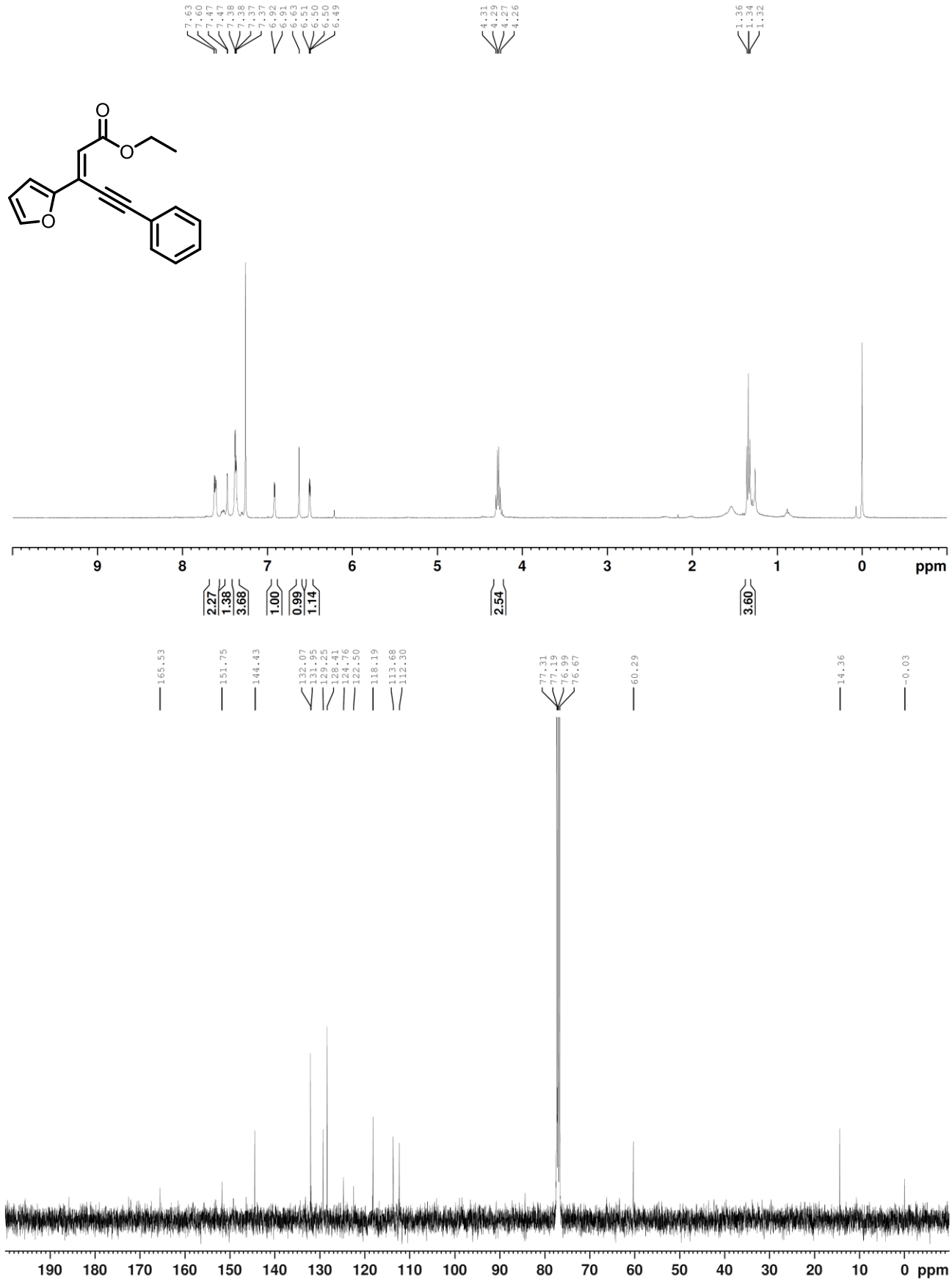
Ethyl (*Z*)-3,5-diphenyl-2-penten-4-ynoate (10Ca) ($CDCl_3$)



Ethyl (Z)-3-(4-chlorophenyl)-5-phenyl-2-penten-4-ynoate (10Da) ($CDCl_3$)



Ethyl (Z)-3-(2-furyl)-5-phenyl-2-penten-4-ynoate (10Ea) ($CDCl_3$)



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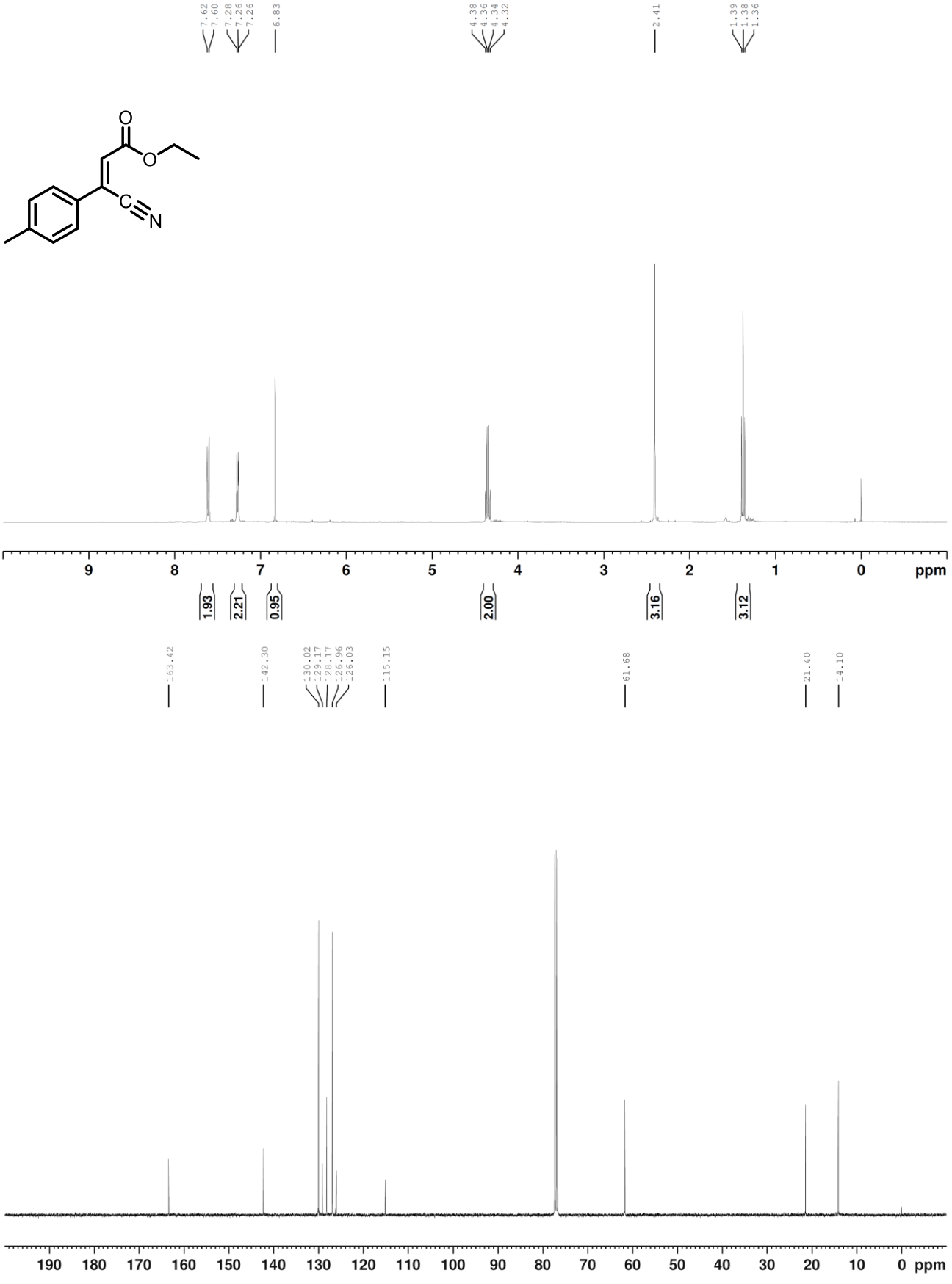
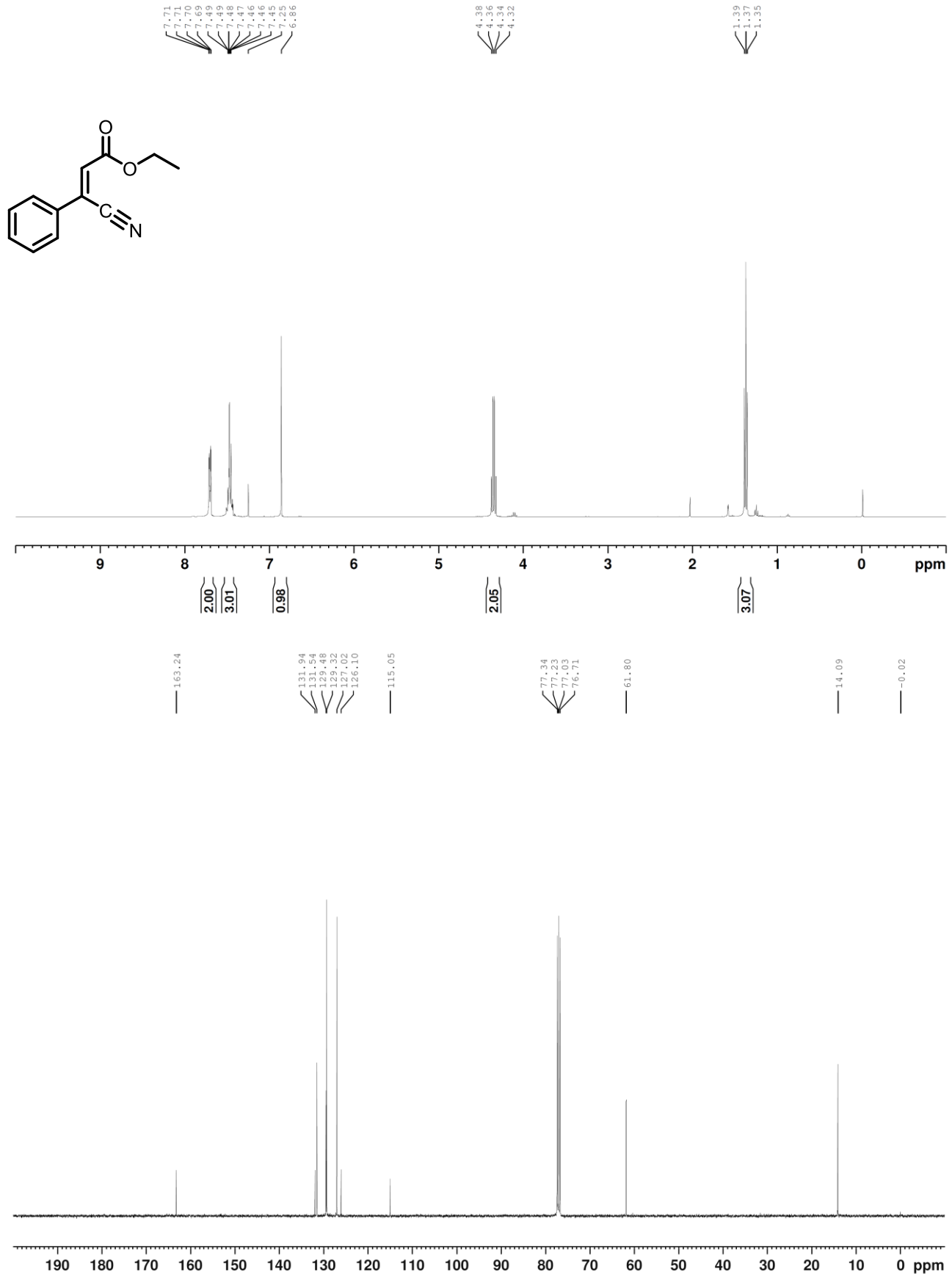
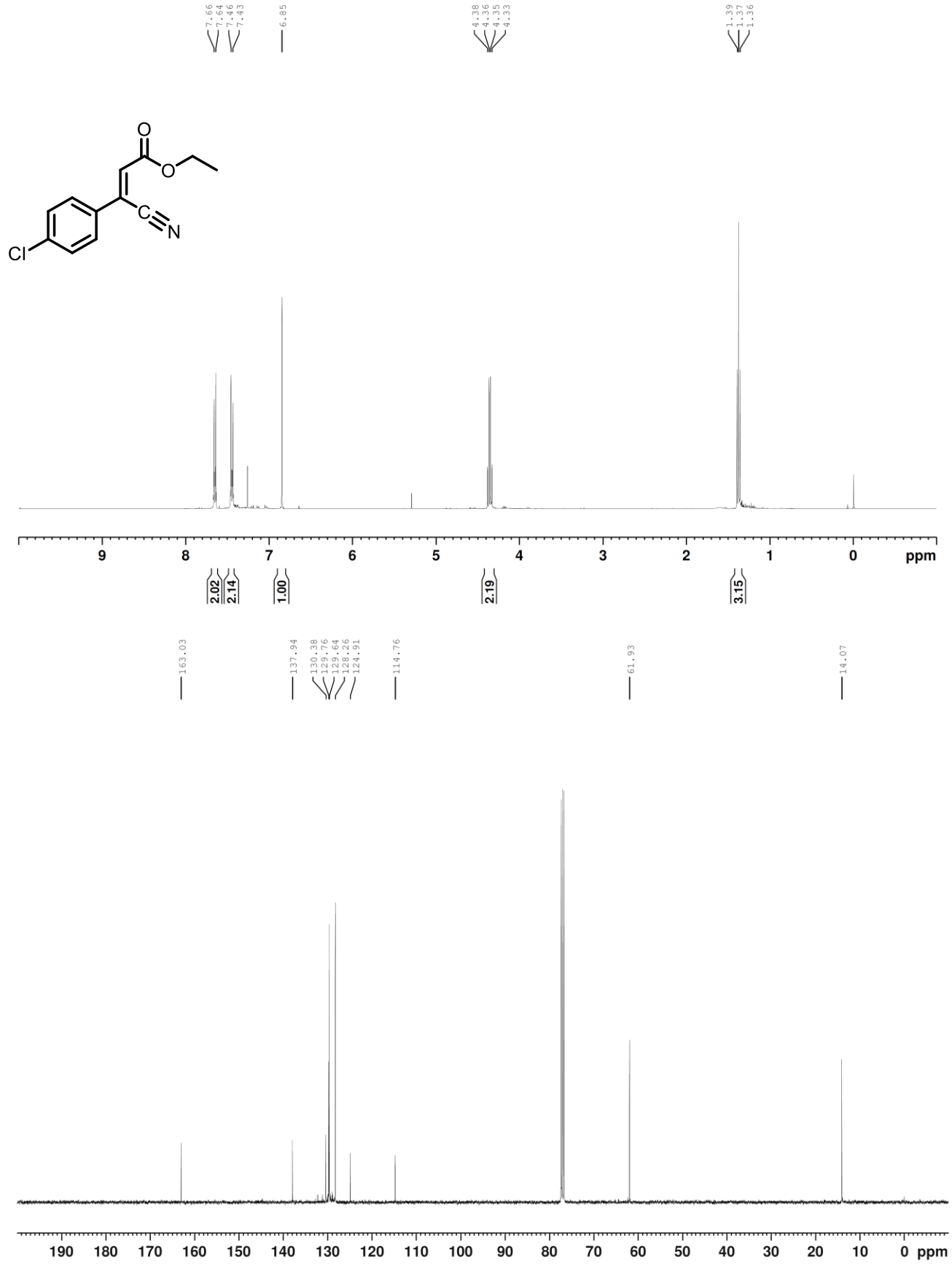


Ethyl 3-cyano-3-(4-methoxyphenyl)-2-propenoate (13b) ($CDCl_3$)

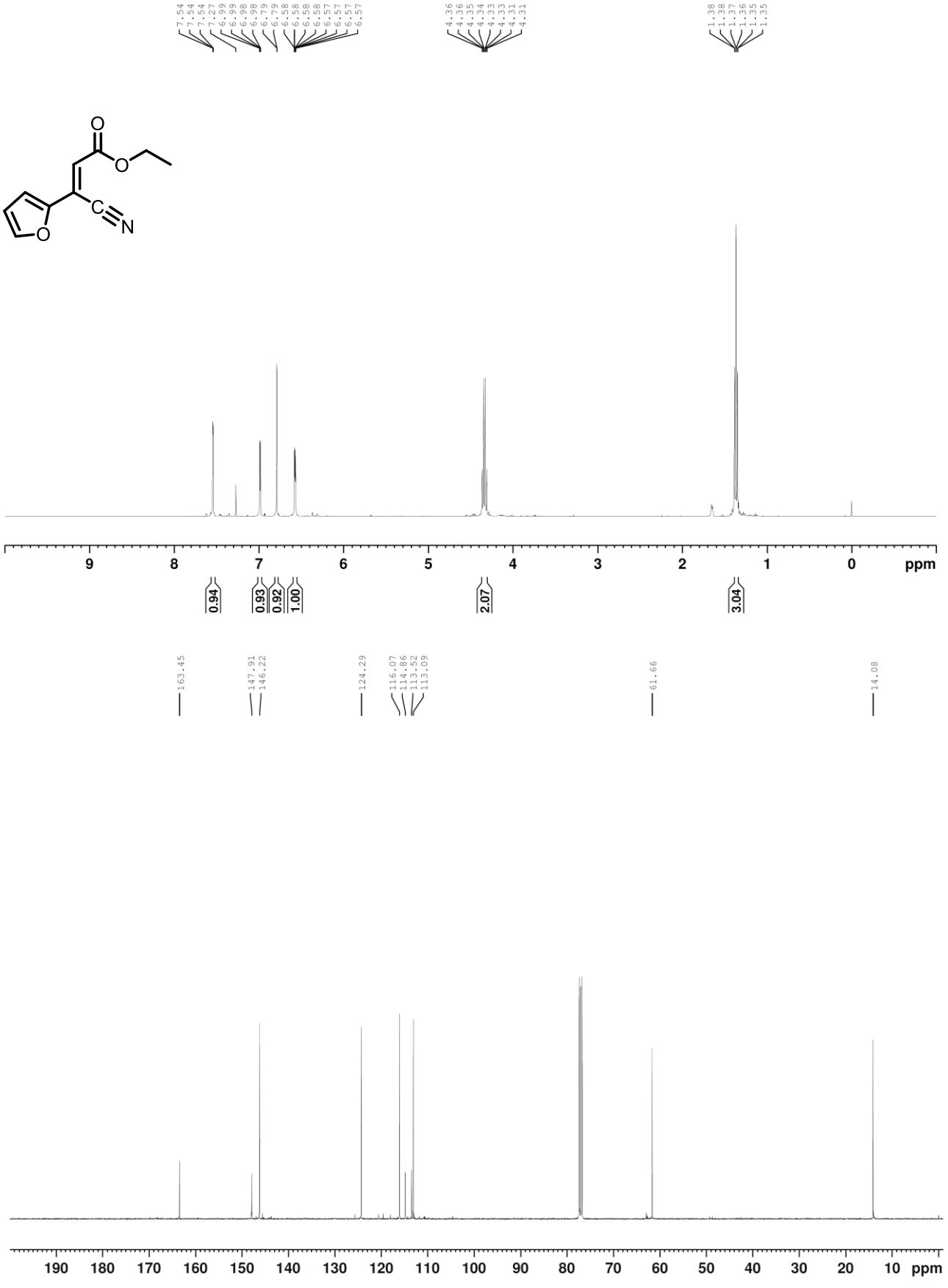
Ethyl 3-cyano-3-phenyl-2-propenoate (13c) ($CDCl_3$)



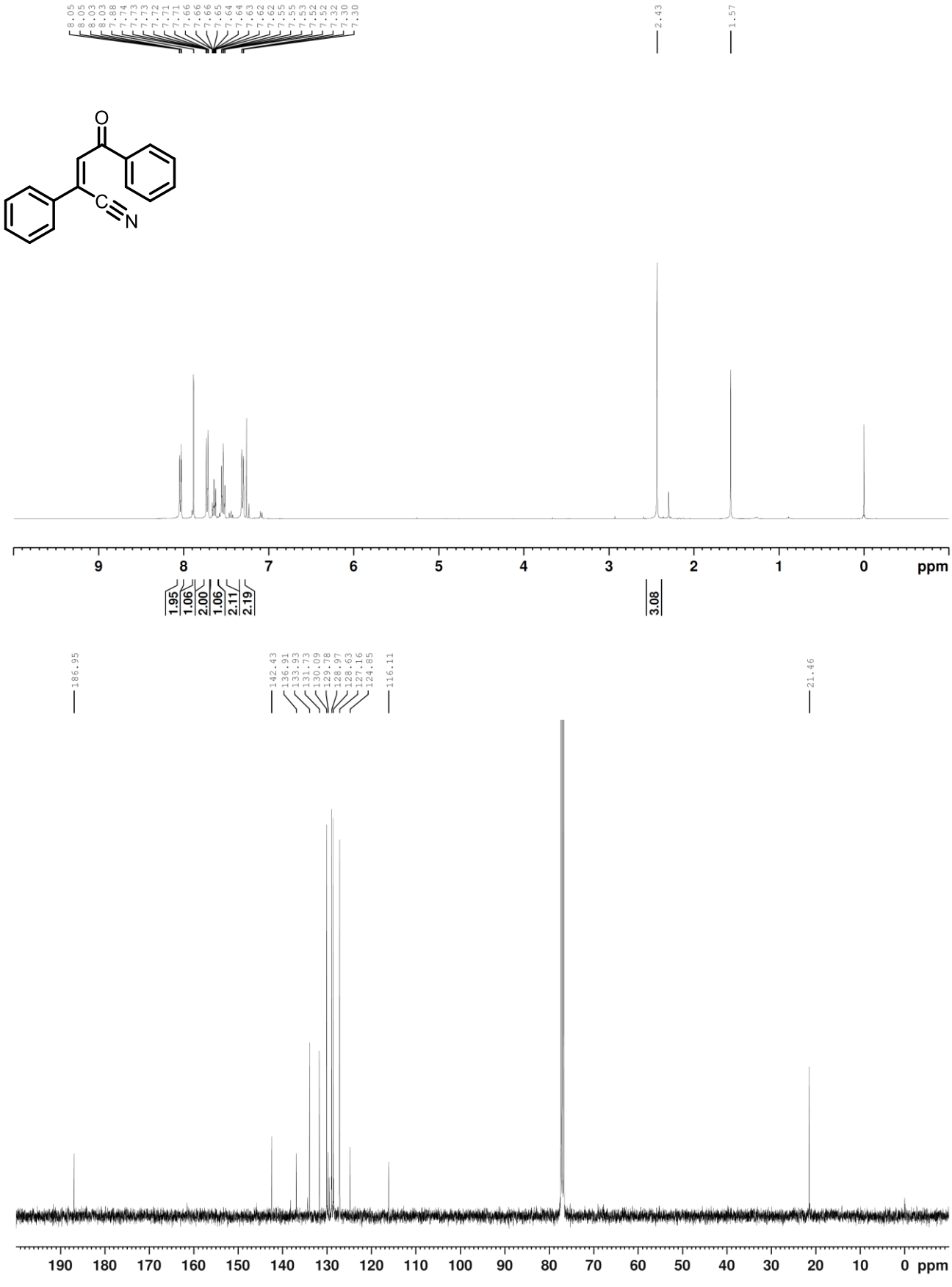
Ethyl 3-(4-chlorophenyl)-3-cyano-2-propenoate (13d) ($CDCl_3$)



Ethyl 3-cyano-3-(2-furyl)-2-propenoate (13e) ($CDCl_3$)



2-(4-Methylphenyl)-4-oxo-4-phenyl-2-butenenitrile (13g) ($CDCl_3$)



Ethyl 3-cyano-3-(4-methylphenyl)-2-nitro-2-propanoate (12a) ($CDCl_3$)