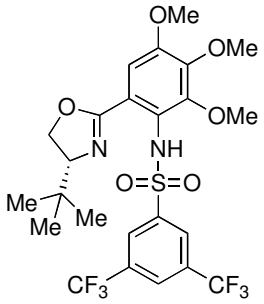
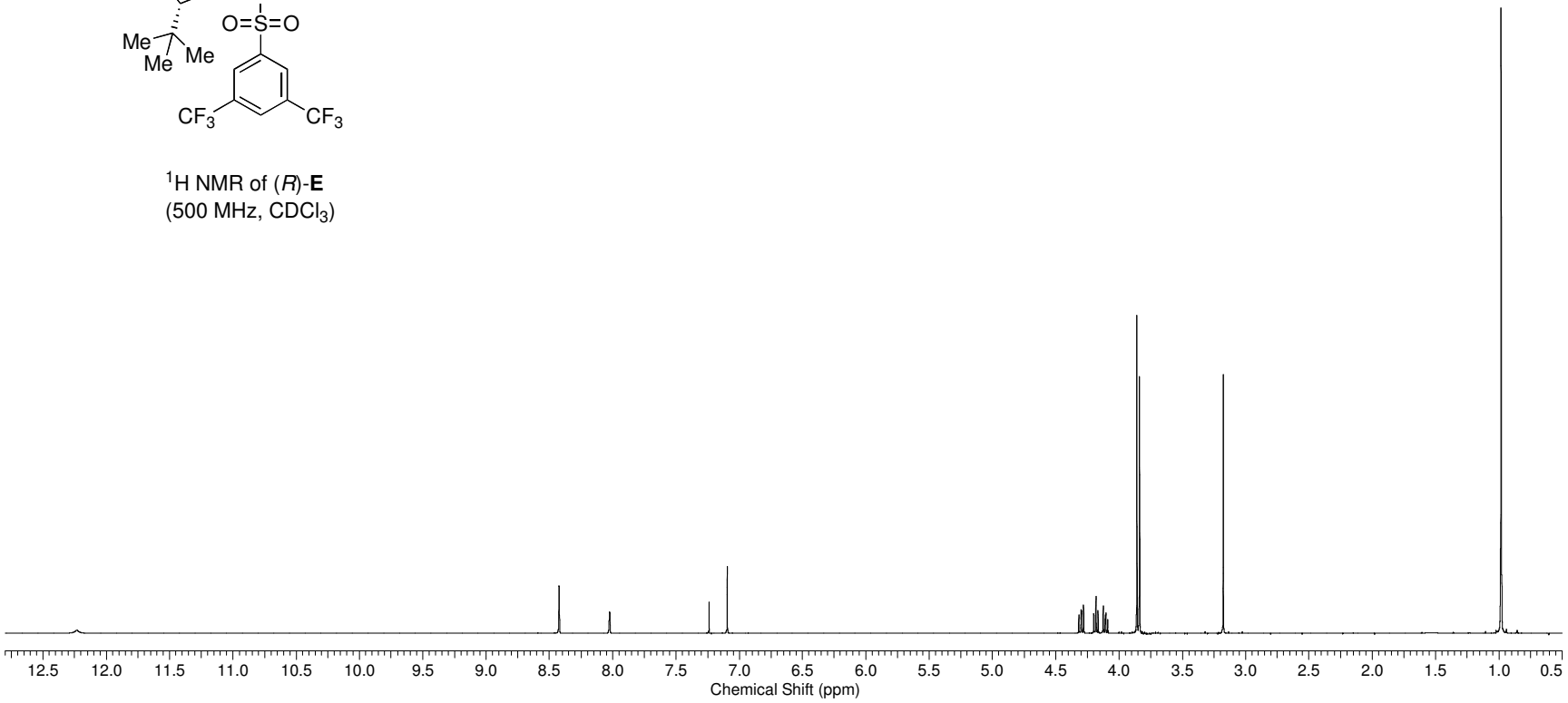
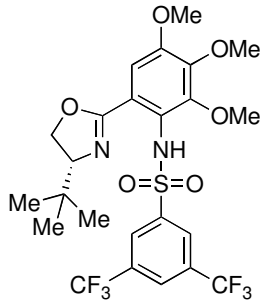
9. NMR Spectra

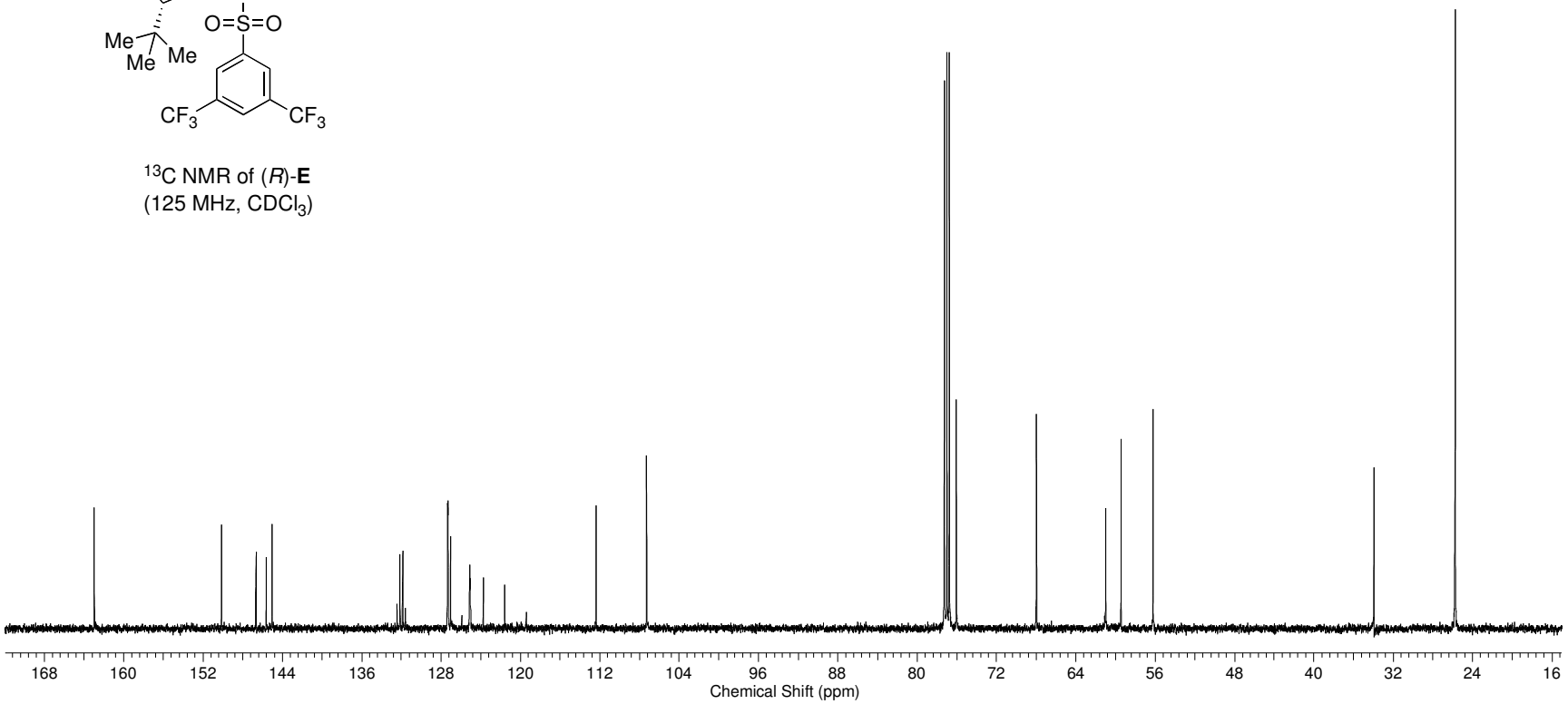


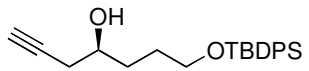
^{1}H NMR of (*R*)-**E**
(500 MHz, $CDCl_3$)



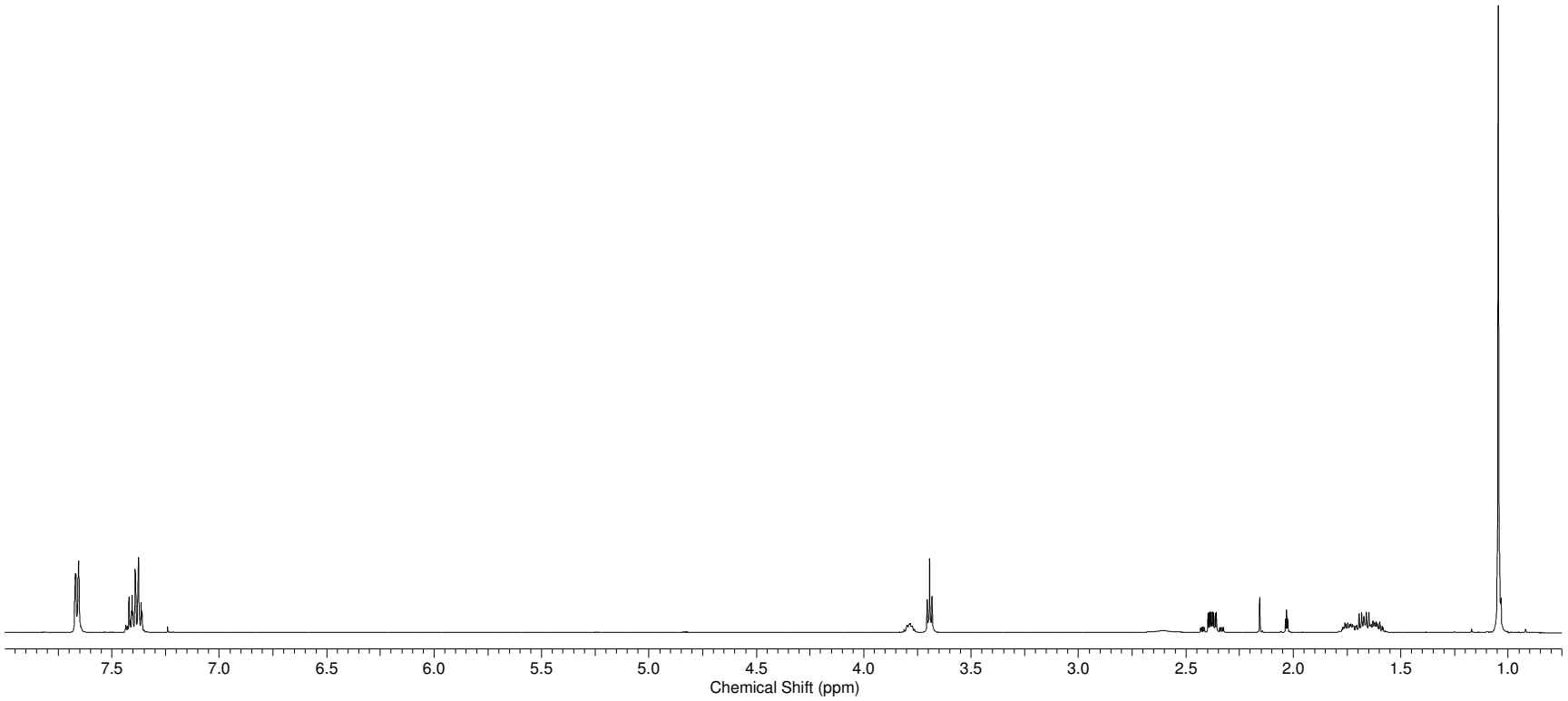


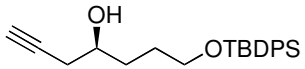
^{13}C NMR of (*R*)-**E**
(125 MHz, $CDCl_3$)



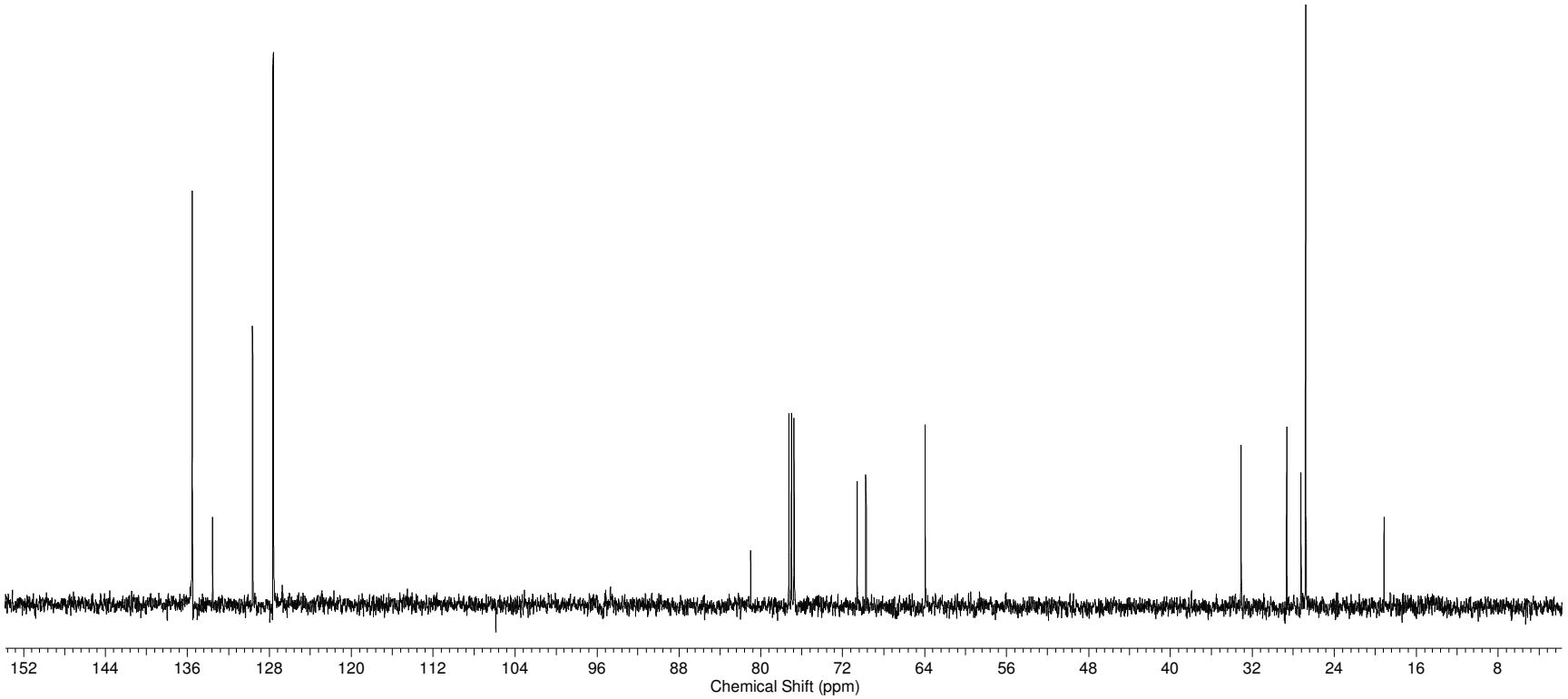


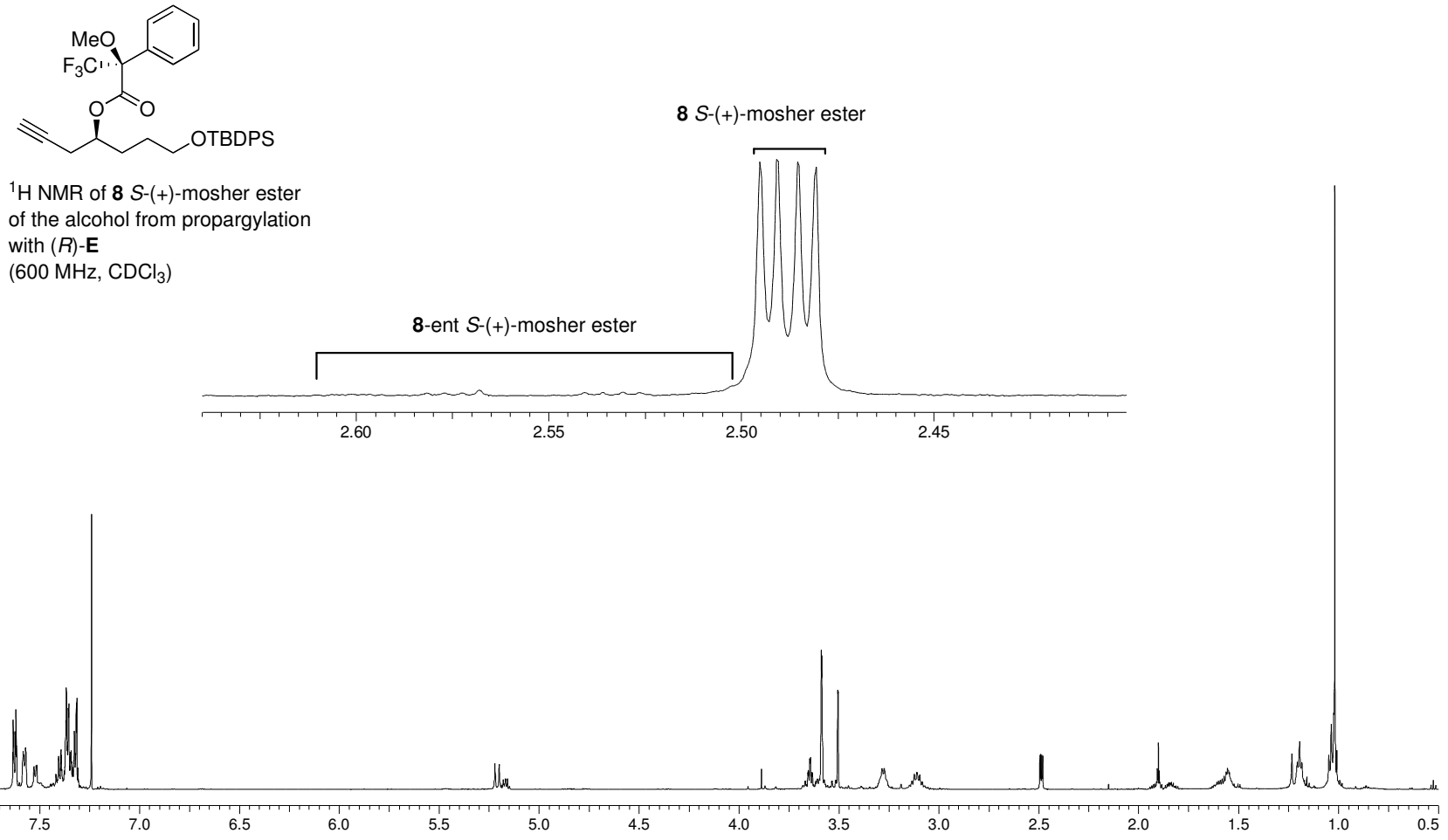
^{1}H NMR of **8**
(500 MHz, $CDCl_3$)





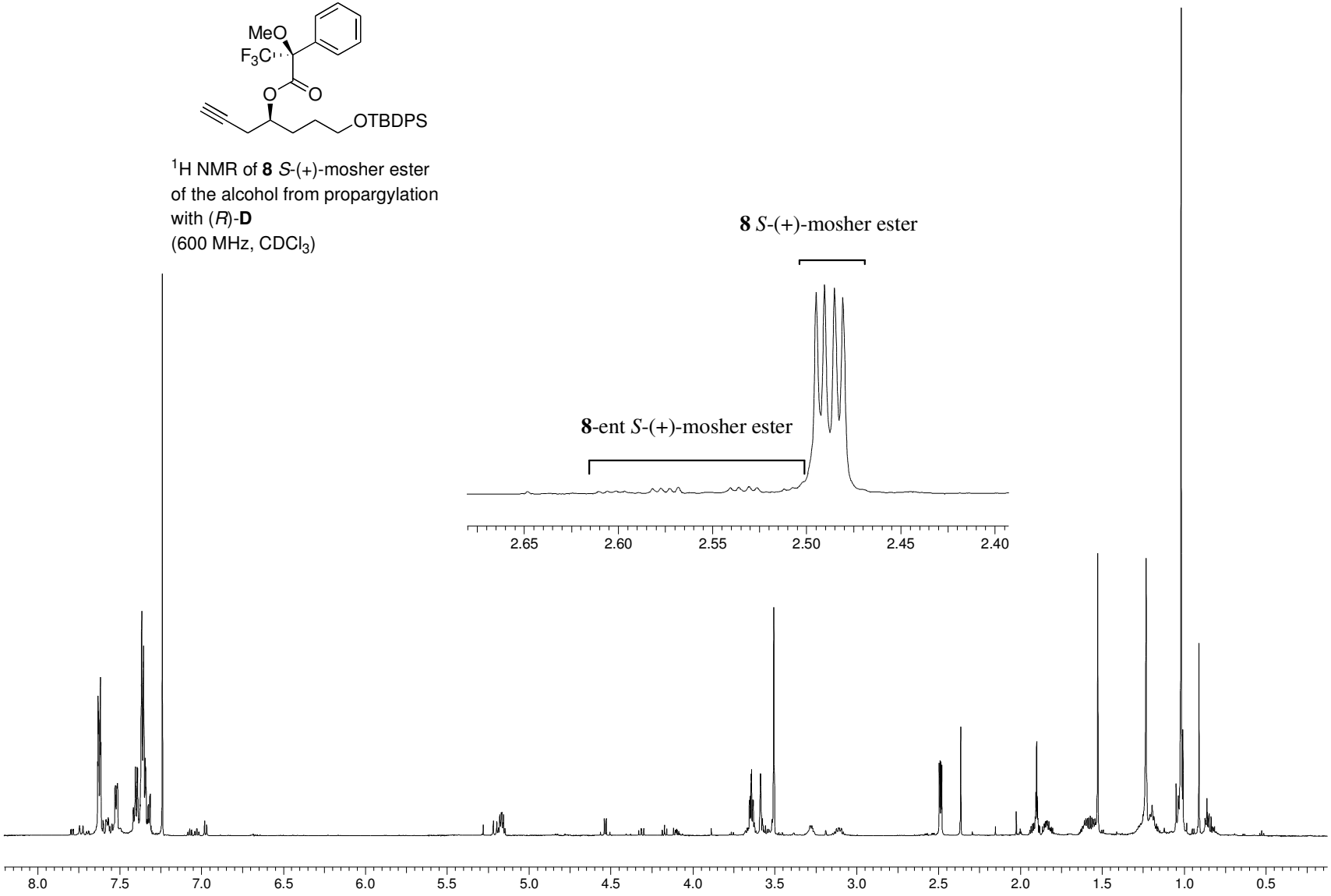
^{13}C NMR of **8**
(125 MHz, $CDCl_3$)

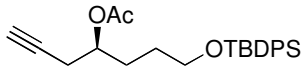




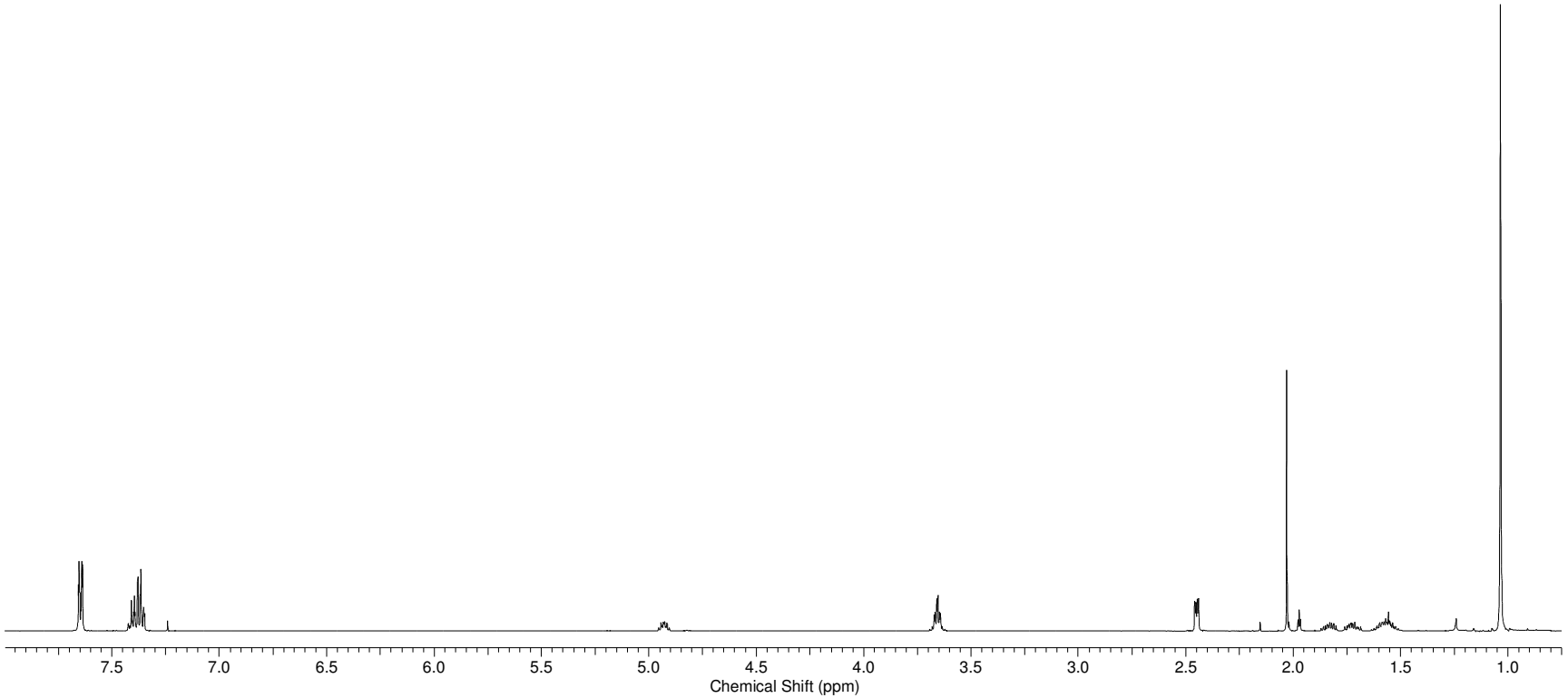
^{1}H NMR of **8** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**E** (600 MHz, $CDCl_3$)

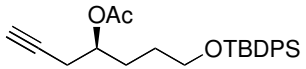
^{1}H NMR of **8** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**D** (600 MHz, $CDCl_3$)



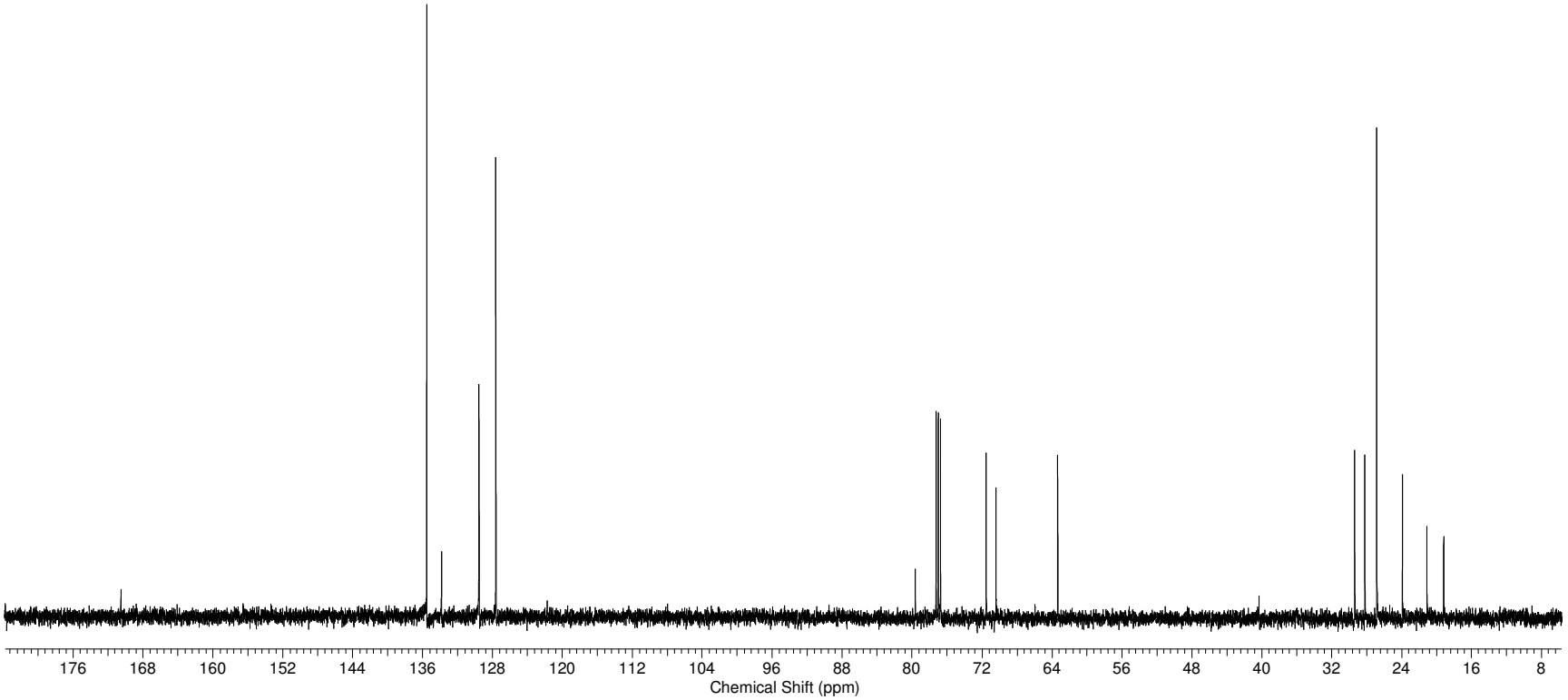


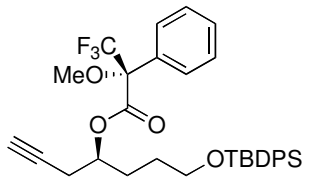
^{1}H NMR of the acetate of **8**
(500 MHz, $CDCl_3$)



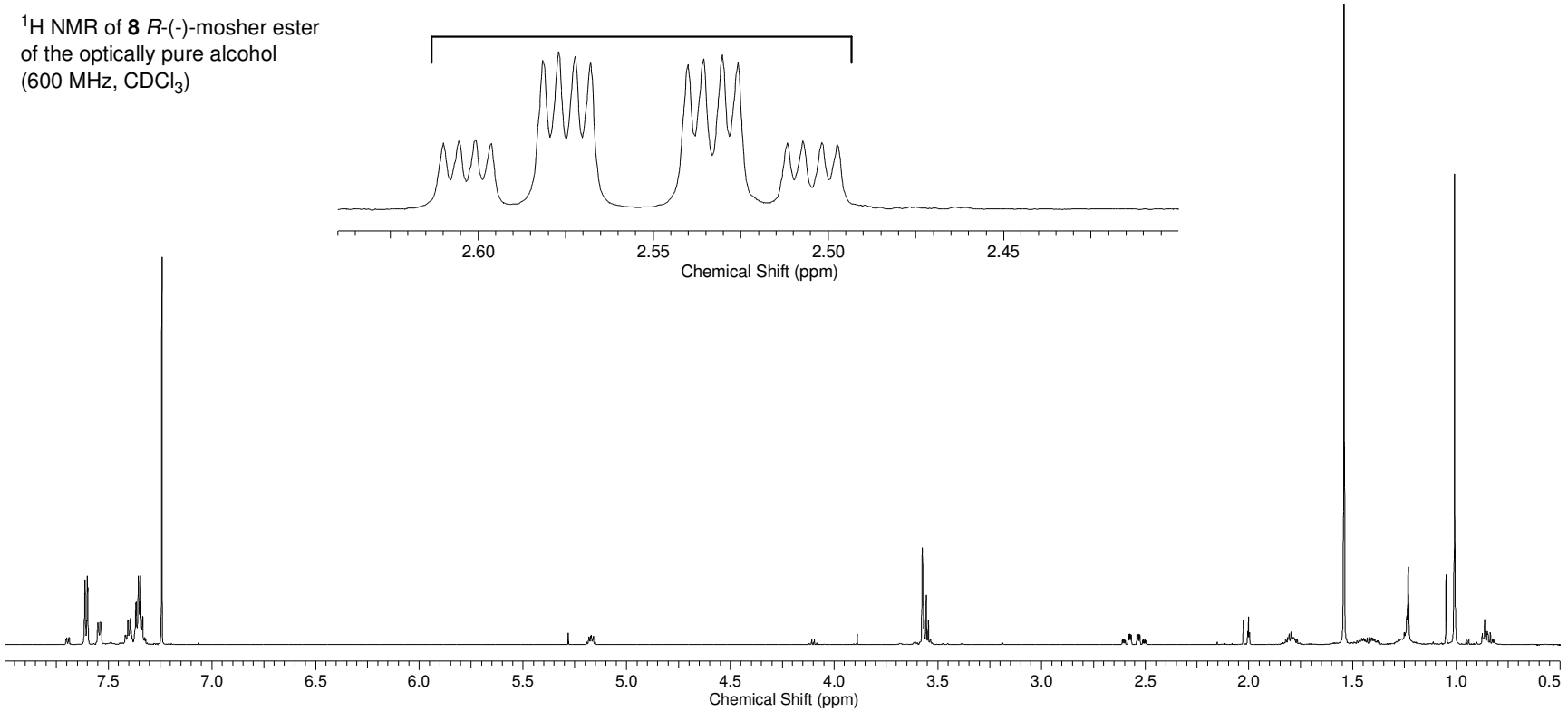


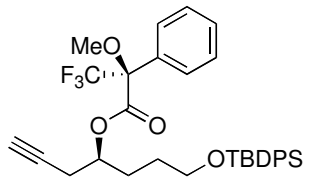
^{13}C NMR of the acetate of **8**
(125 MHz, $CDCl_3$)



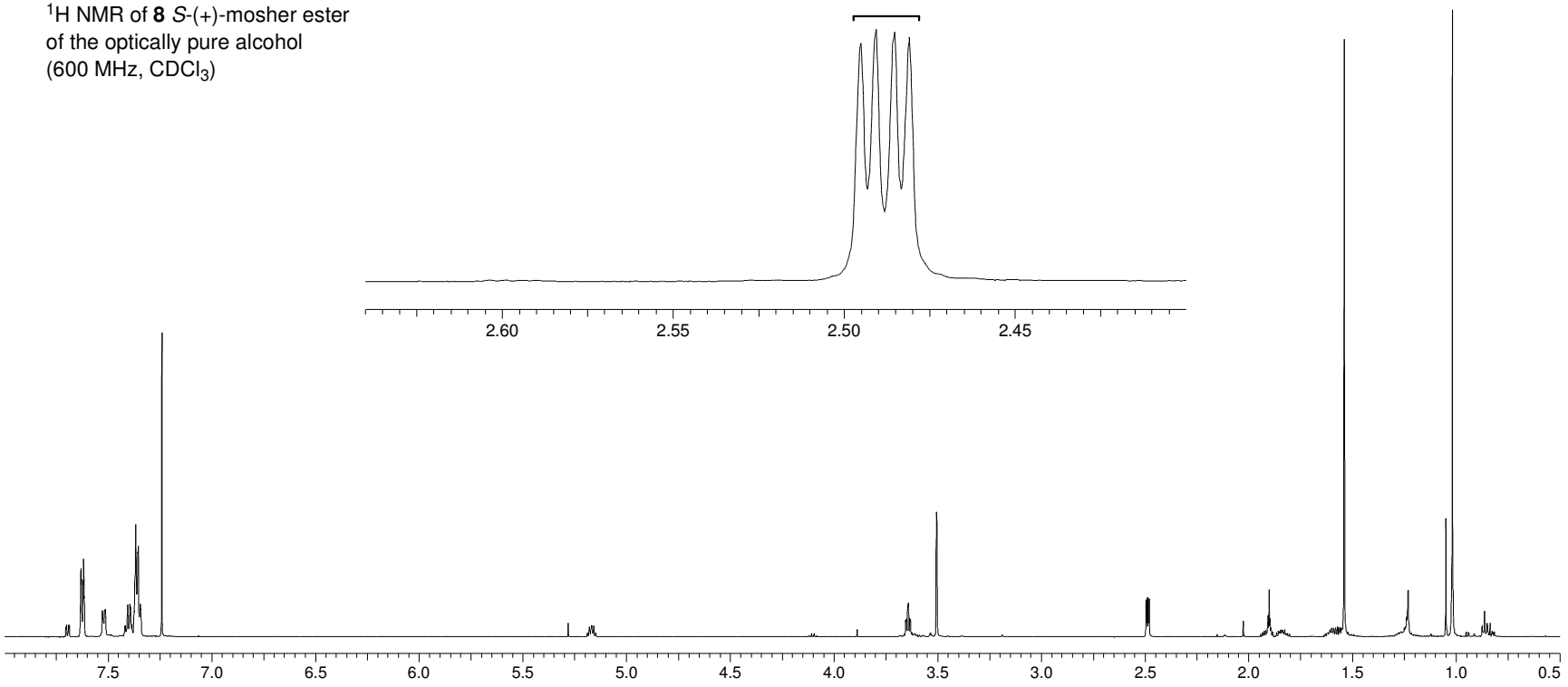


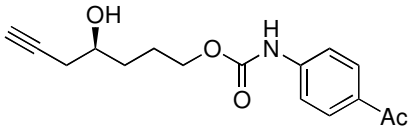
^{1}H NMR of **8** *R*-(-)-mosher ester of the optically pure alcohol (600 MHz, $CDCl_3$)



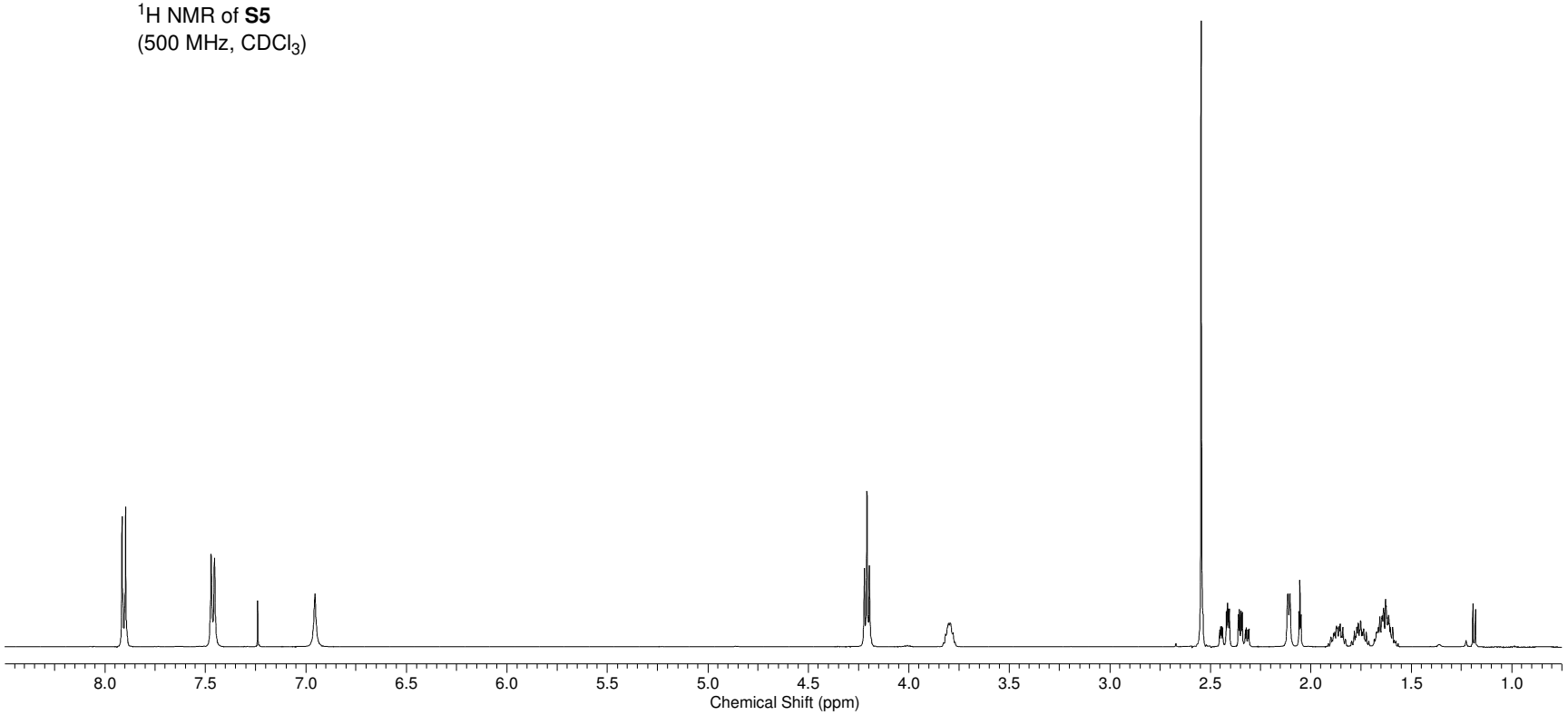


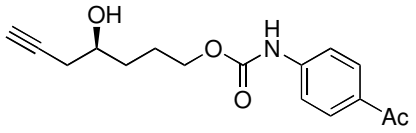
^{1}H NMR of **8** *S*-(+)-mosher ester of the optically pure alcohol (600 MHz, $CDCl_3$)



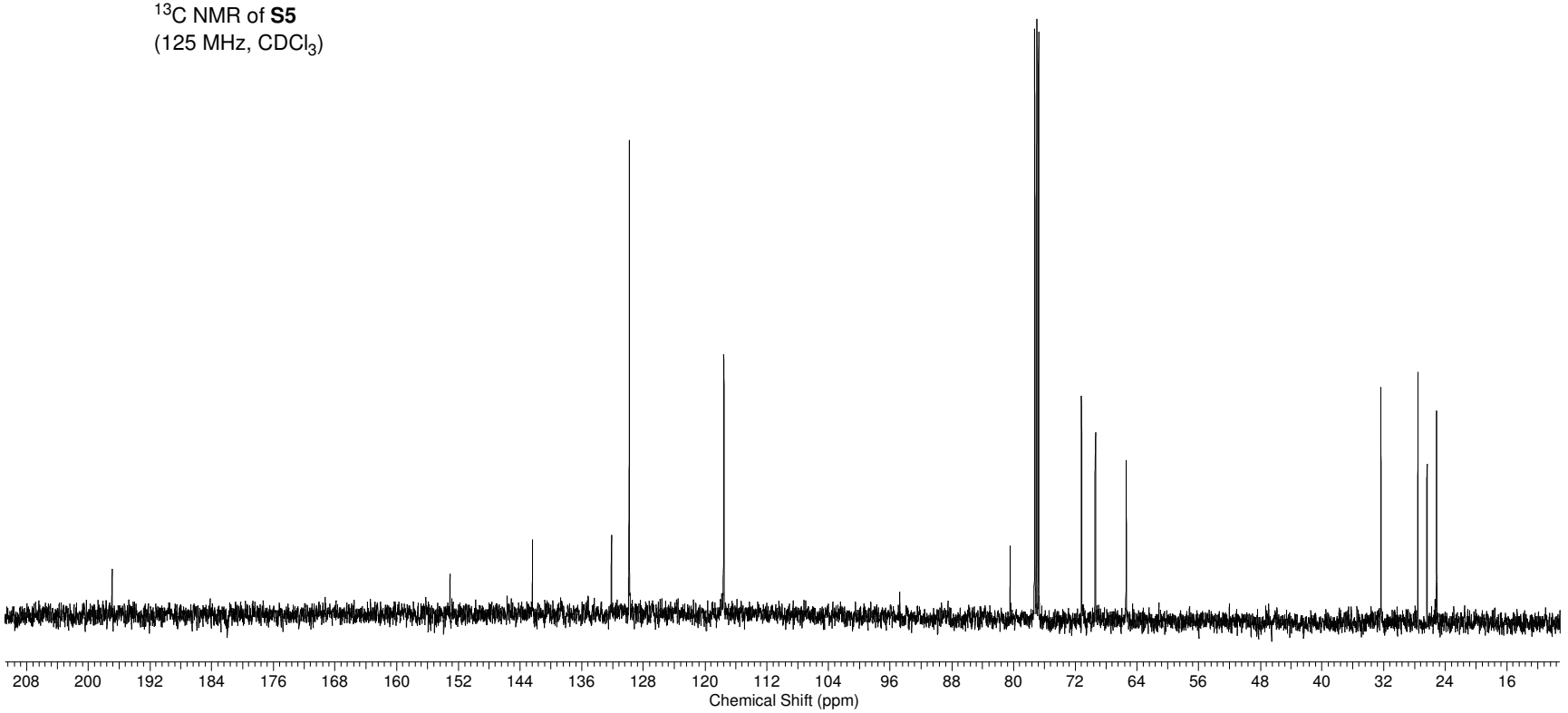


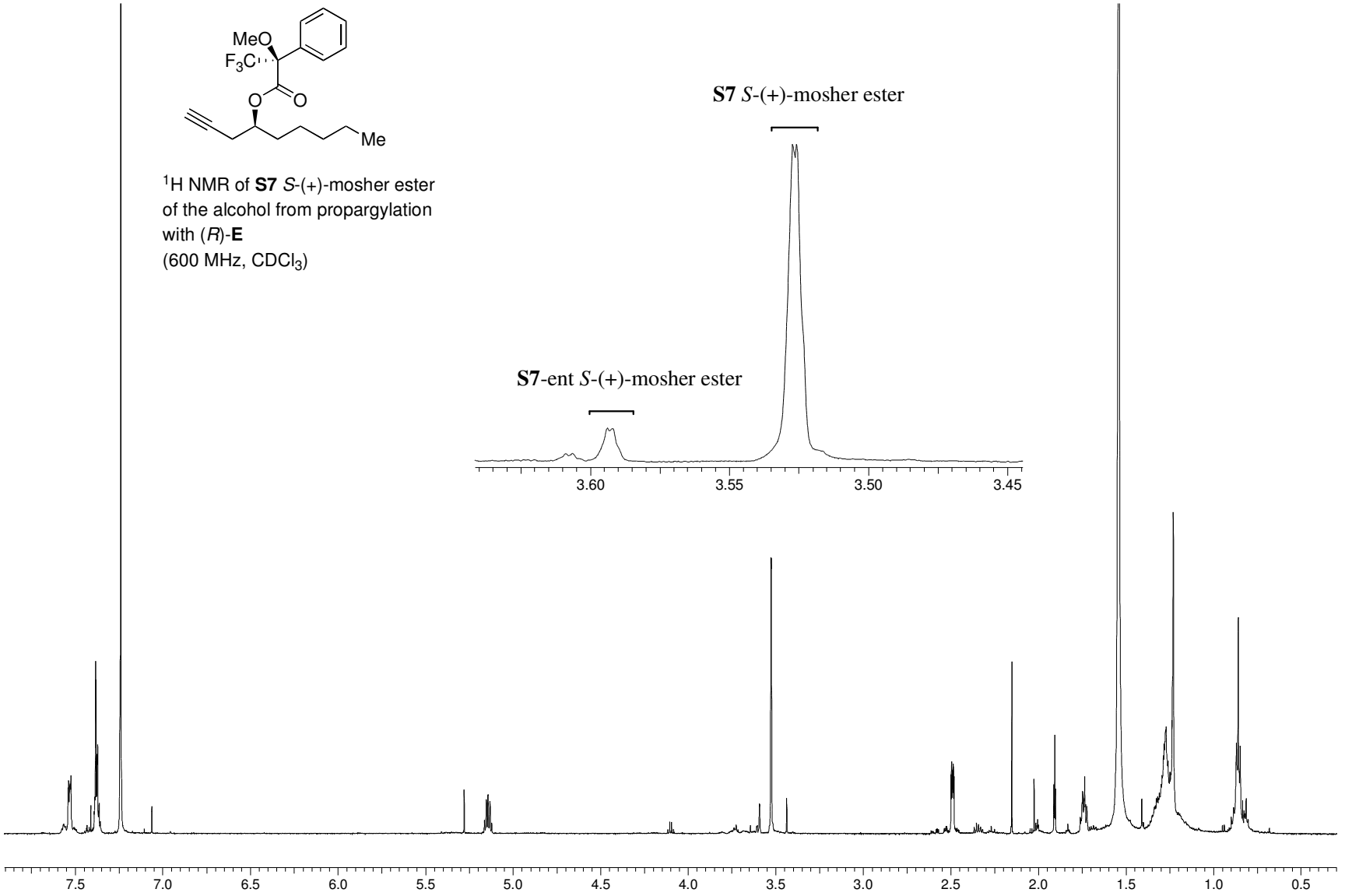
^{1}H NMR of **S5**
(500 MHz, $CDCl_3$)



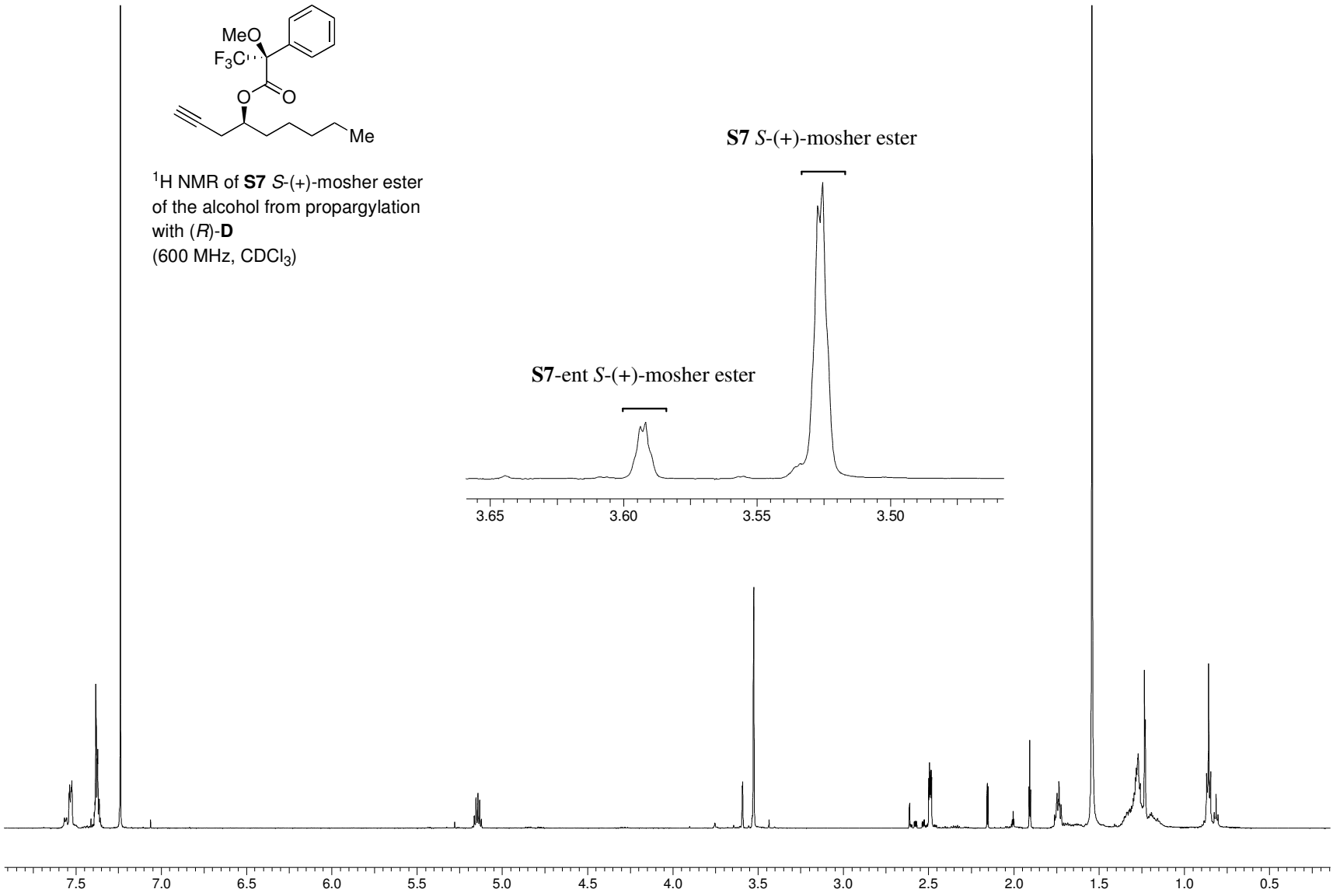


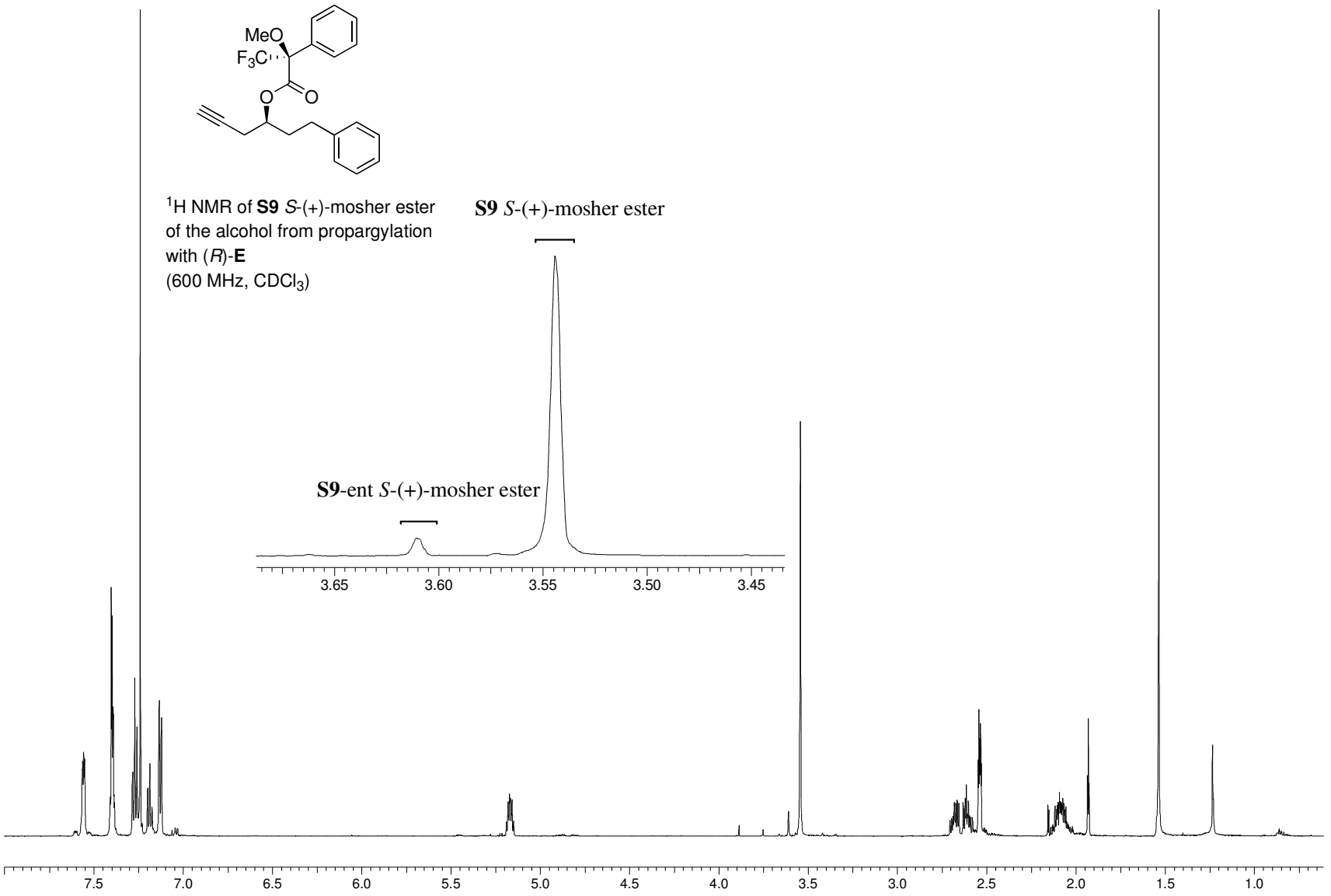
^{13}C NMR of **S5**
(125 MHz, $CDCl_3$)



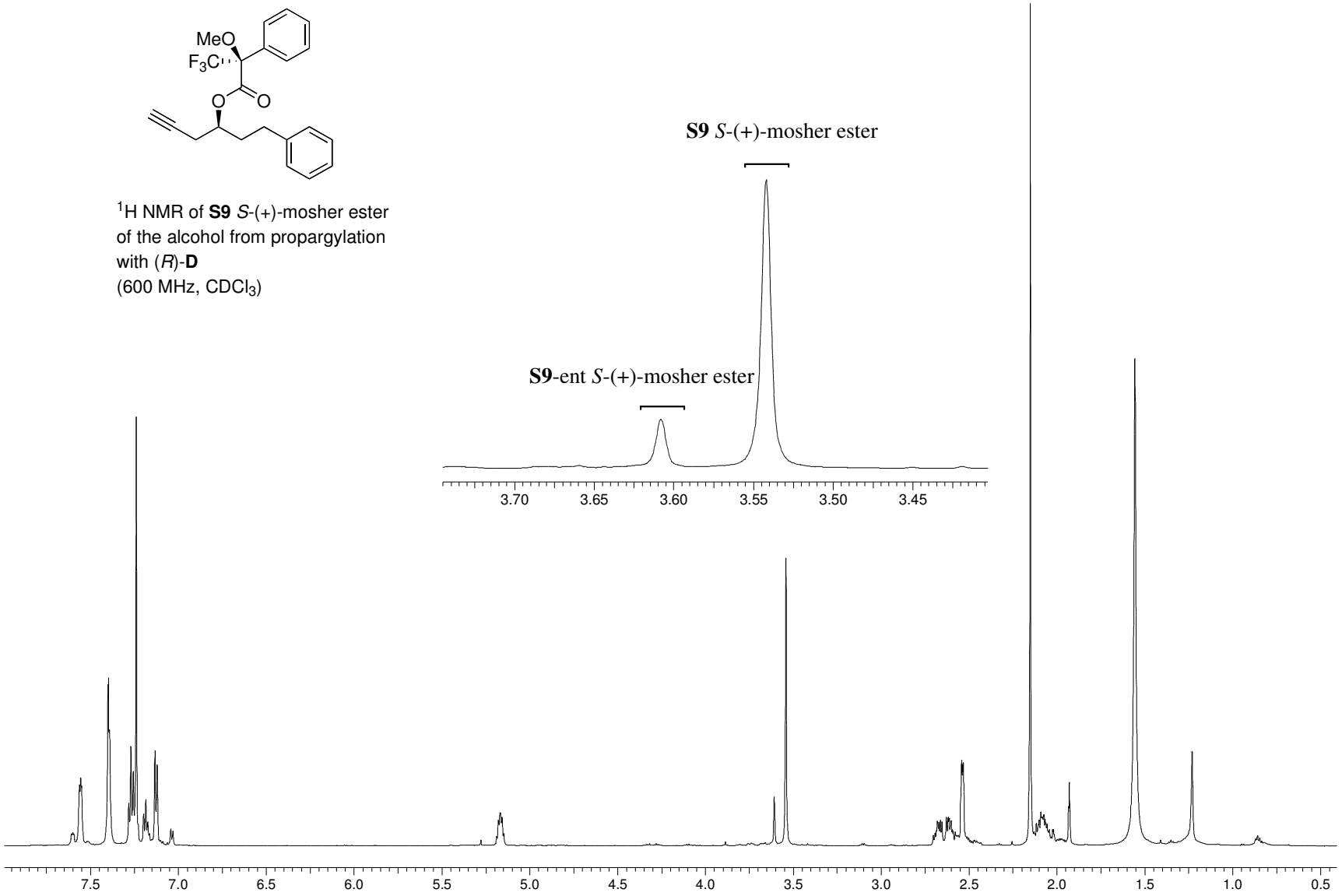


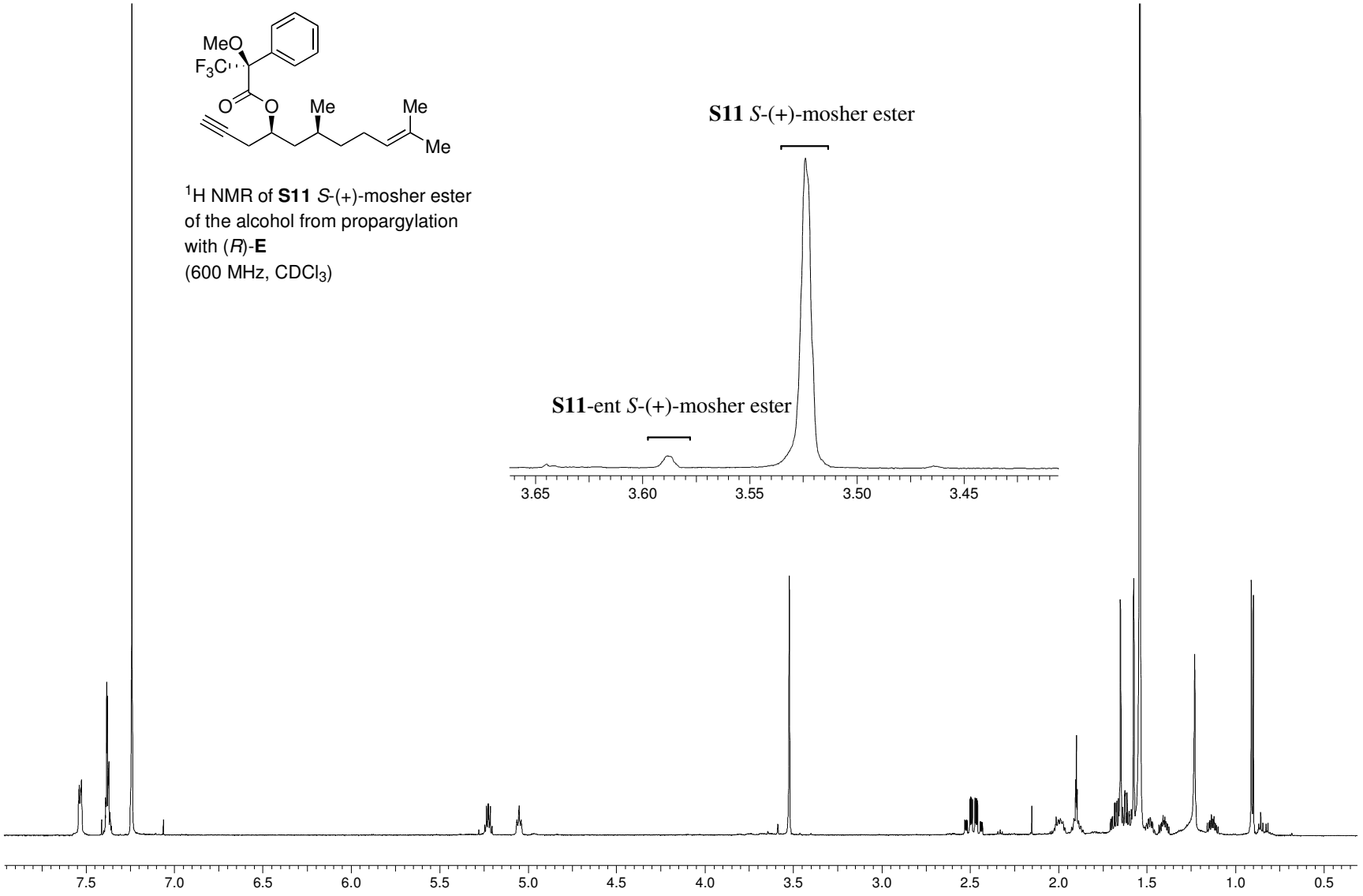
^{1}H NMR of **S7** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**E**
(600 MHz, $CDCl_3$)


MeO
F3C
O
O
Me
1H NMR of S7 S-(+)-mosher ester of the alcohol from propargylation with (R)-D
(600 MHz, CDCl3)
S7 S-(+)-mosher ester
S7-ent S-(+)-mosher ester
3.65
3.60
3.55
3.50
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

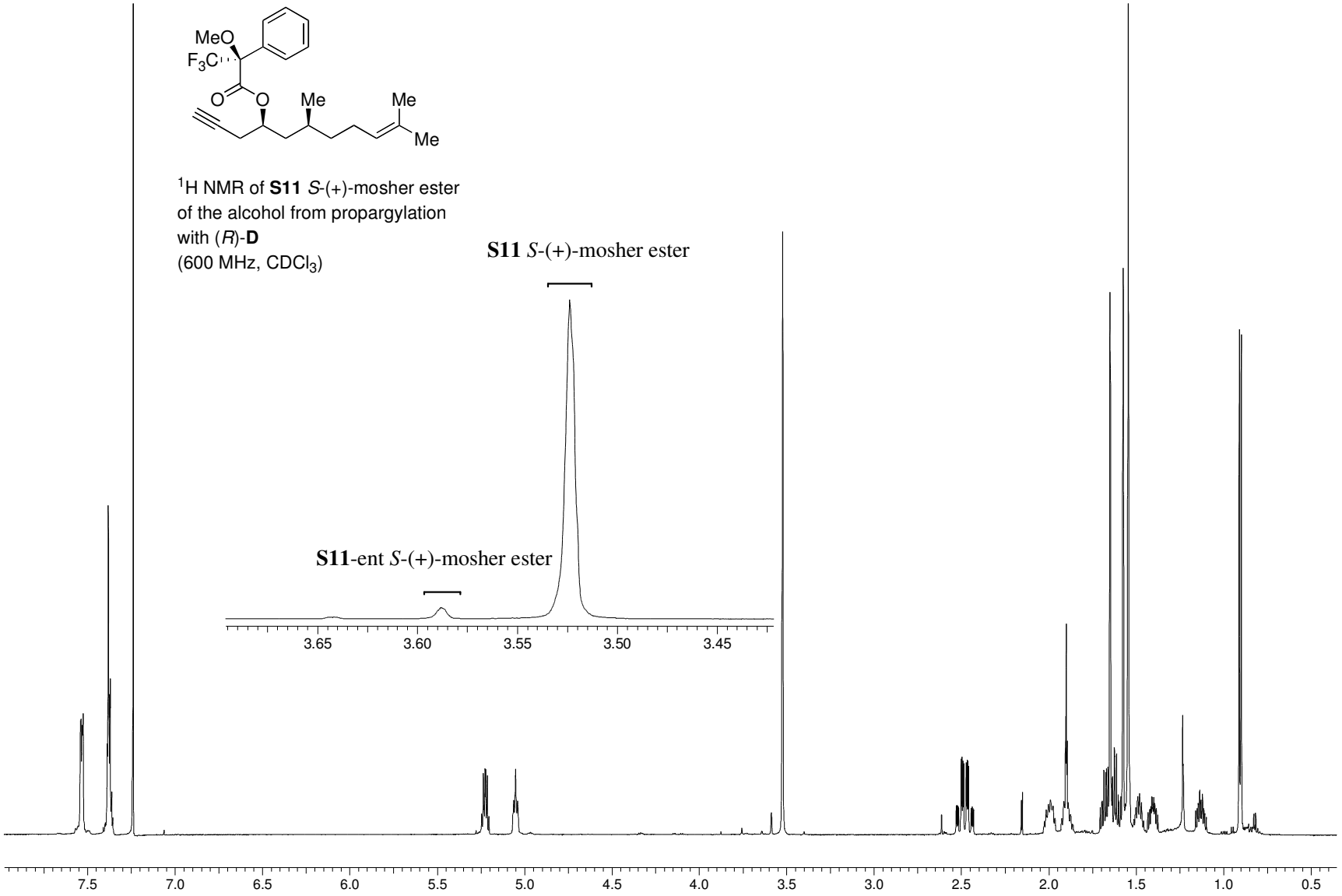

MeO
F3C
O
O
1H NMR of S9 S-(+)-mosher ester of the alcohol from propargylation with (R)-E (600 MHz, CDCl3)
S9 S-(+)-mosher ester
S9-ent S-(+)-mosher ester
3.65
3.60
3.55
3.50
3.45
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0

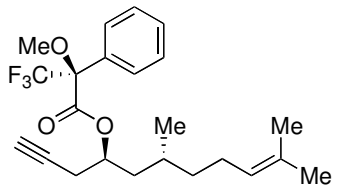
^{1}H NMR of **S9** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**D**
(600 MHz, $CDCl_3$)



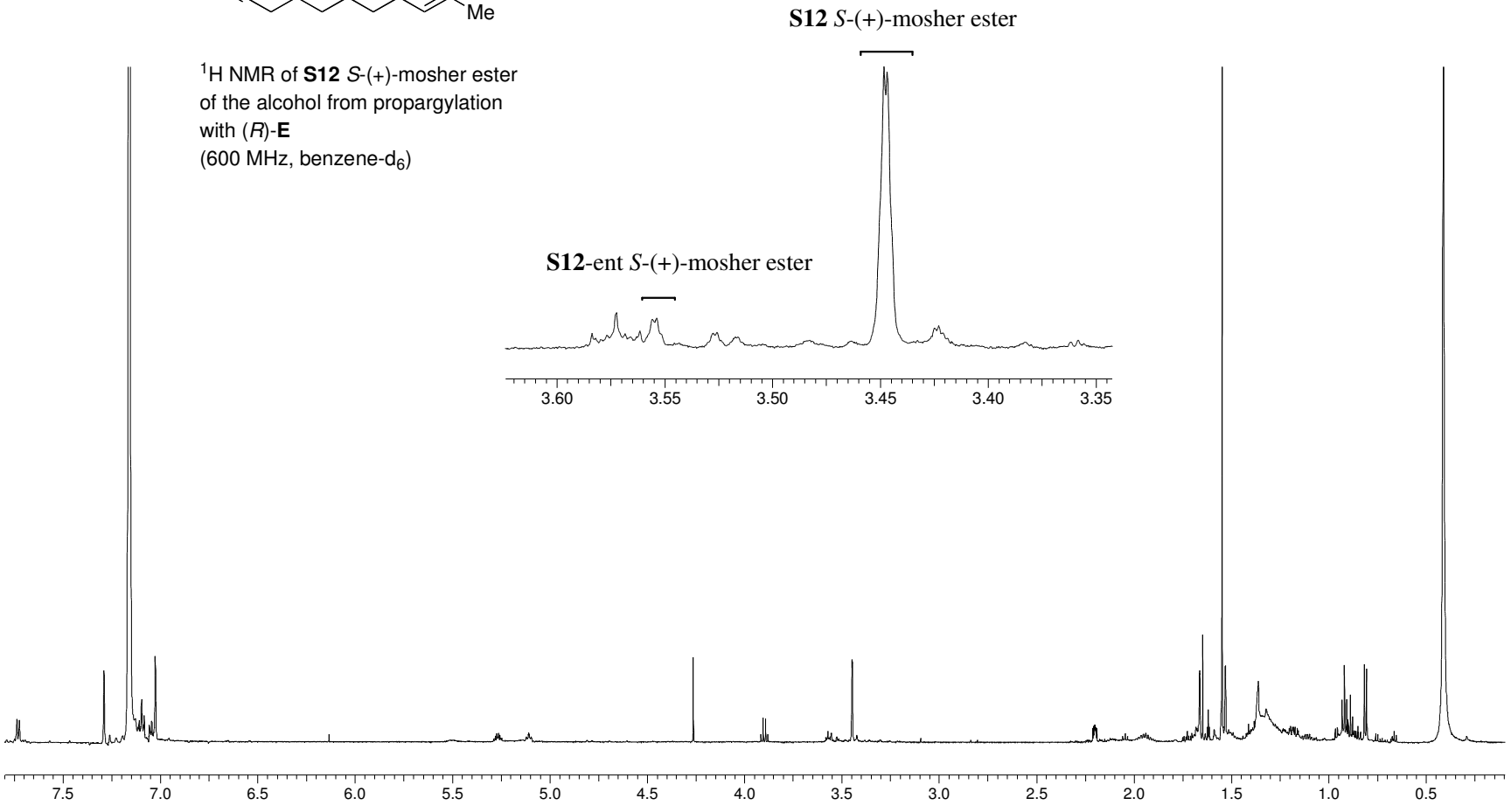


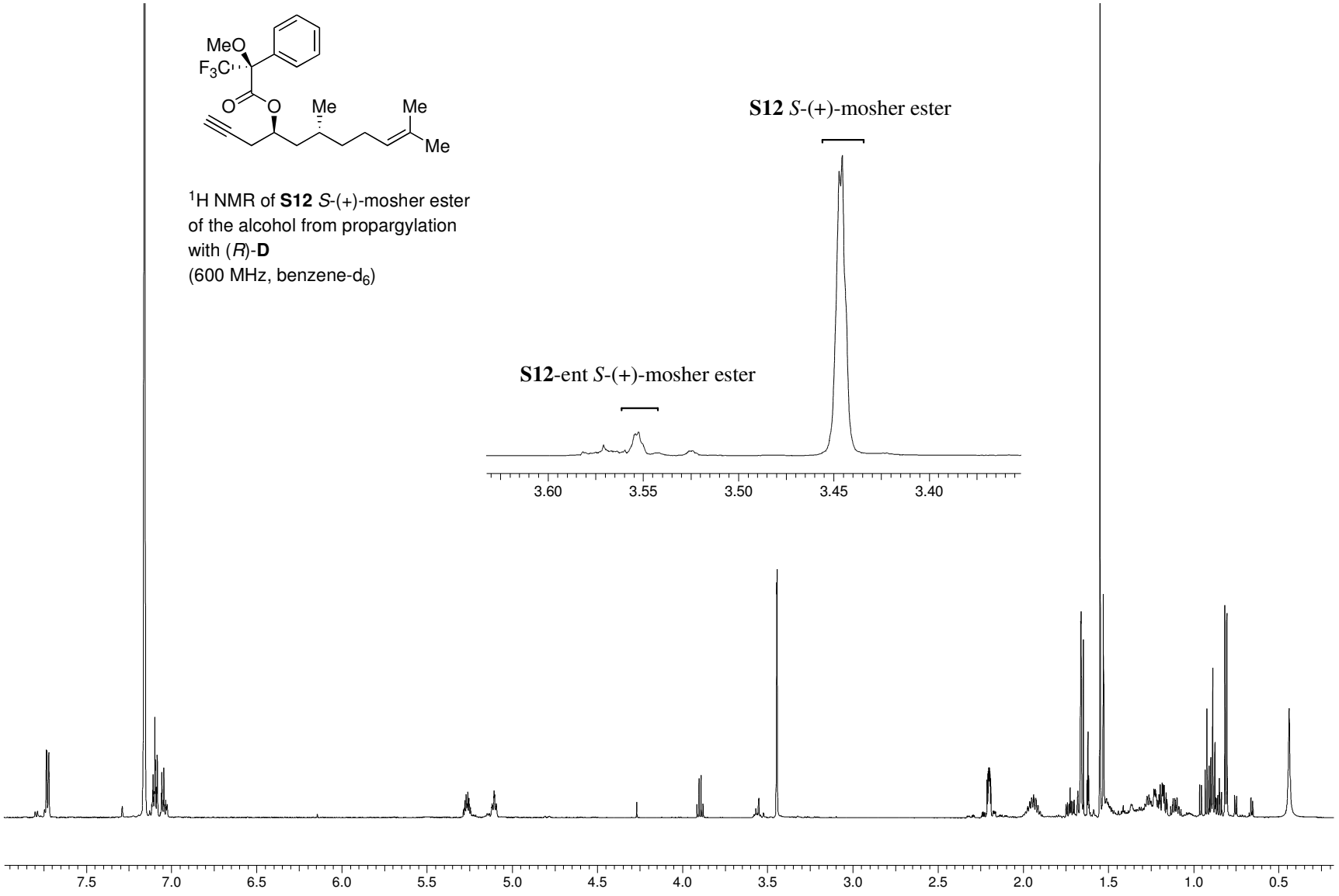
^{1}H NMR of **S11** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**E** (600 MHz, $CDCl_3$)


MeO
F3C
O
O
Me
Me
Me
1H NMR of S11 S-(+)-mosher ester of the alcohol from propargylation with (R)-D (600 MHz, CDCl3)
S11 S-(+)-mosher ester
S11-ent S-(+)-mosher ester
3.65
3.60
3.55
3.50
3.45
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

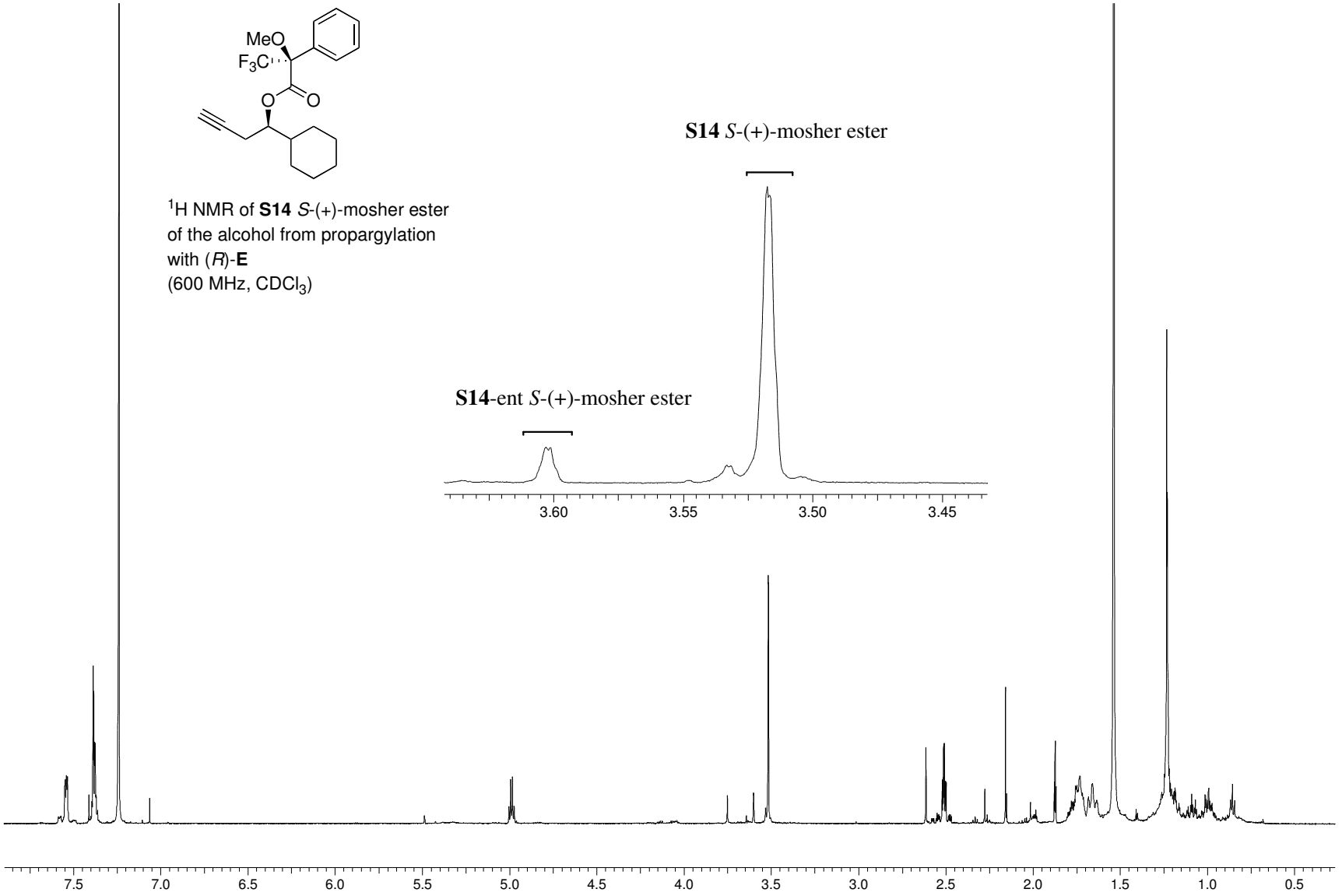


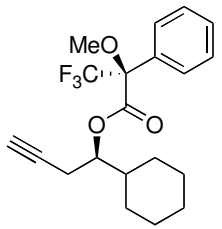
^{1}H NMR of **S12** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**E** (600 MHz, benzene-d_6)





^{1}H NMR of **S12** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**D** (600 MHz, benzene-d_6)

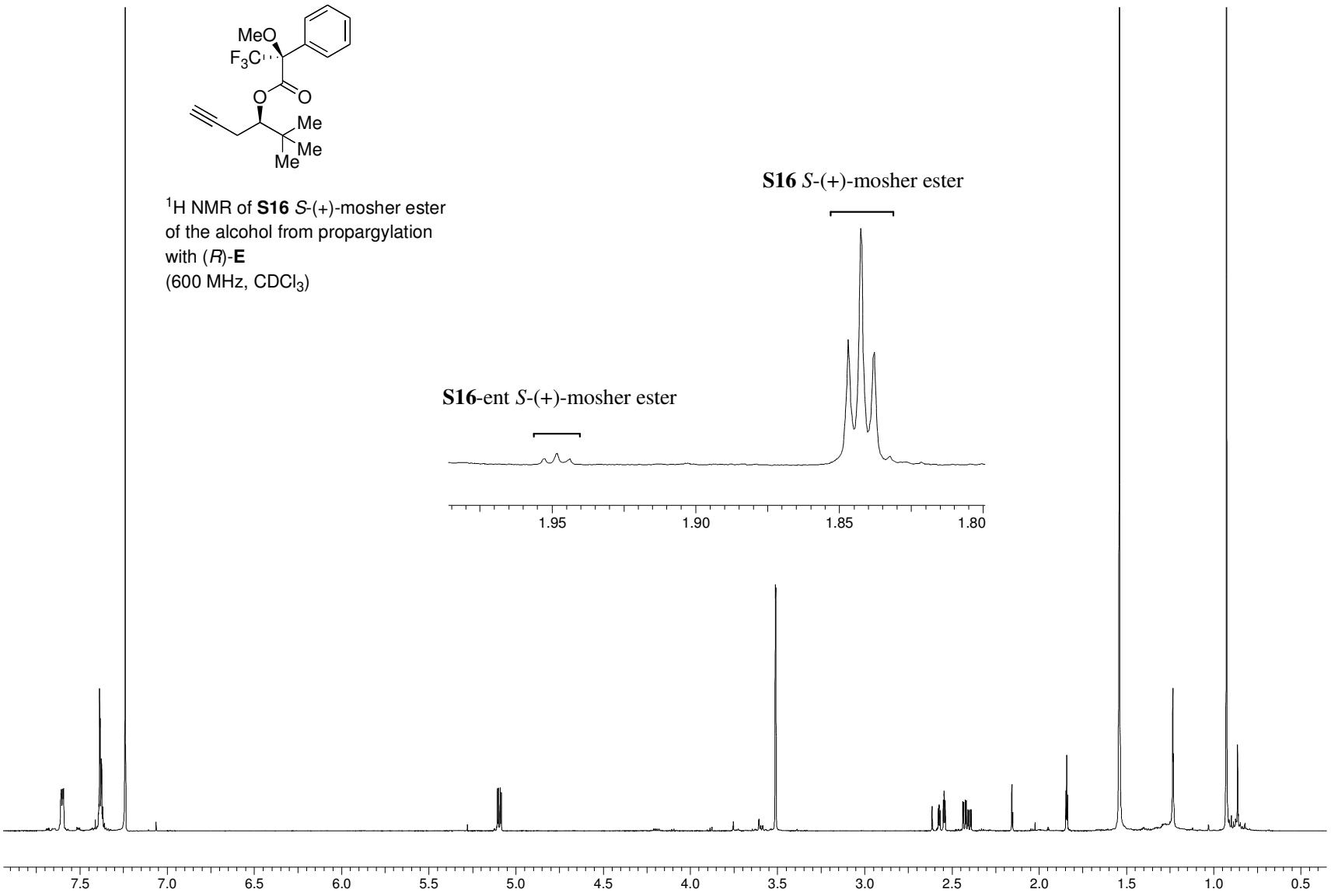

MeO
F3C
O
O
1H NMR of S14 S-(+)-mosher ester of the alcohol from propargylation with (R)-E (600 MHz, CDCl3)
S14 S-(+)-mosher ester
S14-ent S-(+)-mosher ester
3.60
3.55
3.50
3.45
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5

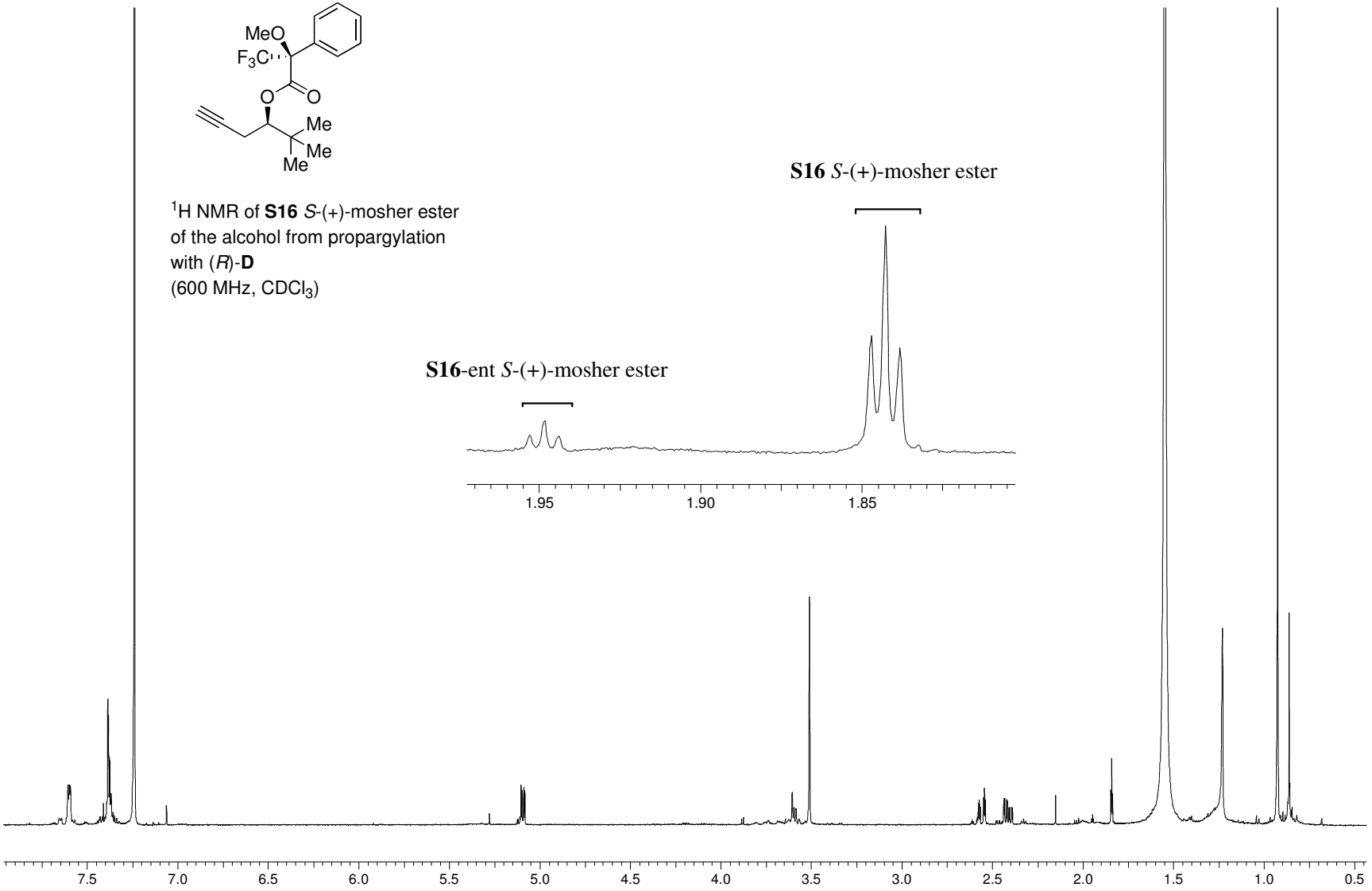


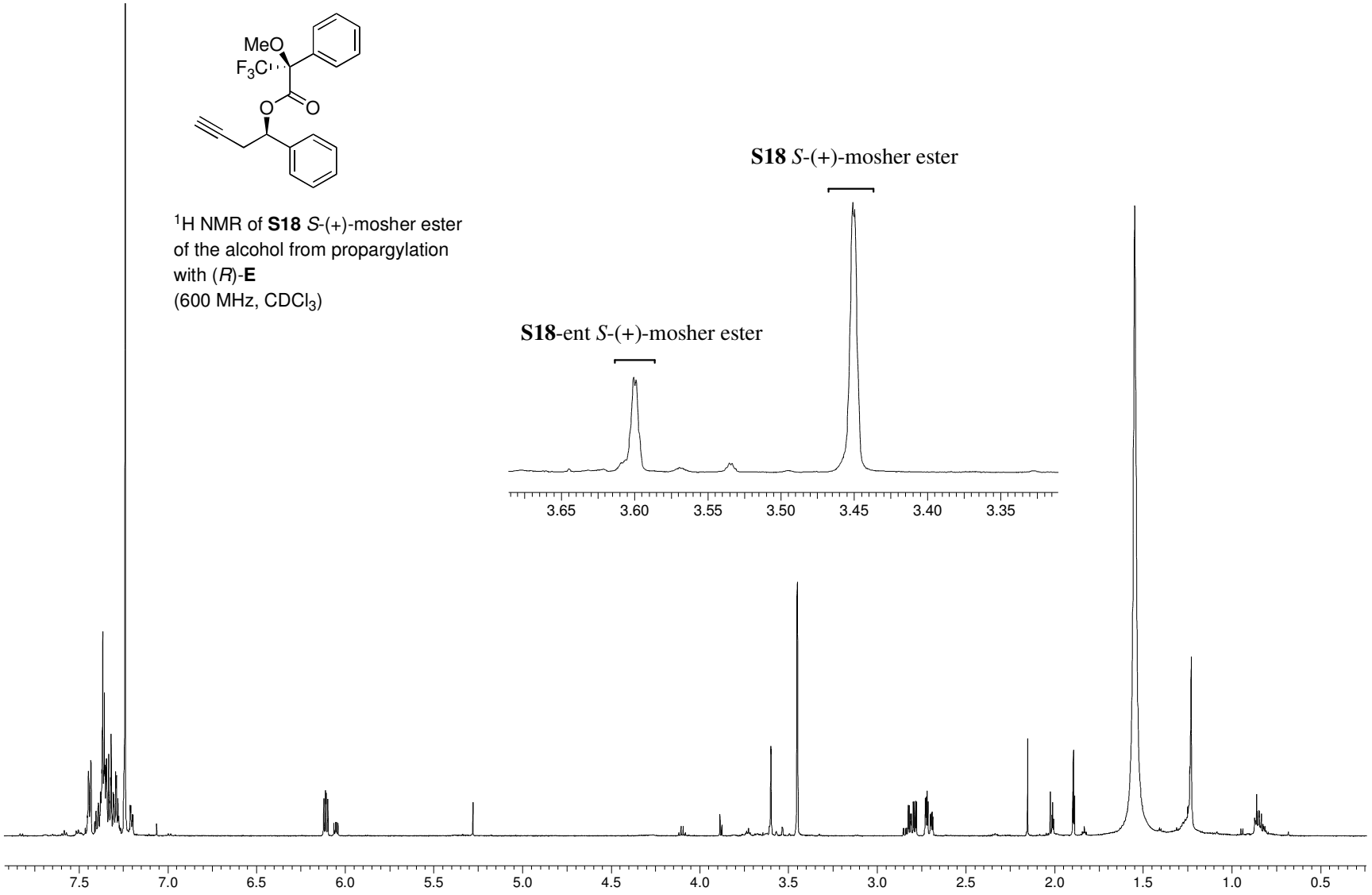
^{1}H NMR of **S14** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**D**
(600 MHz, $CDCl_3$)

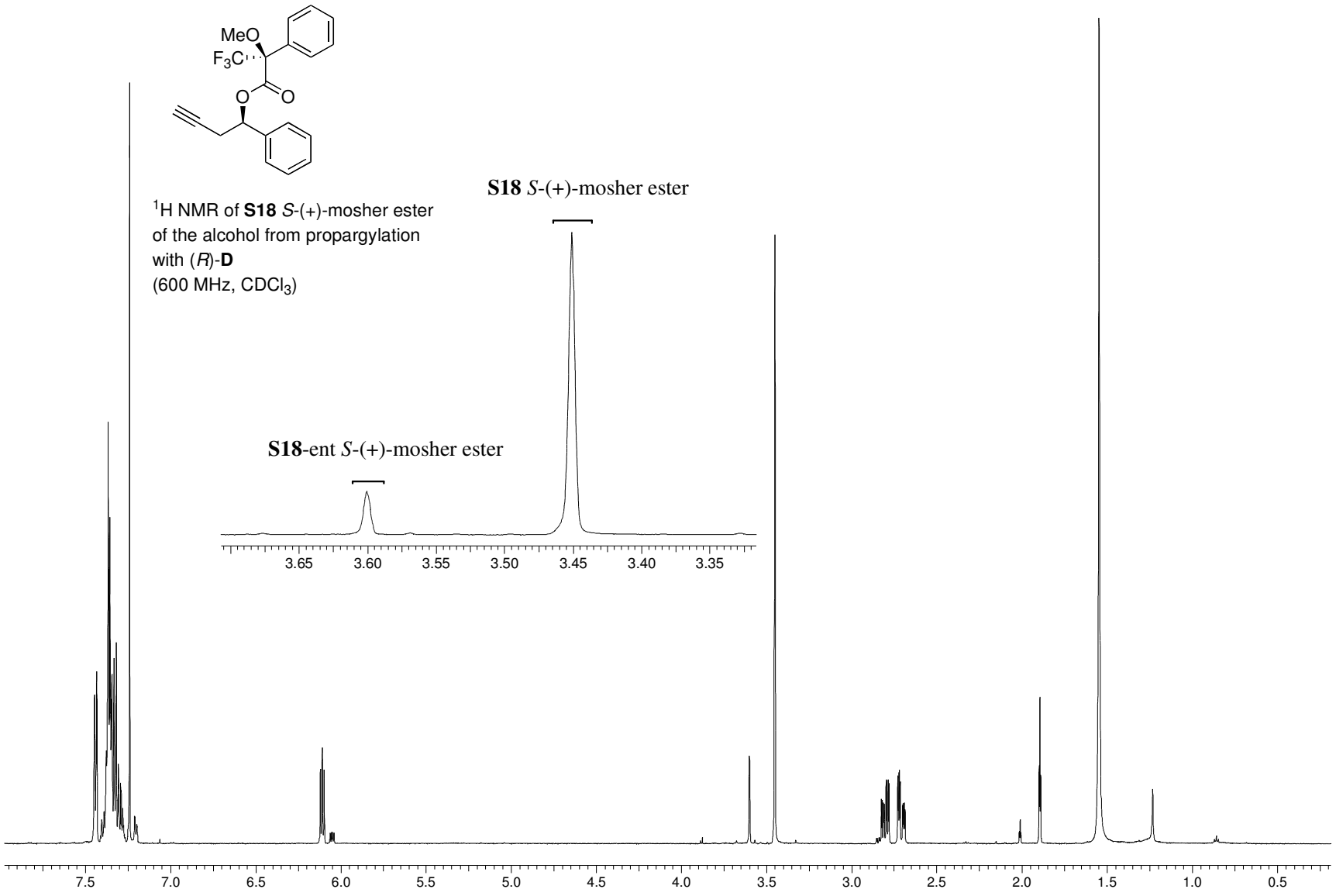
S14 *S*-(+)-mosher ester

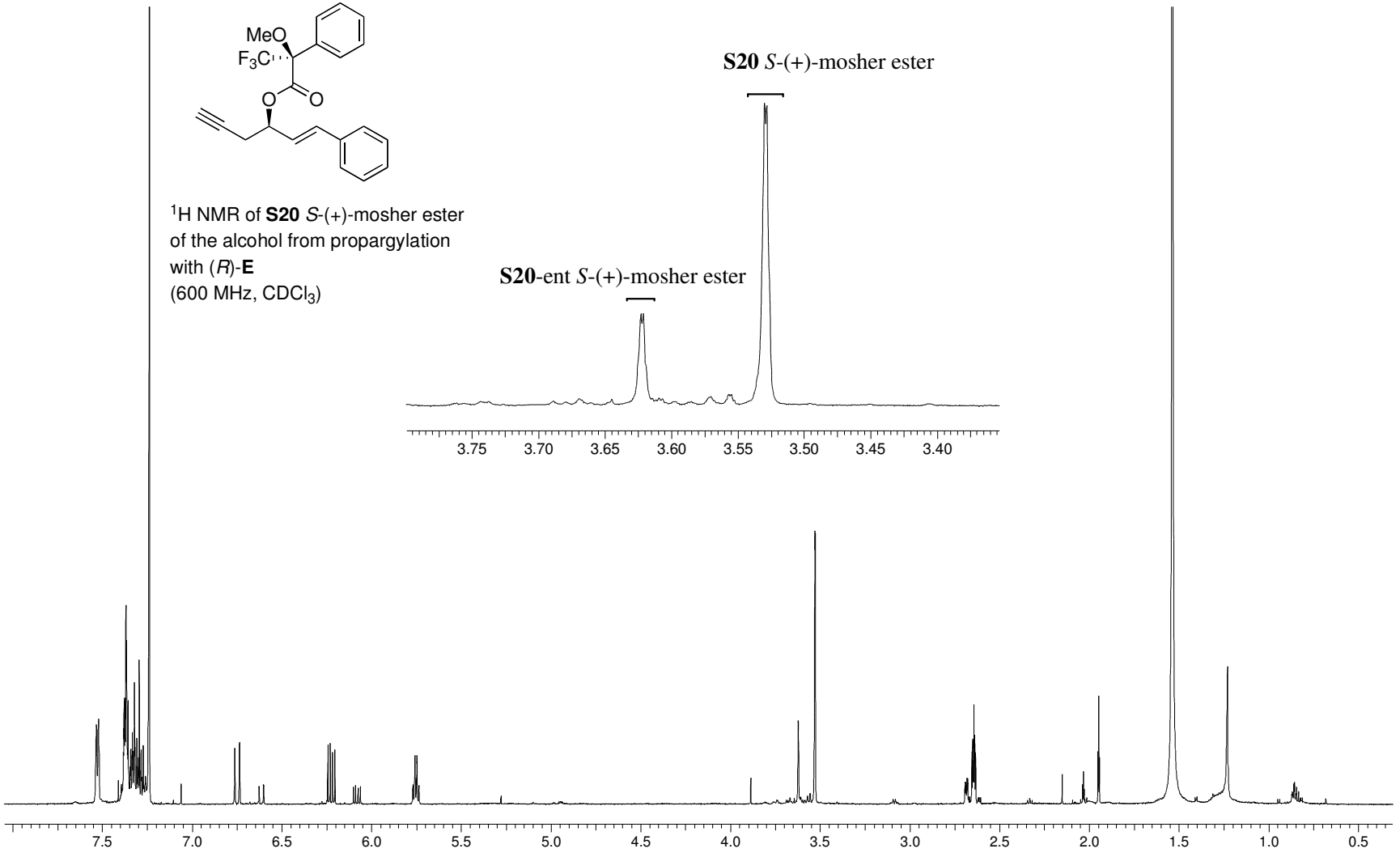
S14-ent *S*-(+)-mosher ester


MeO
F3C
O
O
Me
Me
Me
1H NMR of S16 S-(+)-mosher ester of the alcohol from propargylation with (R)-E (600 MHz, CDCl3)
S16 S-(+)-mosher ester
S16-ent S-(+)-mosher ester
1.95
1.90
1.85
1.80
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

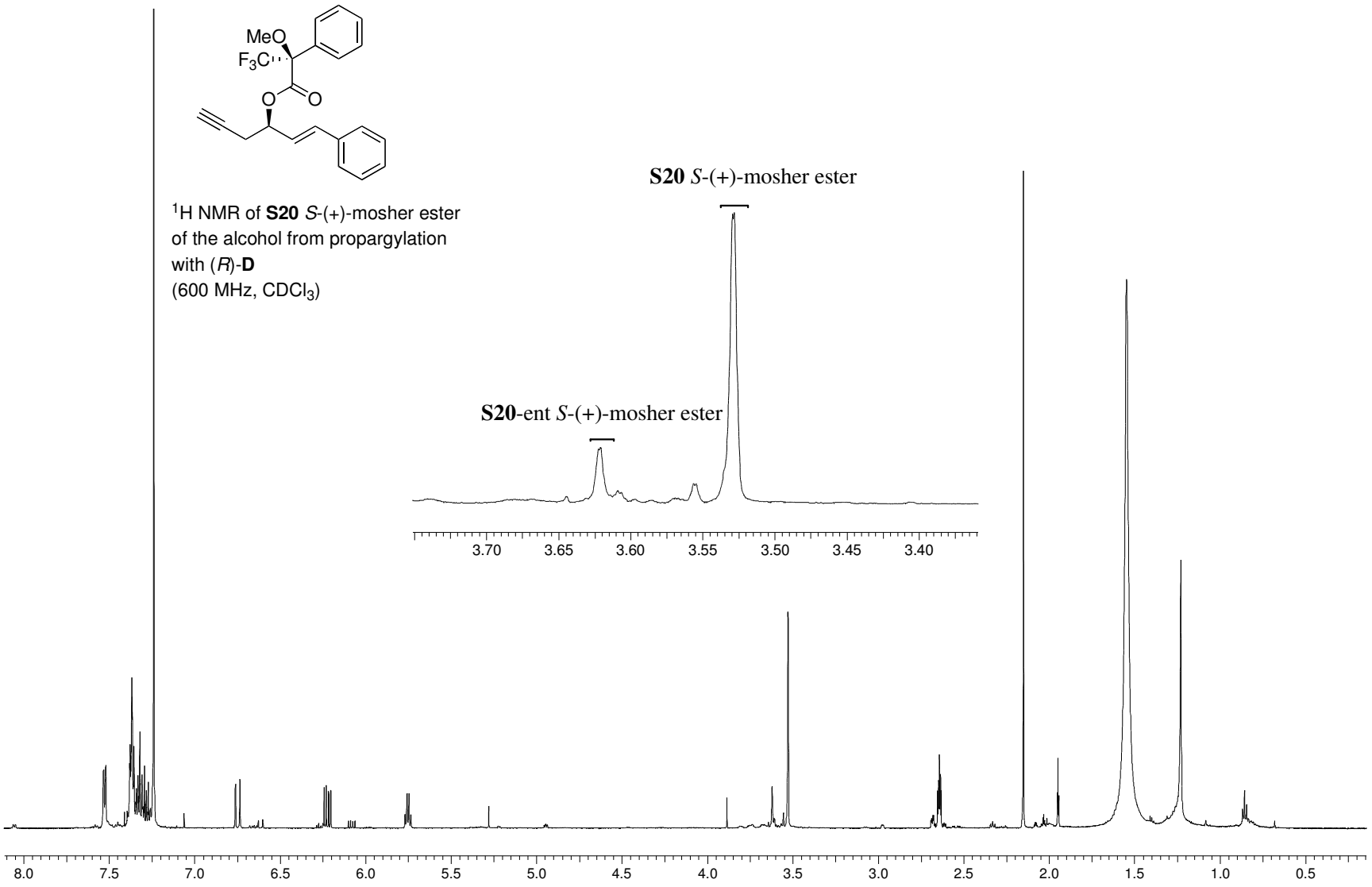

MeO
F3C
O
O
Me
Me
Me
1H NMR of S16 S-(+)-mosher ester of the alcohol from propargylation with (R)-D (600 MHz, CDCl3)
S16 S-(+)-mosher ester
S16-ent S-(+)-mosher ester
1.95
1.90
1.85
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5

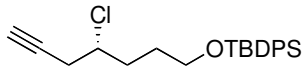

MeO
F3C
O
O
1H NMR of S18 S-(+)-mosher ester of the alcohol from propargylation with (R)-E (600 MHz, CDCl3)
S18 S-(+)-mosher ester
S18-ent S-(+)-mosher ester
3.65
3.60
3.55
3.50
3.45
3.40
3.35
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5


MeO
F3C
O
O
1H NMR of S18 S-(+)-mosher ester of the alcohol from propargylation with (R)-D (600 MHz, CDCl3)
S18 S-(+)-mosher ester
S18-ent S-(+)-mosher ester
3.65
3.60
3.55
3.50
3.45
3.40
3.35
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

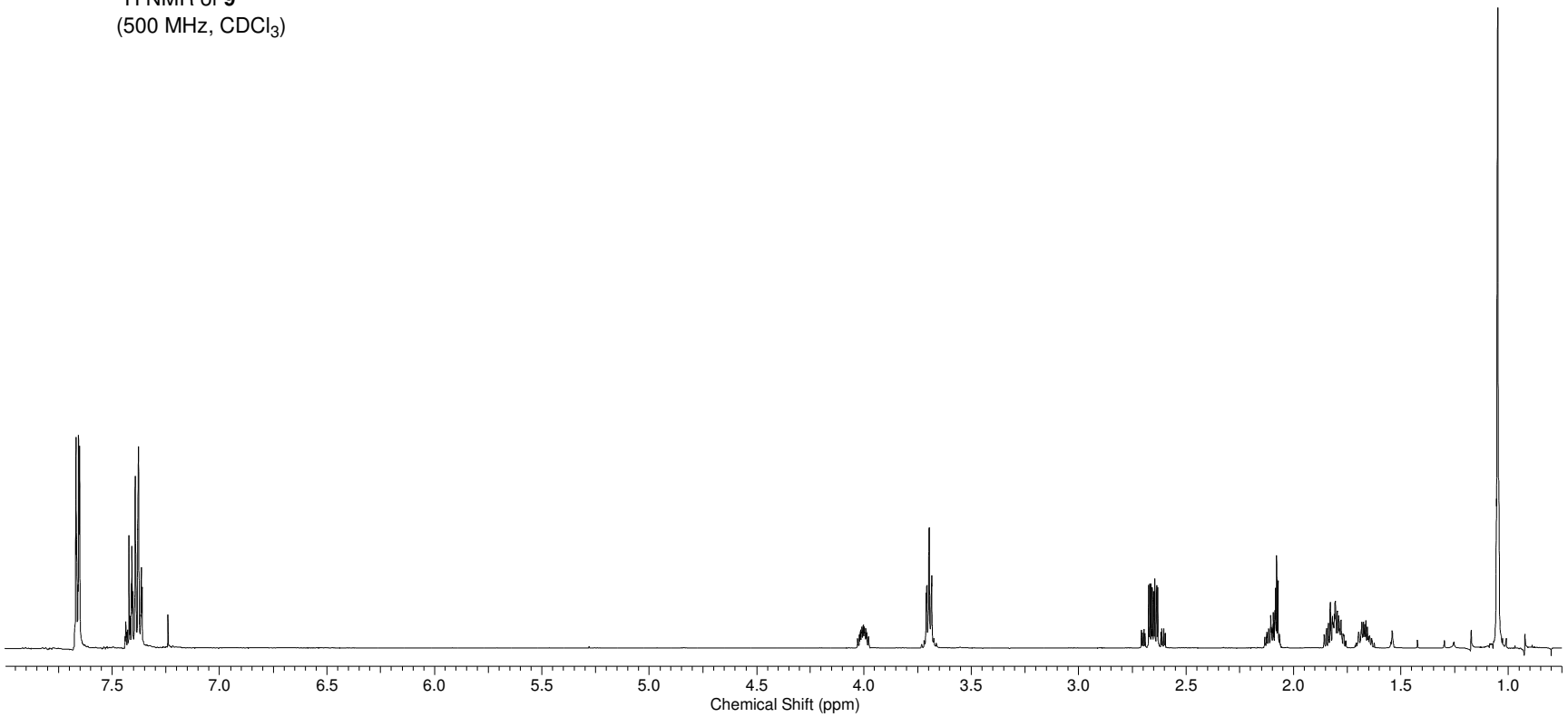


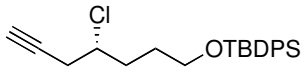
^{1}H NMR of **S20** *S*-(+)-mosher ester of the alcohol from propargylation with (*R*)-**E** (600 MHz, $CDCl_3$)


MeO
F3C
O
O
1H NMR of S20 S-(+)-mosher ester of the alcohol from propargylation with (R)-D (600 MHz, CDCl3)
S20 S-(+)-mosher ester
S20-ent S-(+)-mosher ester
3.70
3.65
3.60
3.55
3.50
3.45
3.40
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

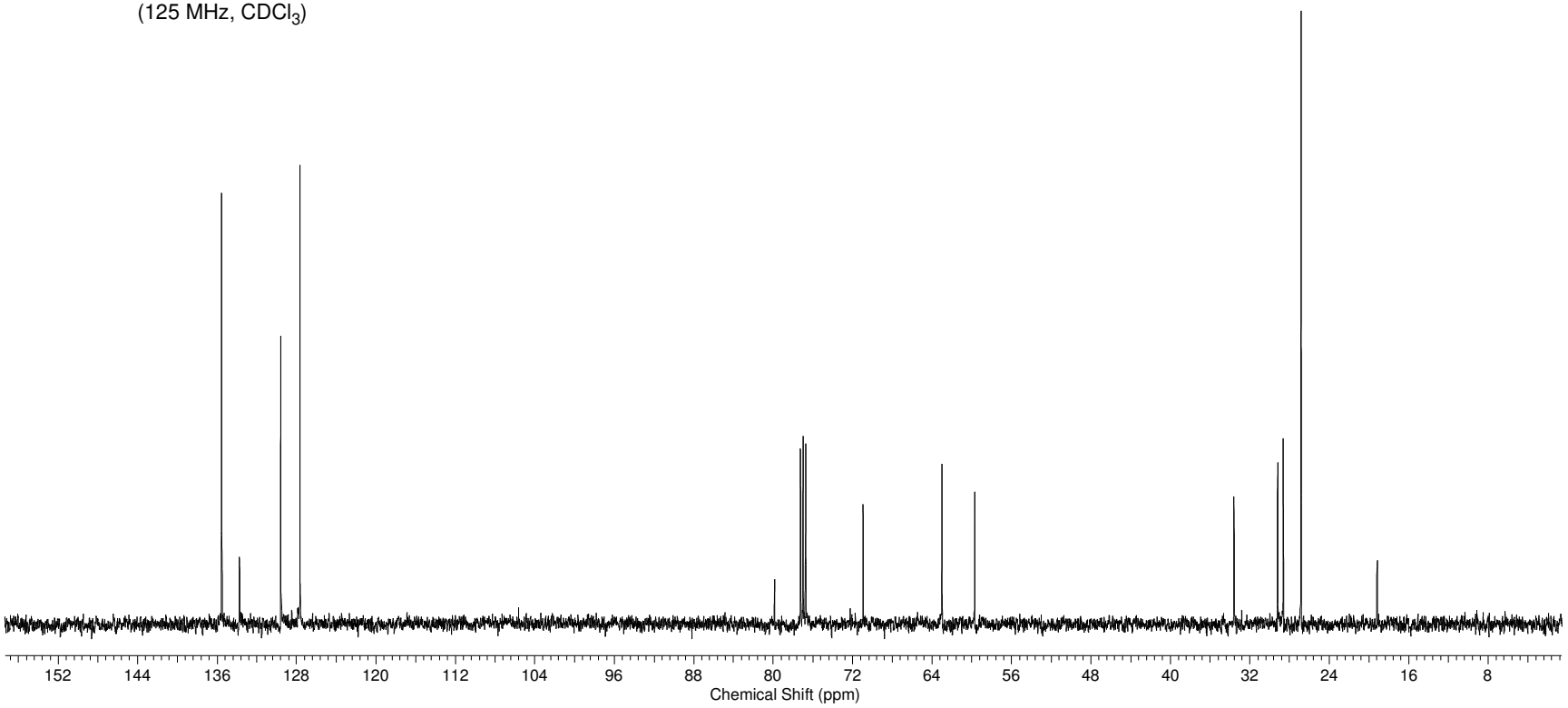


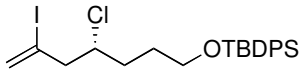
^{1}H NMR of **9**
(500 MHz, $CDCl_3$)



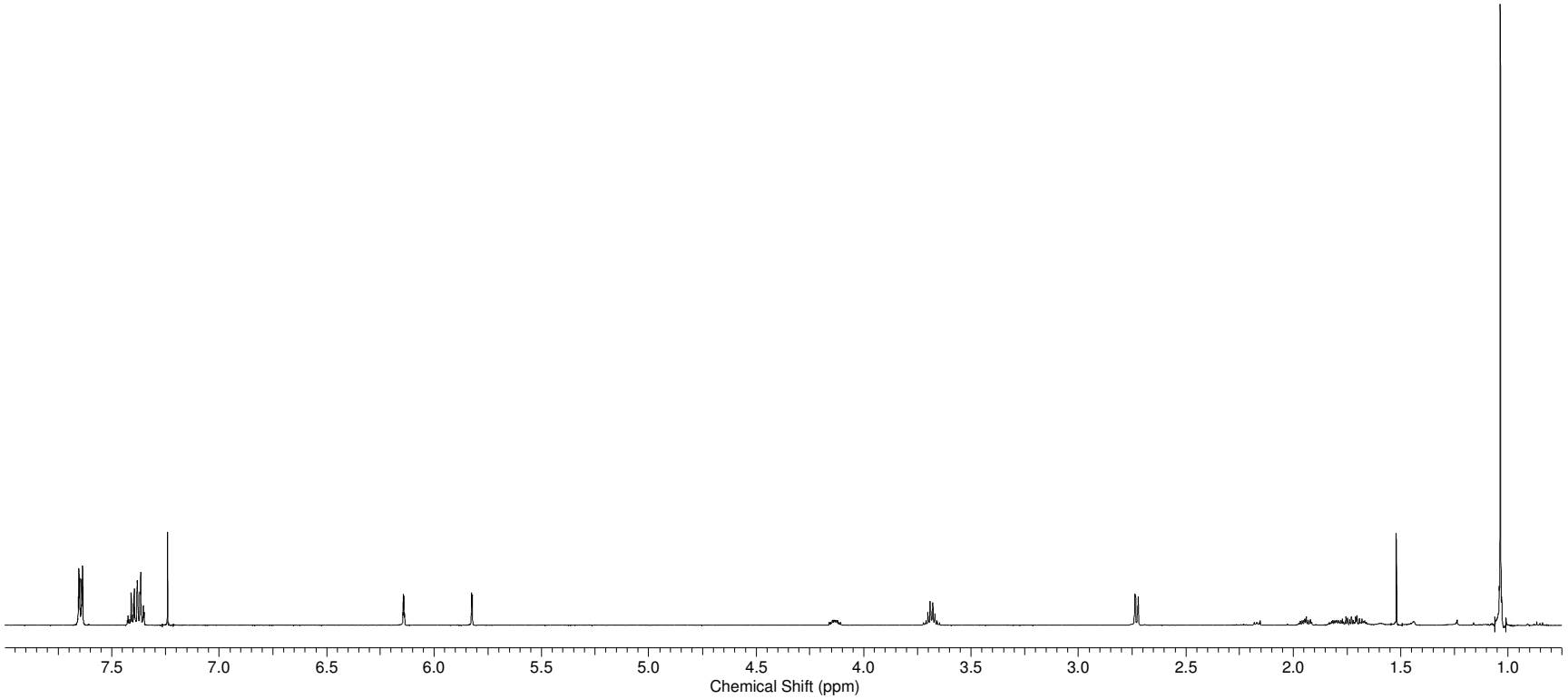


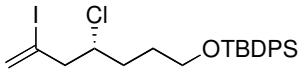
^{13}C NMR of **9**
(125 MHz, $CDCl_3$)



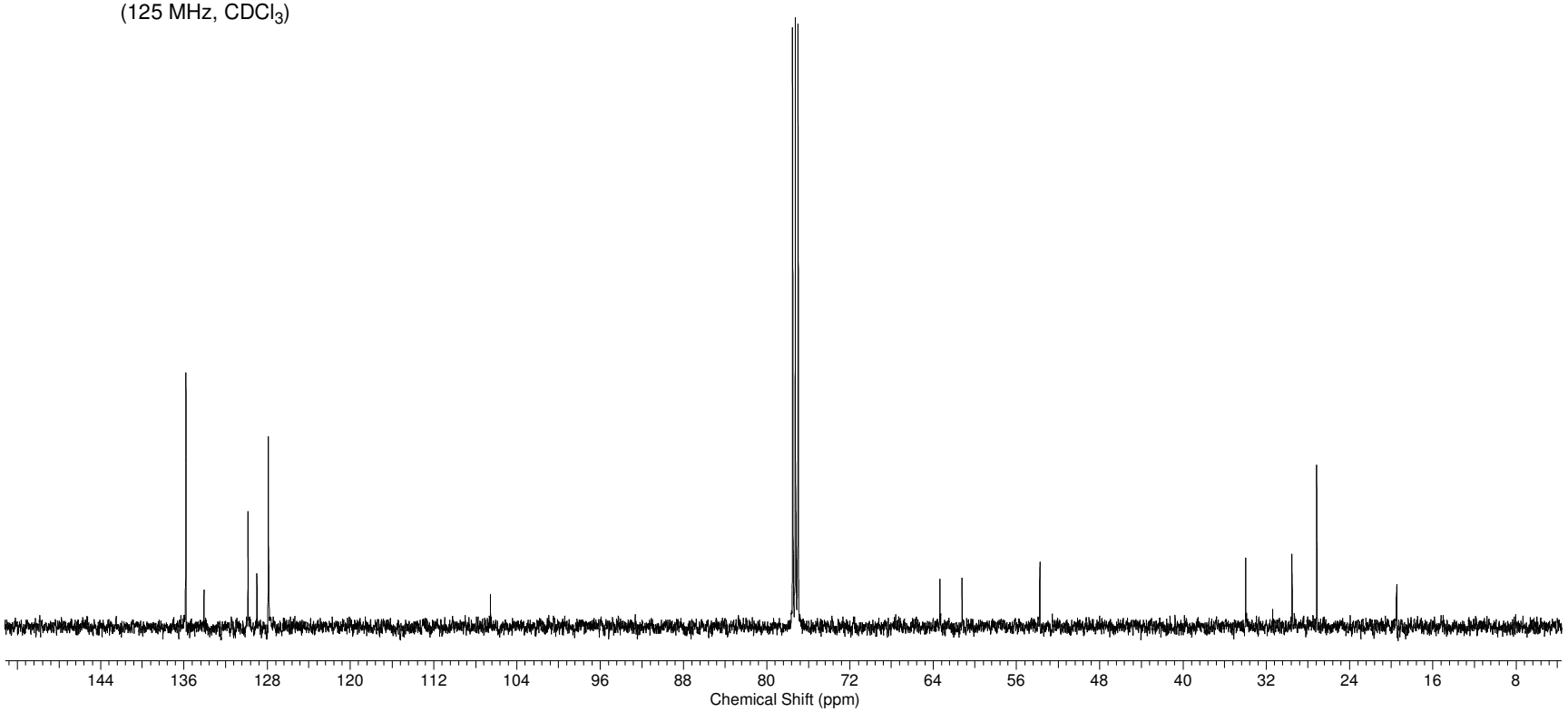


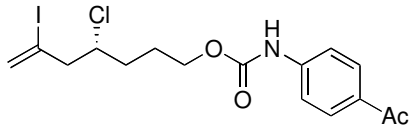
^{1}H NMR of **1b**
(500 MHz, $CDCl_3$)



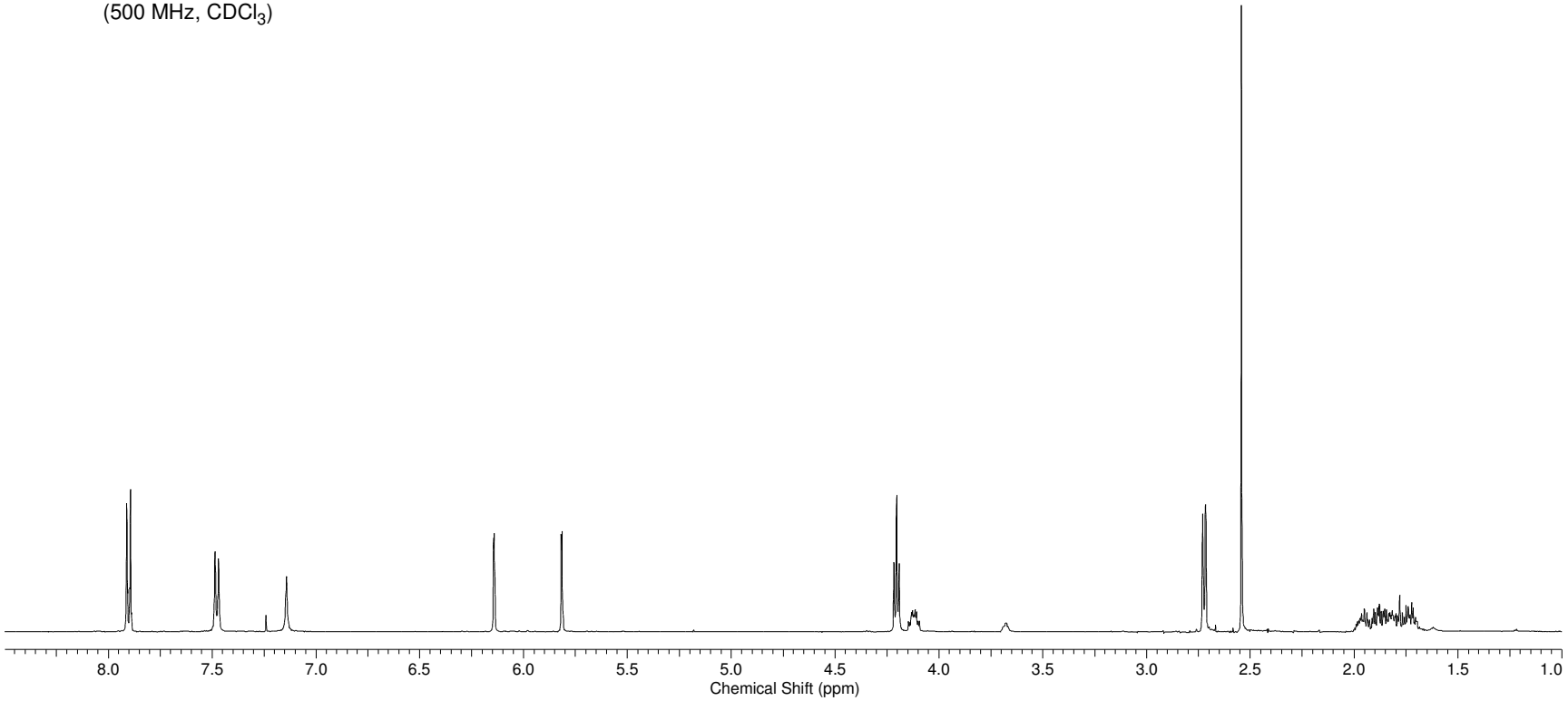


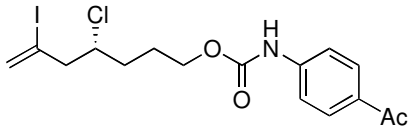
^{13}C NMR of **1b**
(125 MHz, $CDCl_3$)





^{1}H NMR of **iii**
(500 MHz, $CDCl_3$)





^{13}C NMR of **iii**
(125 MHz, $CDCl_3$)