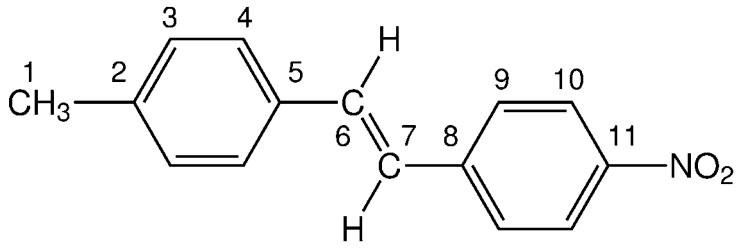
Problem 37

The ^{1}H and $^{13}C\{^{1}H\}$ NMR spectra of (*E*)-4-methyl-4'-nitrostilbene ($C_{15}H_{13}NO_2$) recorded in acetone-d_6 solution at 298 K and 500 MHz are given below.

The ^{1}H NMR spectrum has signals at δ 2.34, 7.23, 7.33, 7.48, 7.56, 7.83 and 8.22 ppm.

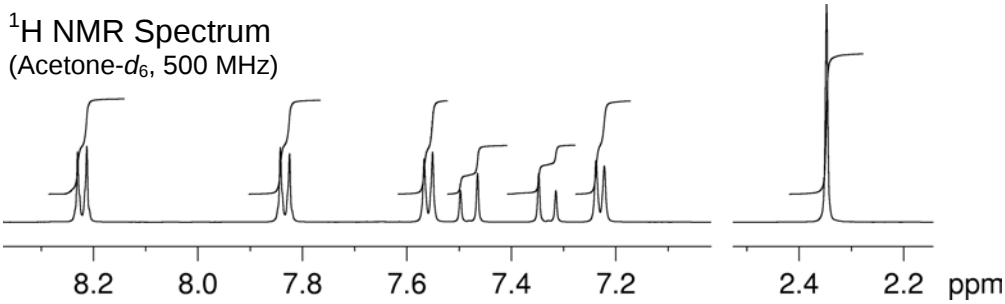
The $^{13}C\{^{1}H\}$ NMR spectrum has signals at δ 21.3, 124.8, 126.2, 127.9, 128.0, 130.3, 134.1, 134.8, 139.5, 145.3 and 147.5 ppm.

The ^{1}H–^{1}H COSY, ^{1}H–^{13}C me-HSQC and ^{1}H–^{13}C HMBC spectra are given on the following pages. Use these spectra to assign the ^{1}H and $^{13}C\{^{1}H\}$ resonances for this compound.

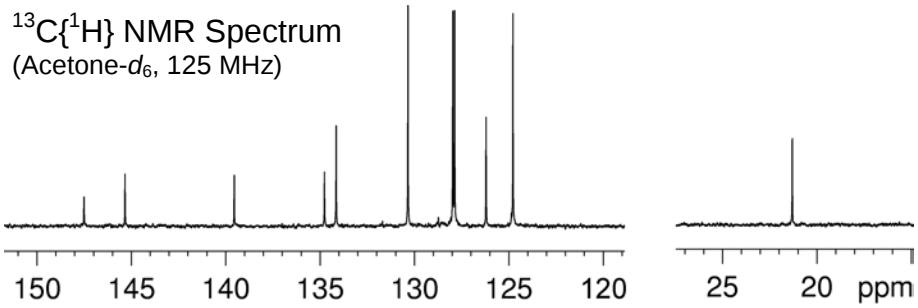


Proton	Chemical Shift (ppm)	Carbon	Chemical Shift (ppm)
H_1		C_1	
		C_2	
H_3		C_3	
H_4		C_4	
		C_5	
H_6		C_6	
H_7		C_7	
		C_8	
H_9		C_9	
H_{10}		C_{10}	
		C_{11}	

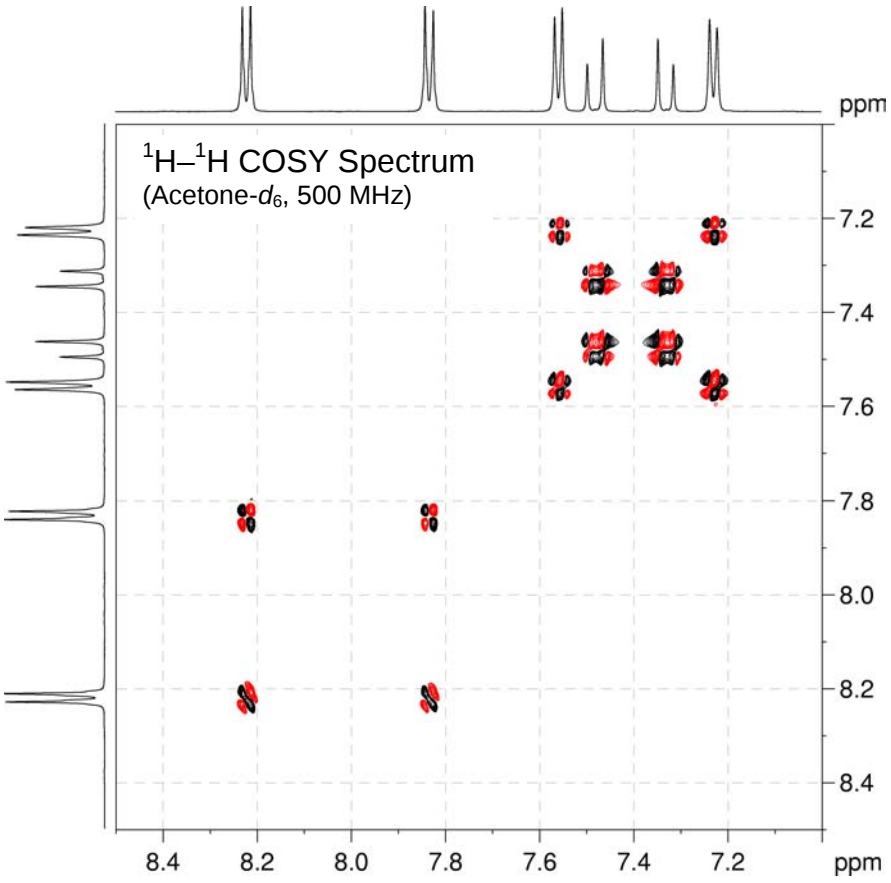
^{1}H NMR Spectrum
(Acetone-d_6, 500 MHz)

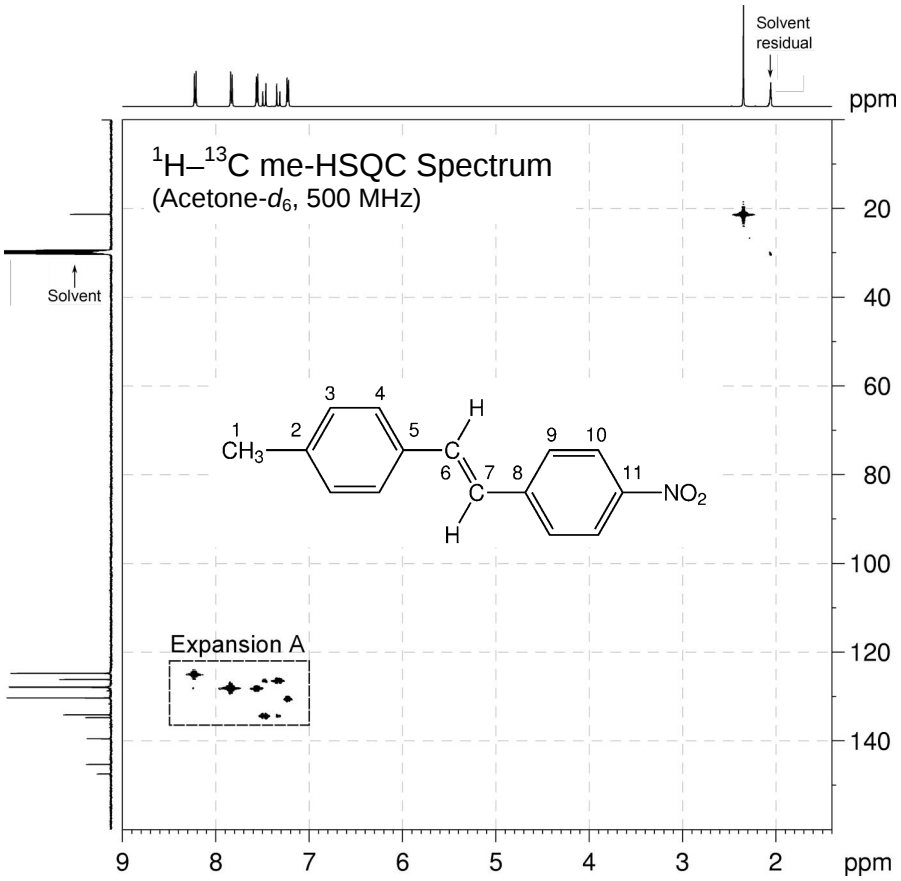


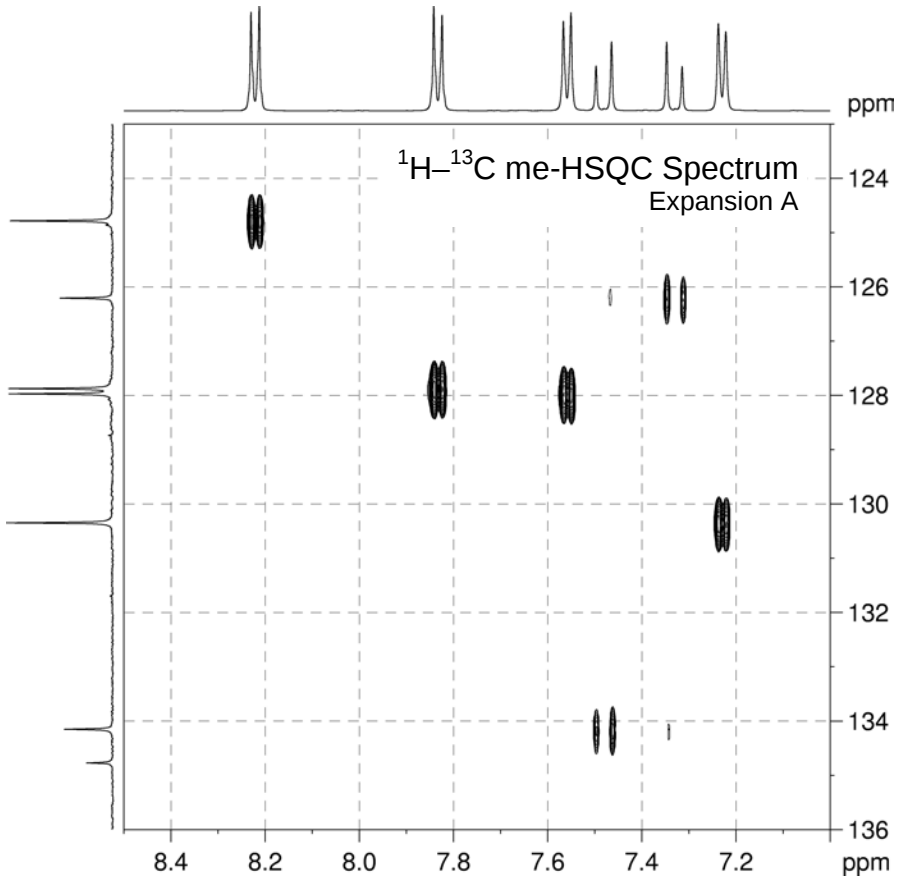
^{13}C{^{1}H} NMR Spectrum
(Acetone-d_6, 125 MHz)

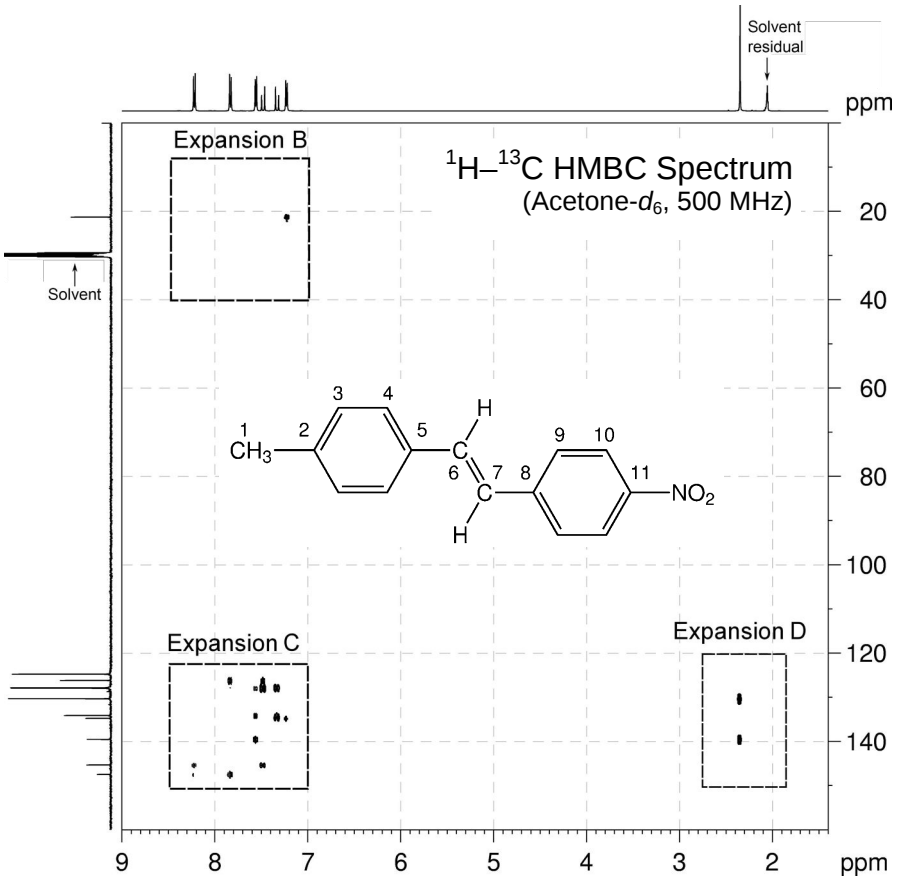


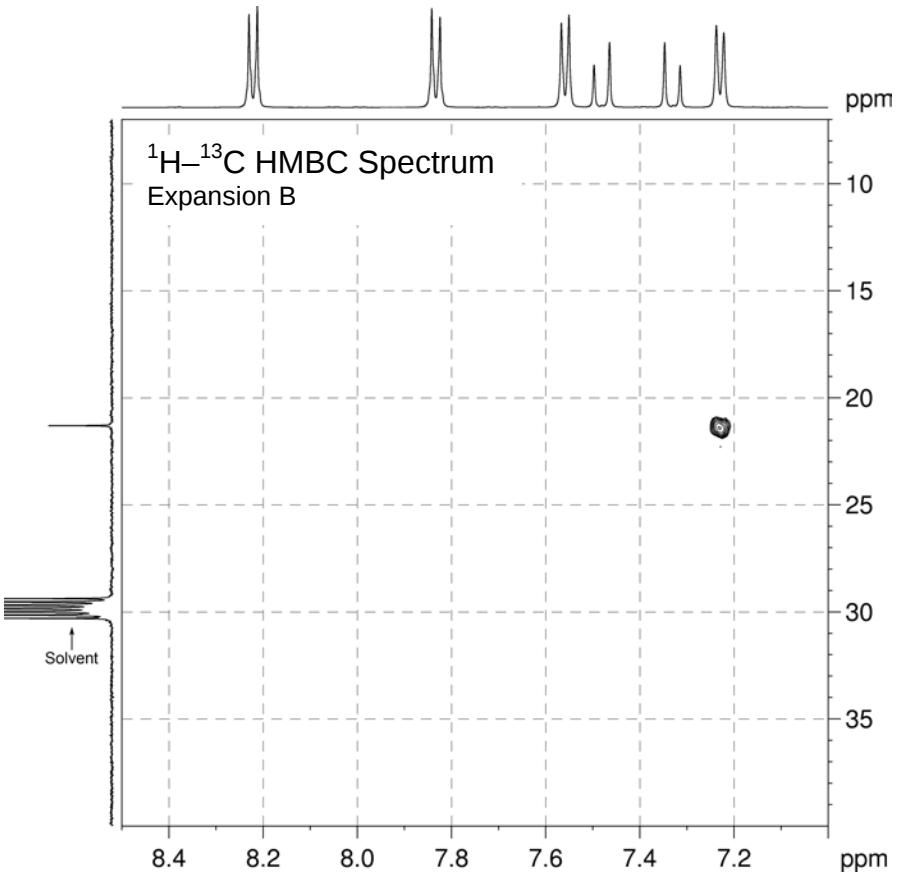
^{1}H–^{1}H COSY Spectrum
(Acetone-d_6, 500 MHz)

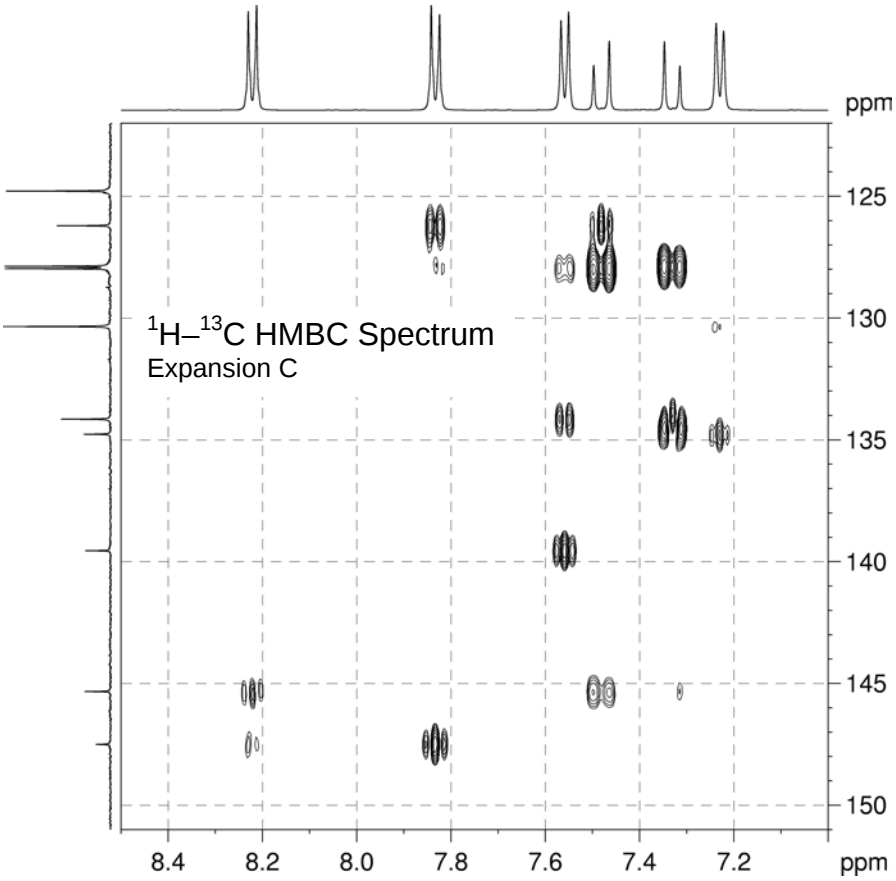



Solvent residual
ppm
^{1}H–^{13}C me-HSQC Spectrum
(Acetone-d_6, 500 MHz)
Solvent
Expansion A
20
40
60
80
100
120
140
9
8
7
6
5
4
3
2
ppm

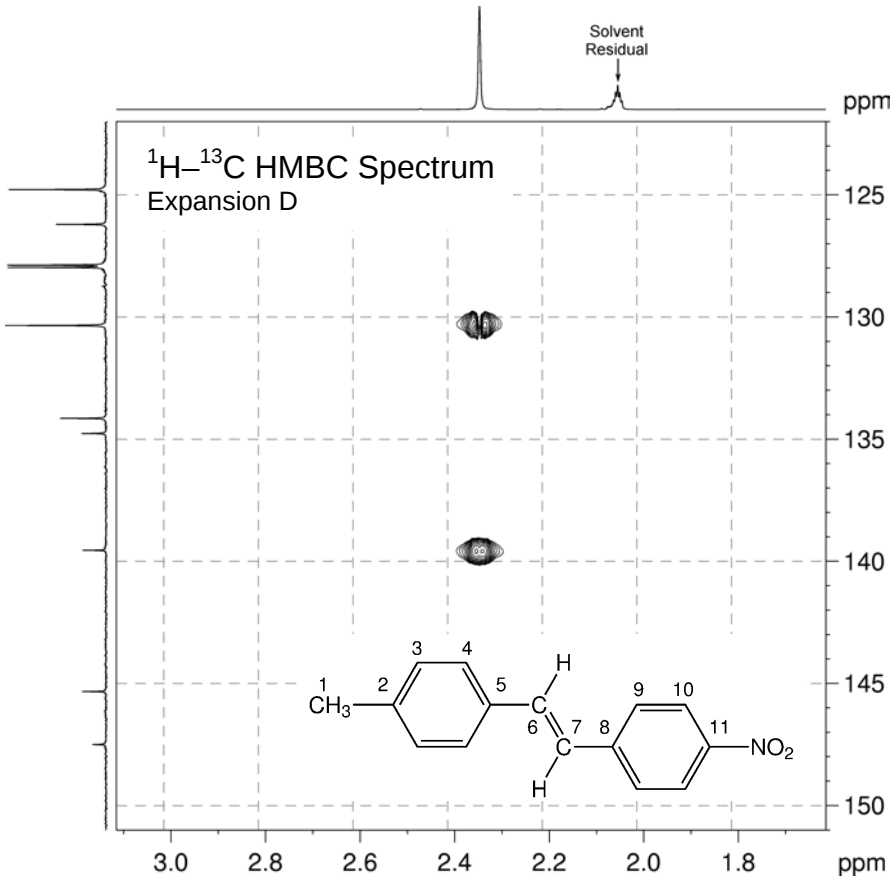

ppm
^{1}H–^{13}C me-HSQC Spectrum
Expansion A
124
126
128
130
132
134
136
8.4
8.2
8.0
7.8
7.6
7.4
7.2
ppm


Solvent residual
ppm
Expansion B
^{1}H–^{13}C HMBC Spectrum
(Acetone-d_6, 500 MHz)
Solvent
20
40
60
80
100
120
140
Expansion C
Expansion D
9
8
7
6
5
4
3
2
ppm


ppm
^{1}H–^{13}C HMBC Spectrum
Expansion B
10
15
20
25
30
35
Solvent
8.4
8.2
8.0
7.8
7.6
7.4
7.2
ppm



$^{1}H–^{13}C$ HMBC Spectrum
Expansion C



$^{1}H–^{13}C$ HMBC Spectrum
Expansion D