

Supporting Information File 2

for

Continuous gas/liquid–liquid/liquid flow synthesis of 4-fluoropyrazole derivatives by selective direct fluorination

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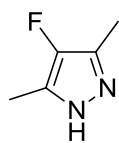
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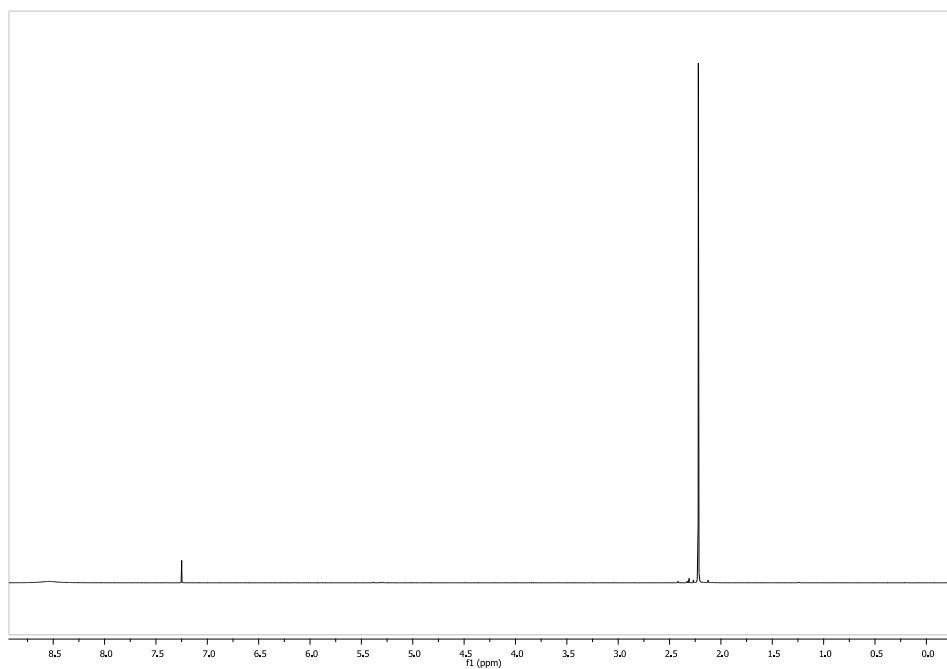
*Corresponding author

NMR spectra

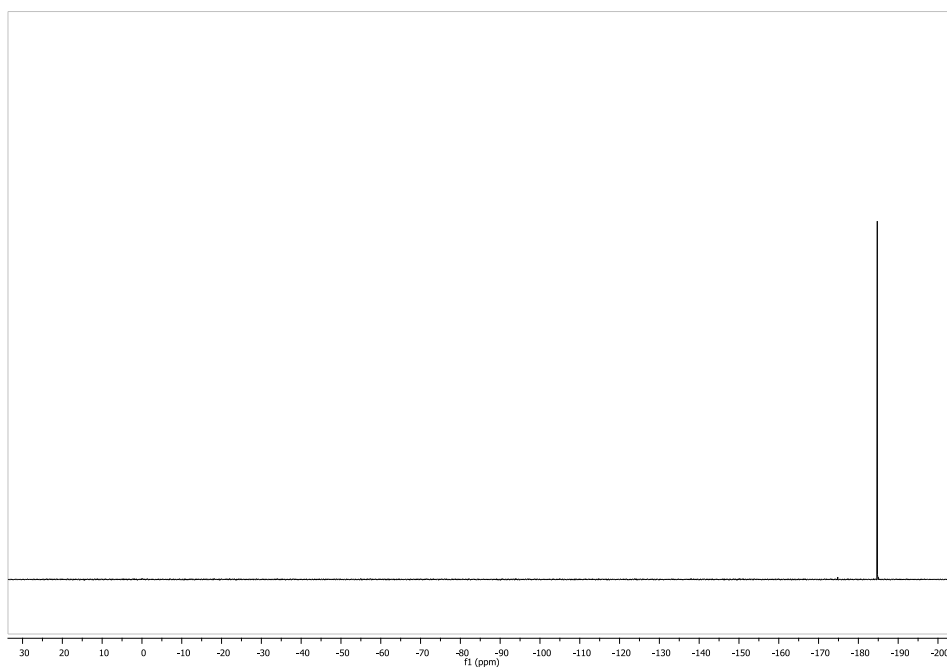
4-Fluoro-3,5-dimethyl-1H-pyrazole (4a)



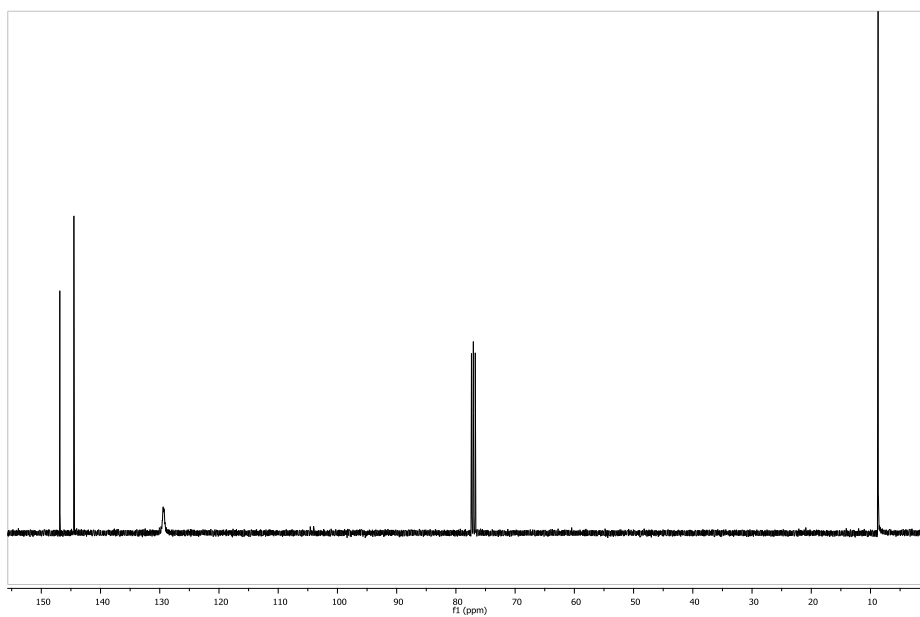
^1H NMR (700 MHz, CDCl_3 , Me_4Si)



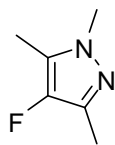
^{19}F NMR (658 MHz, CDCl_3)



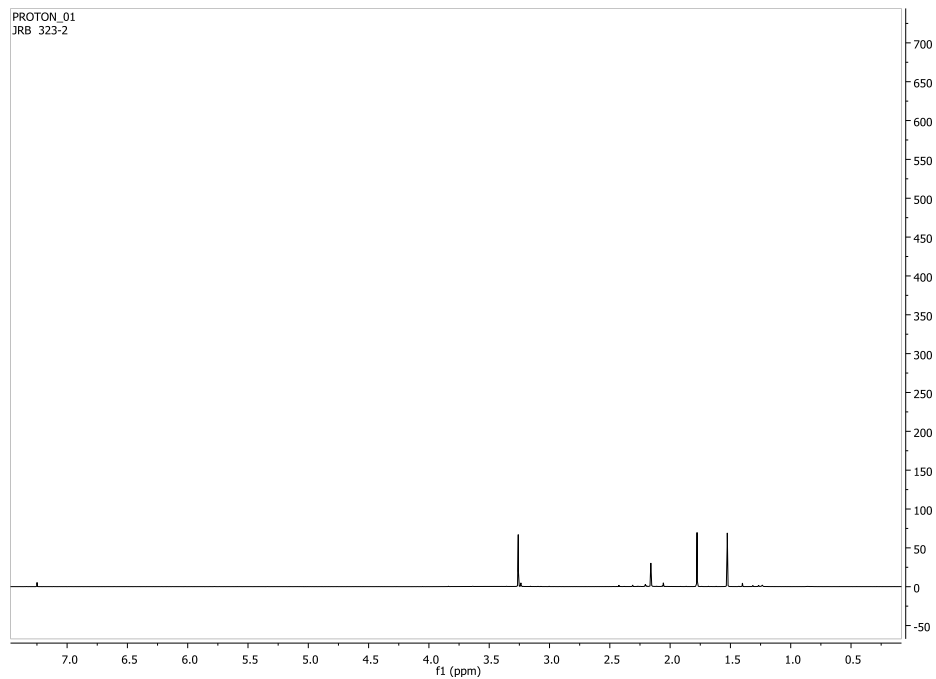
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



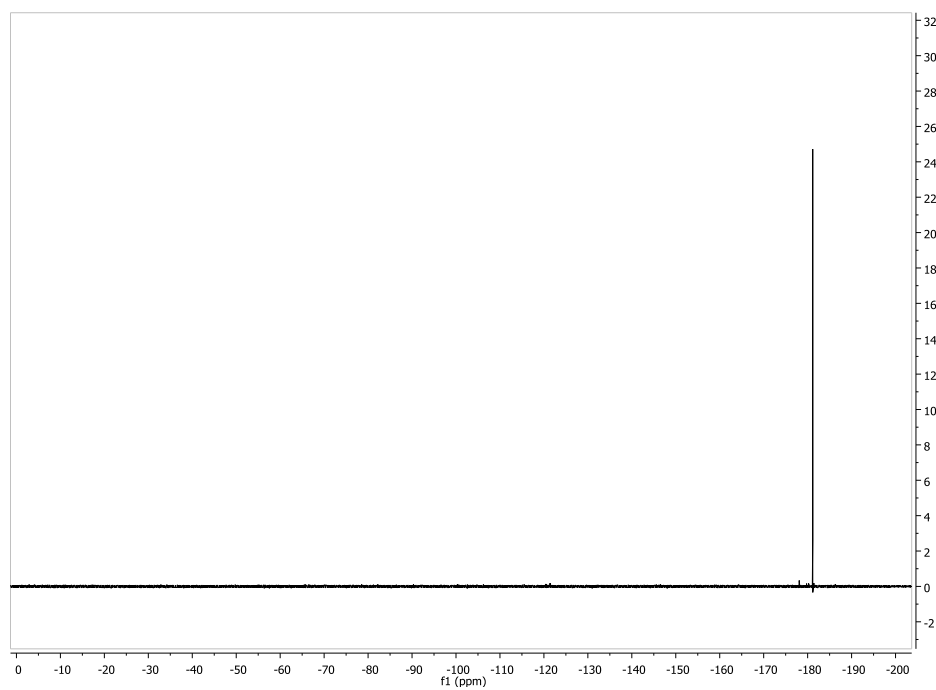
4-Fluoro-1,3,5-trimethyl-1H-pyrazole (4b)



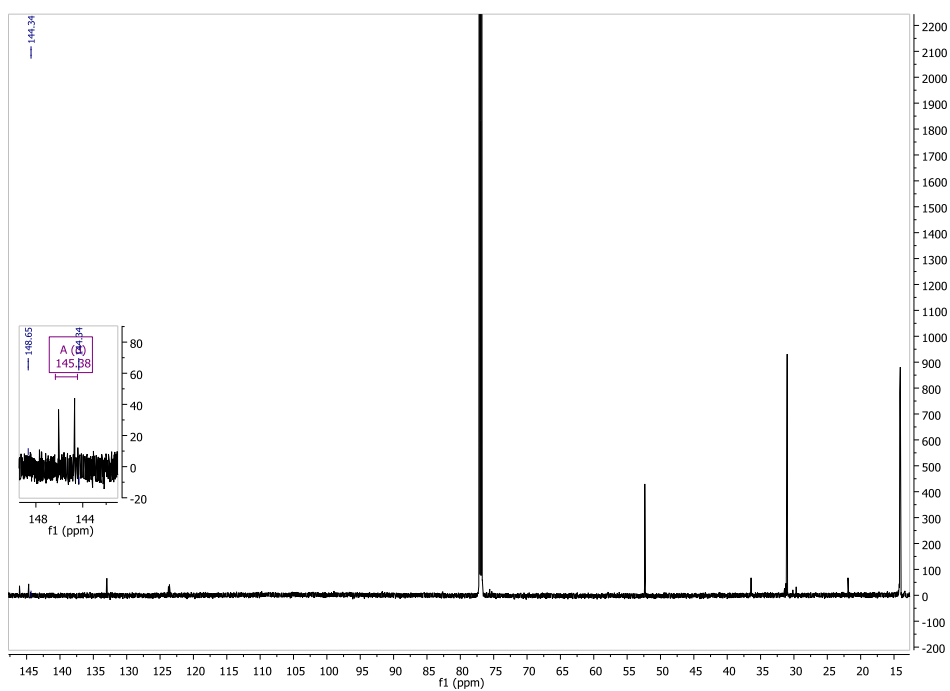
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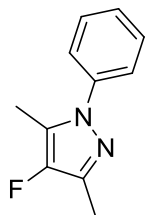
^{19}F NMR (658 MHz, CDCl_3 , CFCl_3)



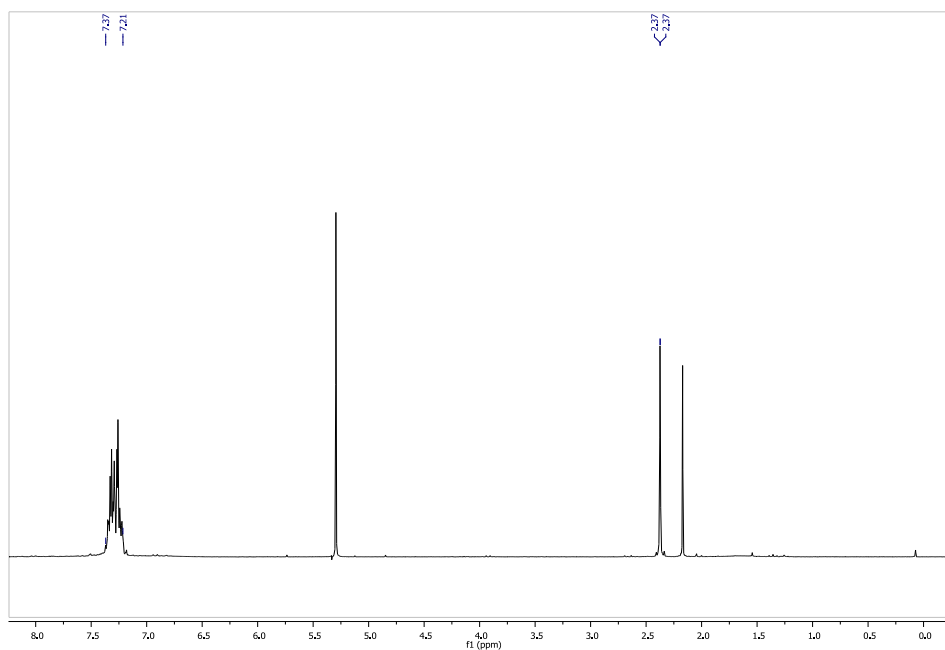
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



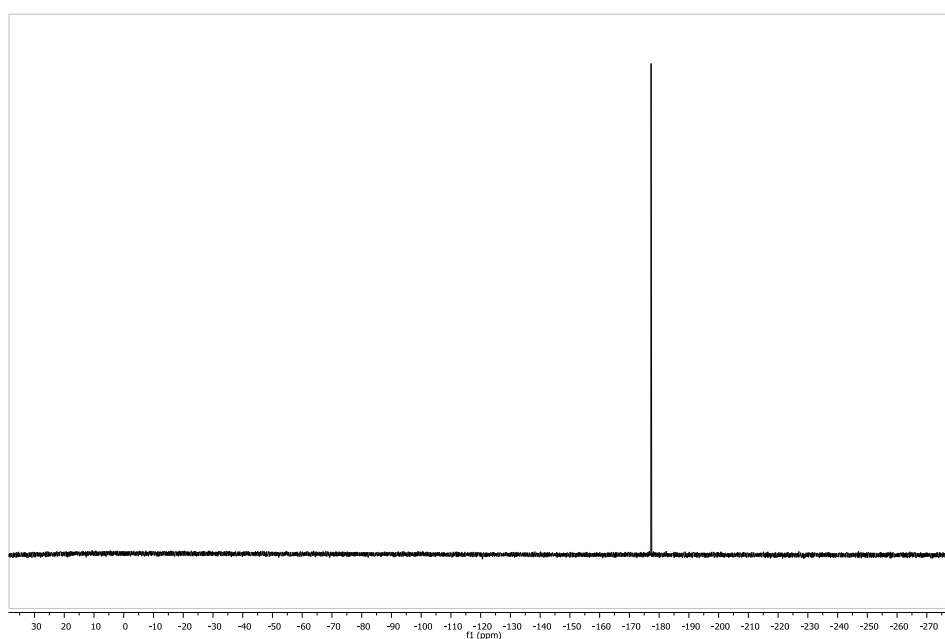
4-Fluoro-3,5-dimethyl-1-phenyl-1H-pyrazole (4c)



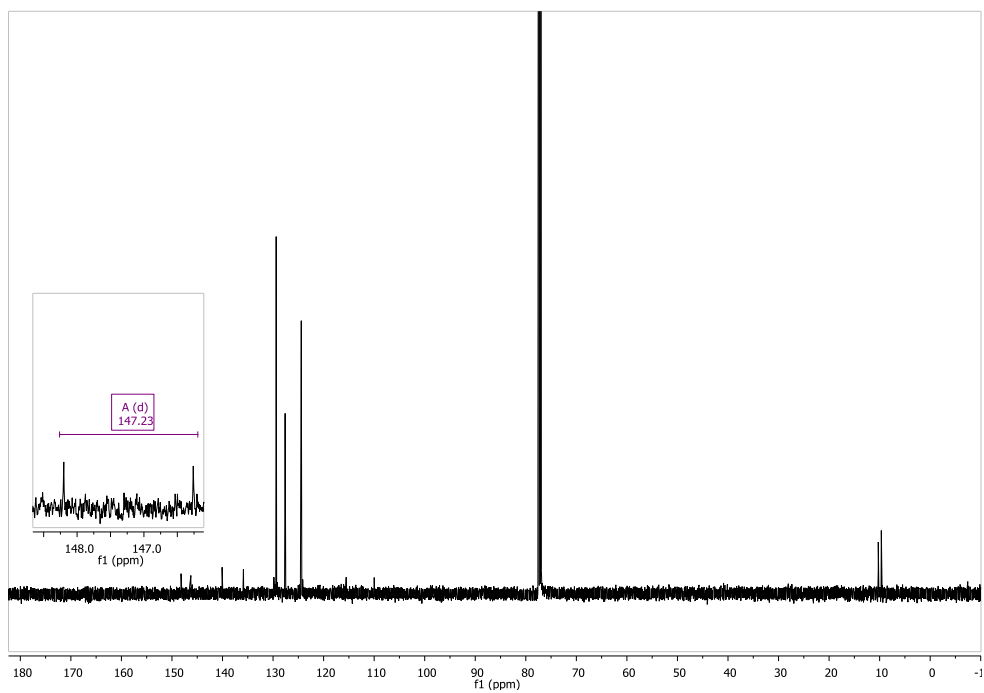
^1H NMR (700 MHz, CDCl_3 , Me_4Si)



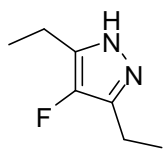
^{19}F NMR (658 MHz, CDCl_3 , CFCl_3)



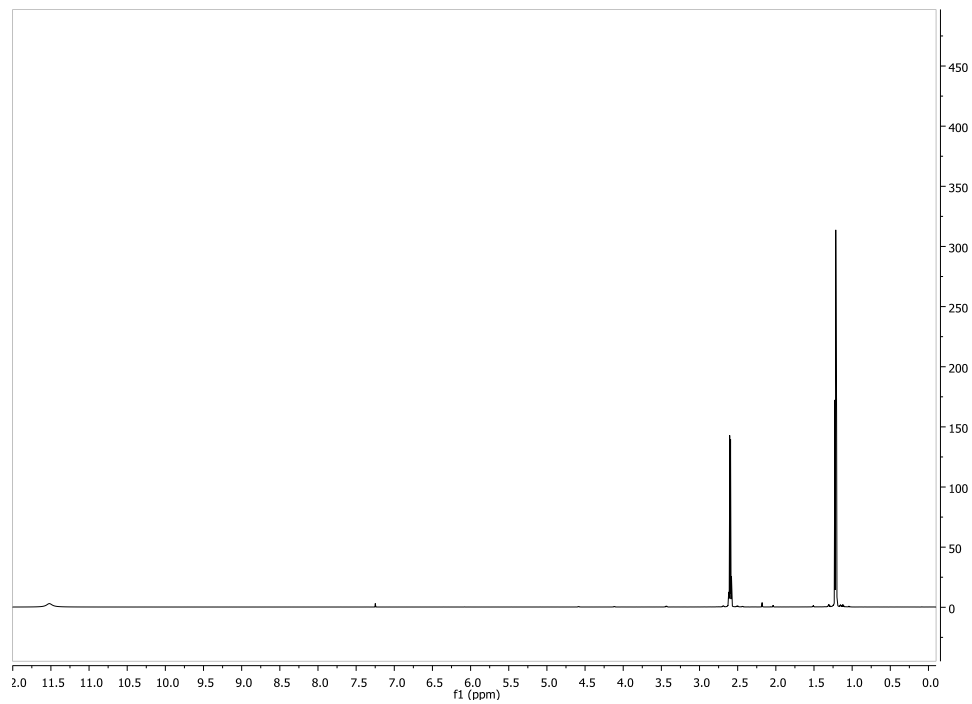
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



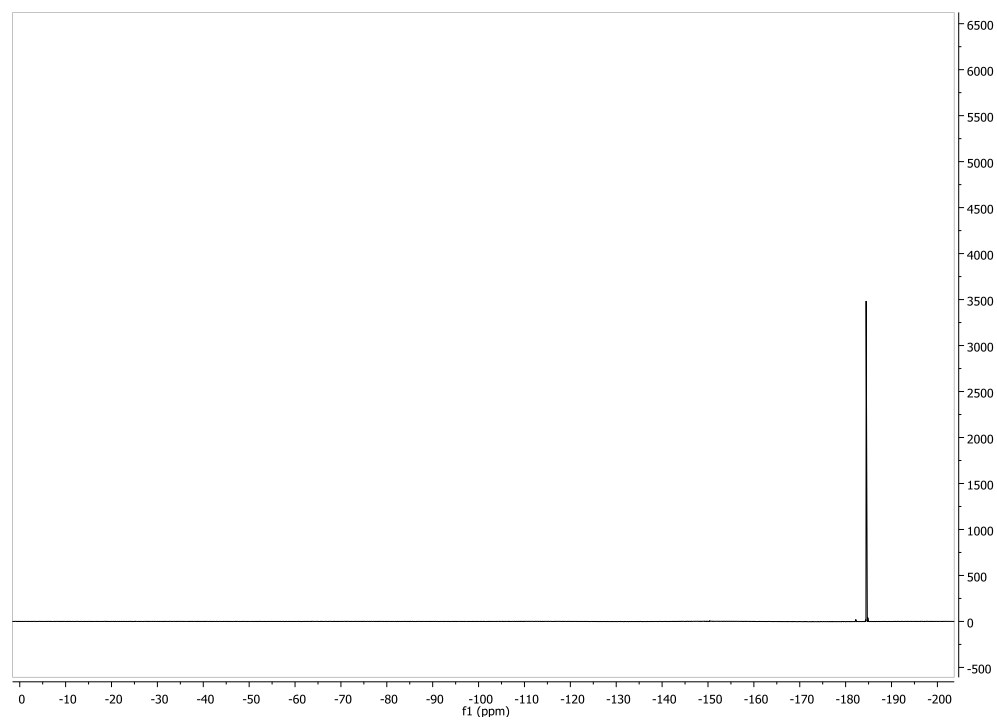
3,5-Diethyl-4-fluoro-1H-pyrazole (4d)



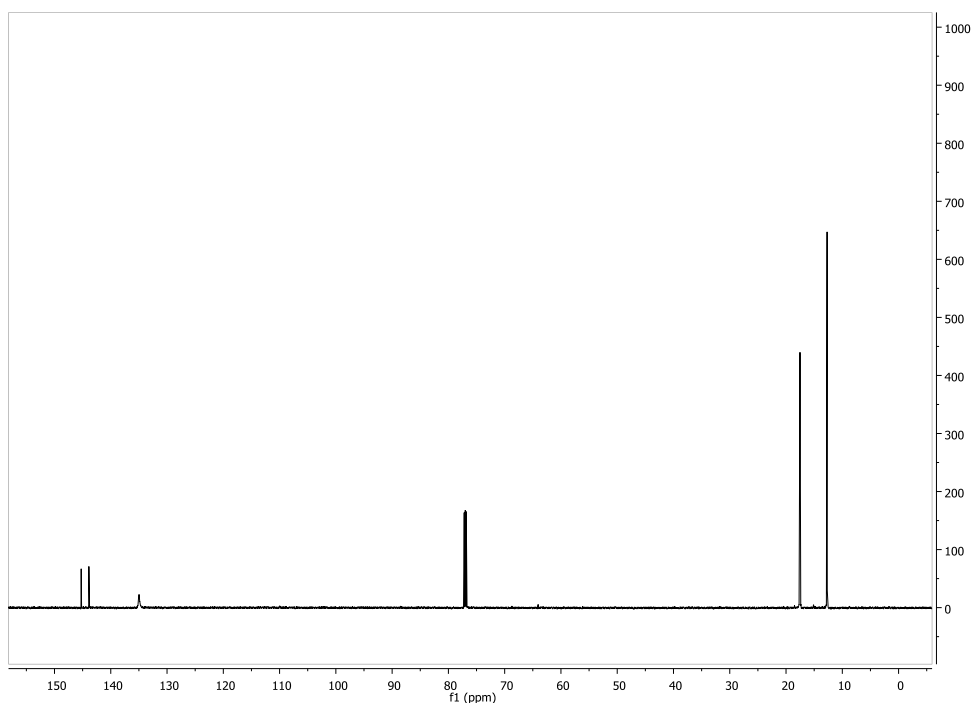
^1H NMR (700 MHz, CDCl_3 , Me_4Si)



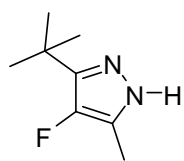
^{19}F NMR (658 MHz, CDCl_3 , CFCl_3)



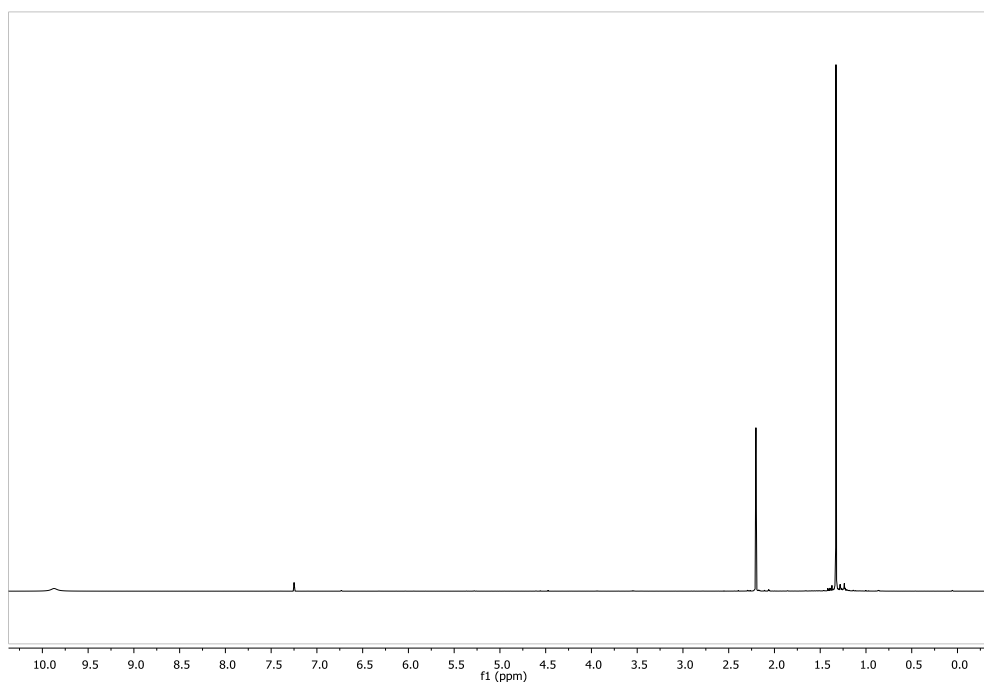
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



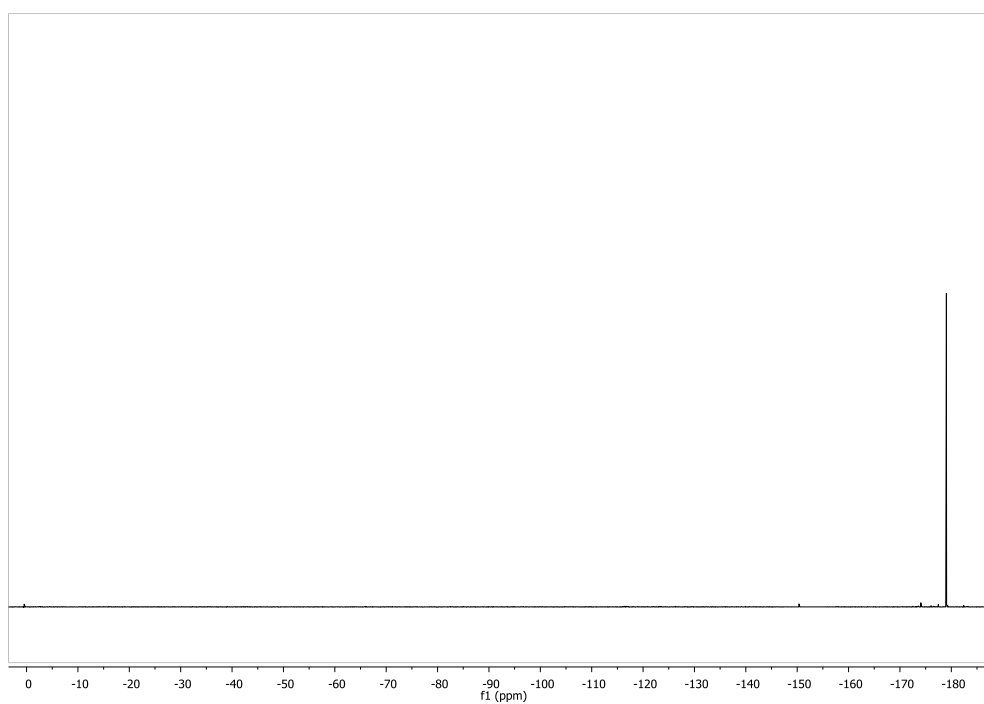
3-*tert*-Butyl-4-fluoro-5-methyl-1*H*-pyrazole (4e)



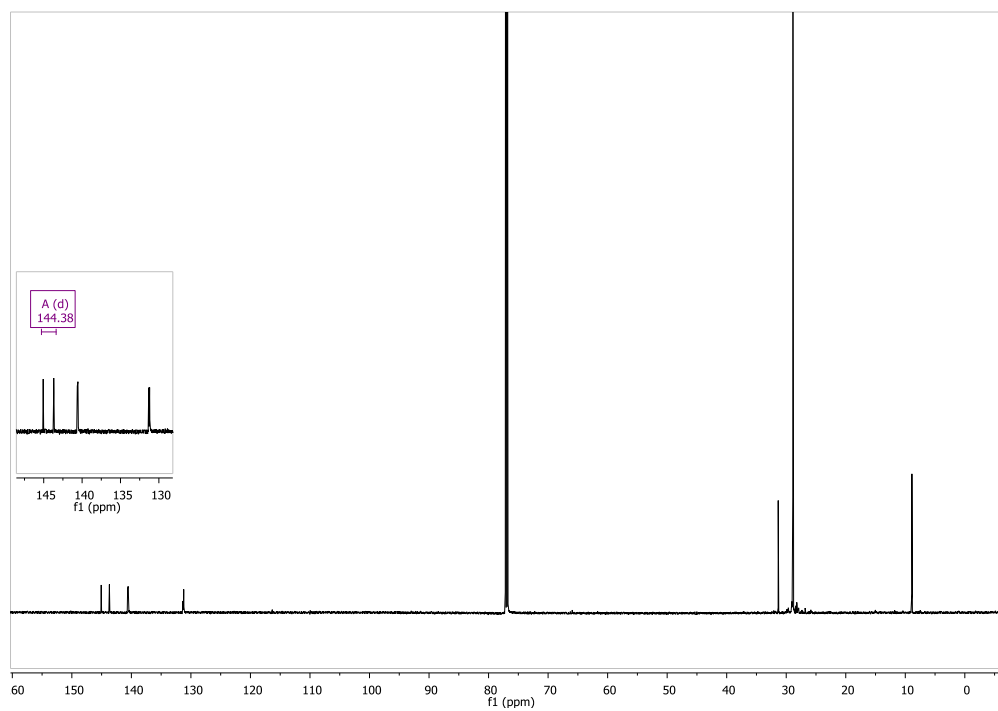
¹H NMR (700 MHz, CDCl₃, Me₄Si)



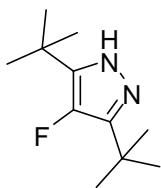
¹⁹F NMR (658 MHz, CDCl₃, CFC₃)



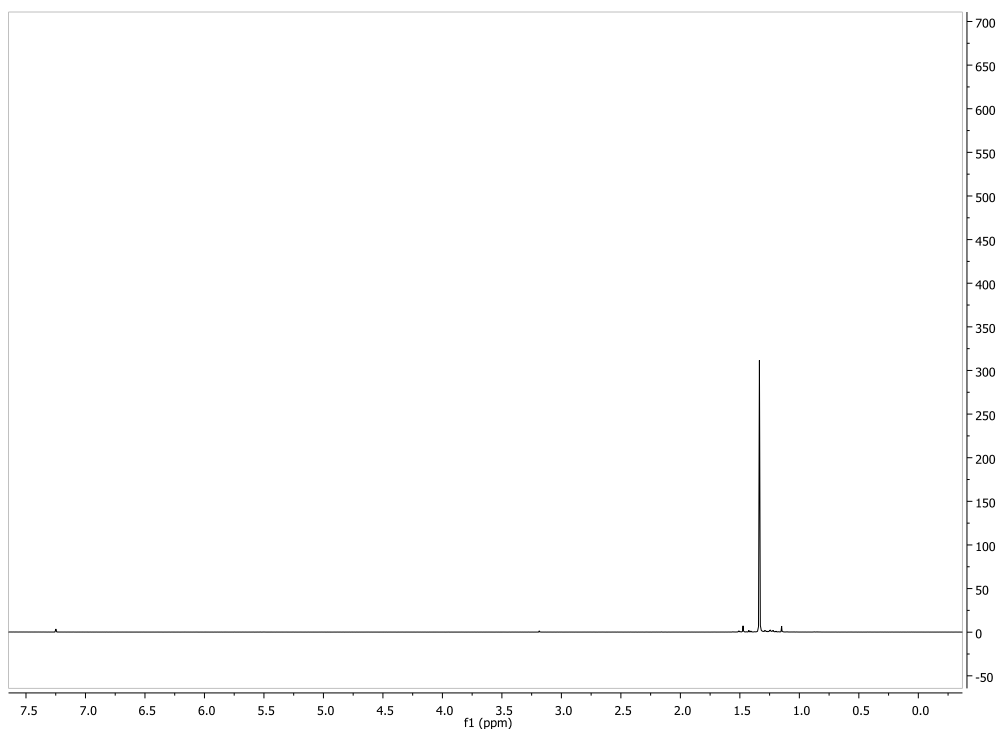
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



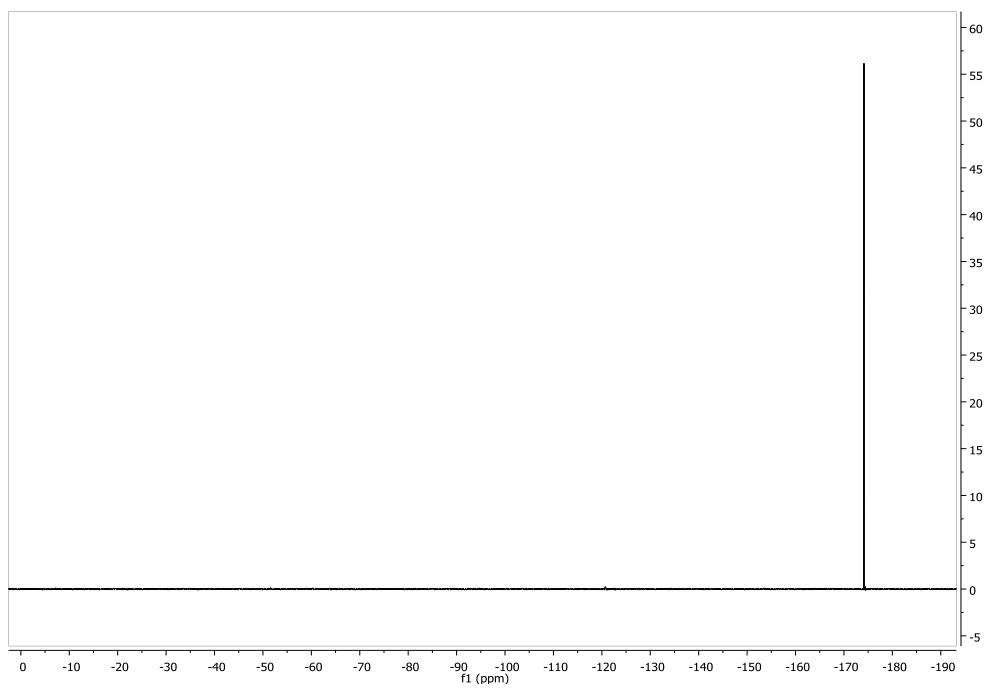
3,5-Di-*tert*-butyl-4-fluoro-1*H*-pyrazole (4f)



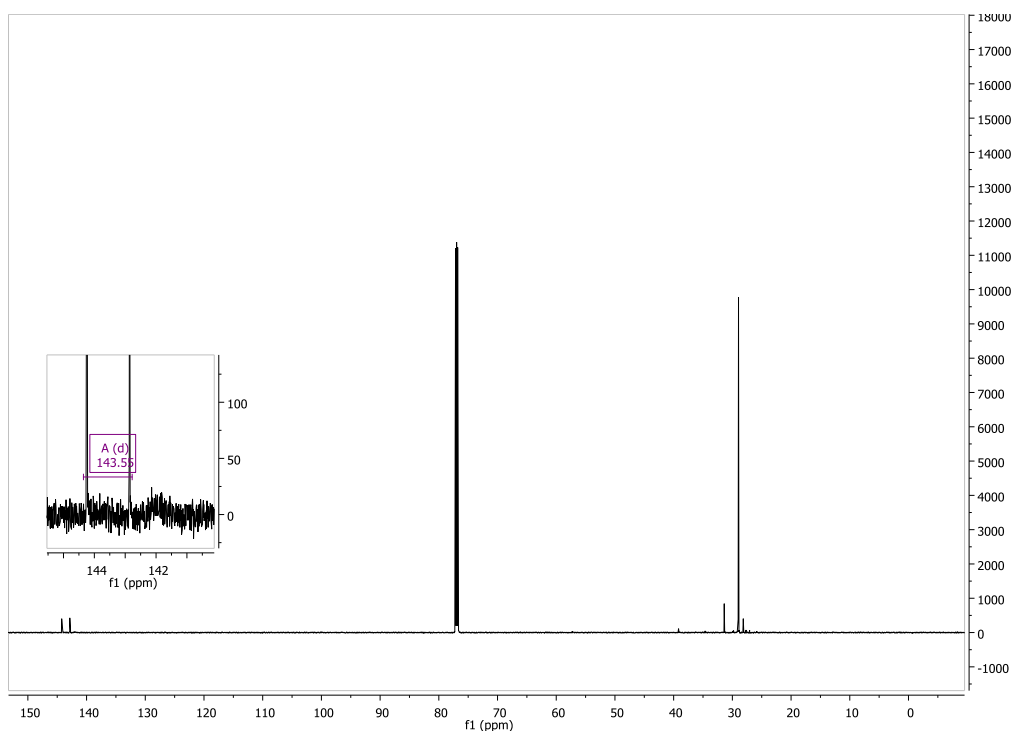
^1H NMR (700 MHz, CDCl_3 , Me_4Si)



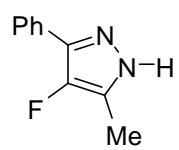
^{19}F NMR (658 MHz, CDCl_3 , CFCl_3)



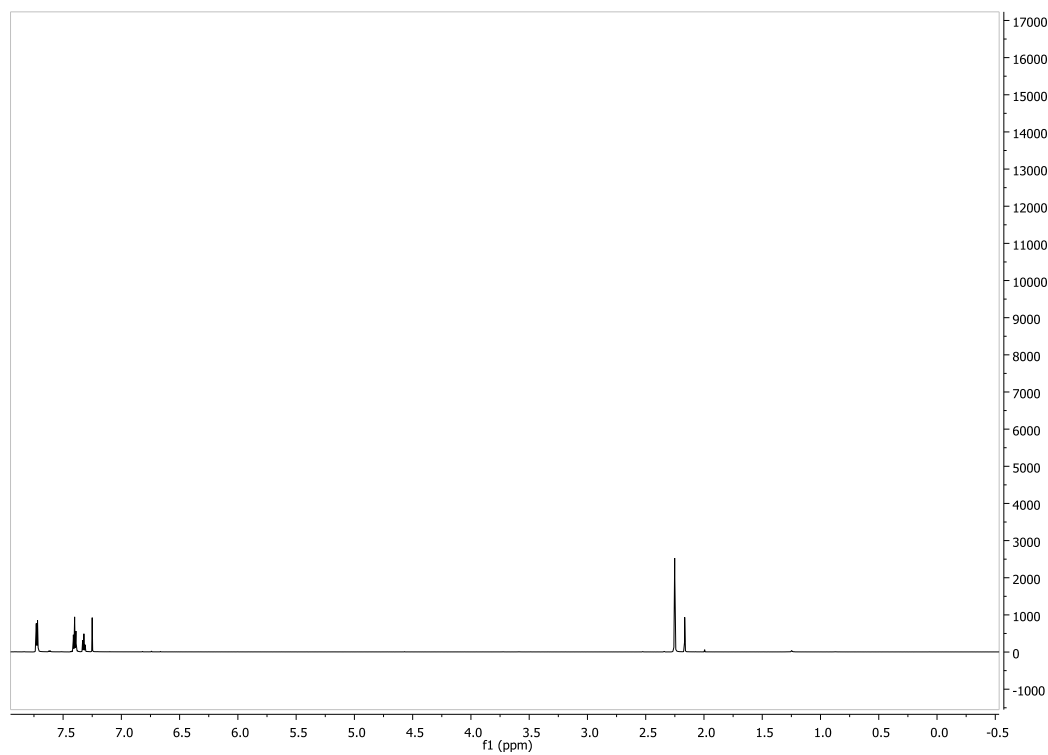
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



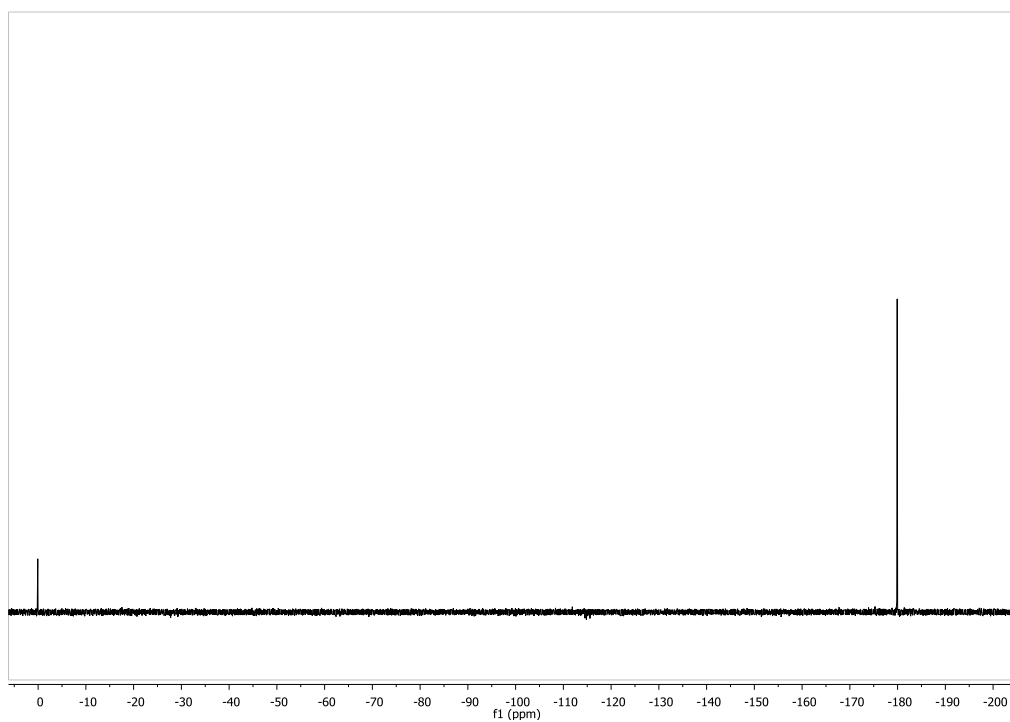
4-Fluoro-5-methyl-3-phenyl-1H-pyrazole (4g)



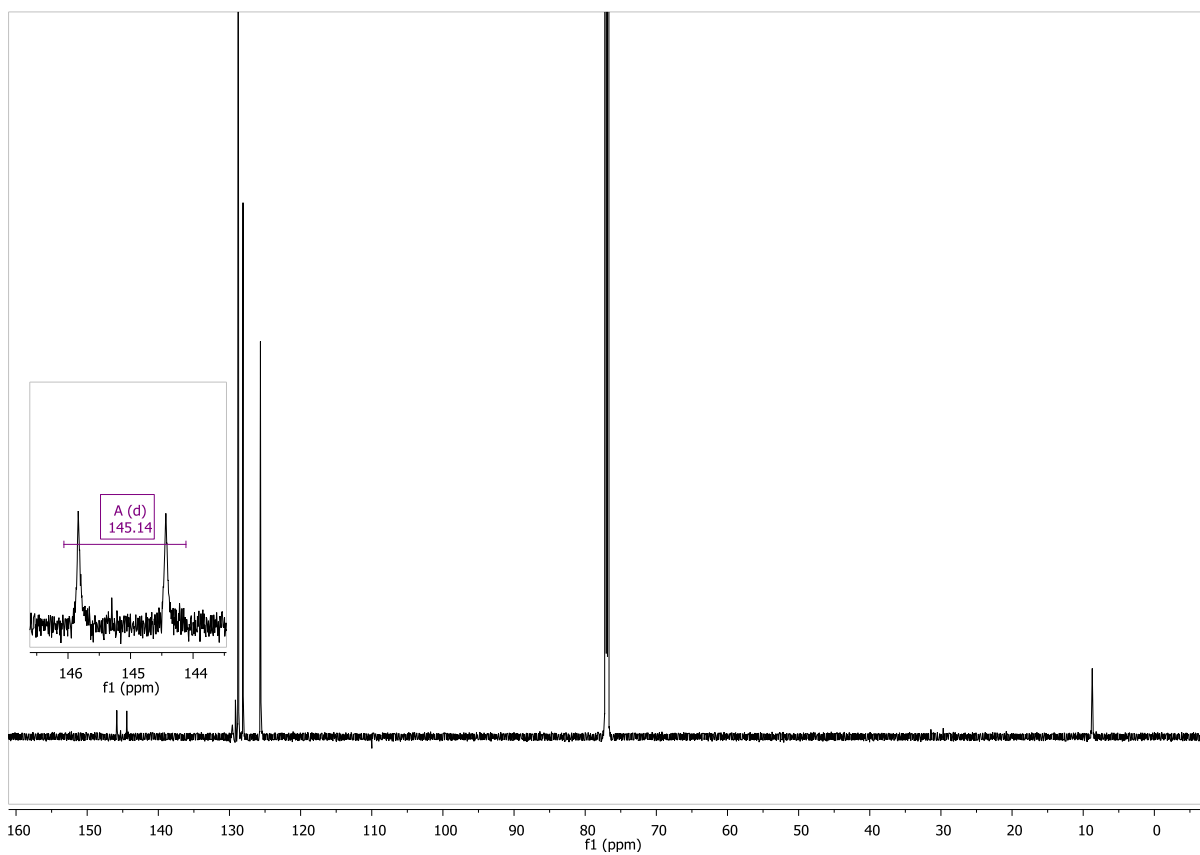
^1H NMR (700 MHz, CDCl_3 , Me_4Si)



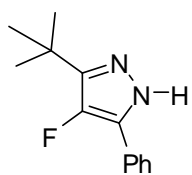
^{19}F NMR (658 MHz, CDCl_3 , CFCl_3)



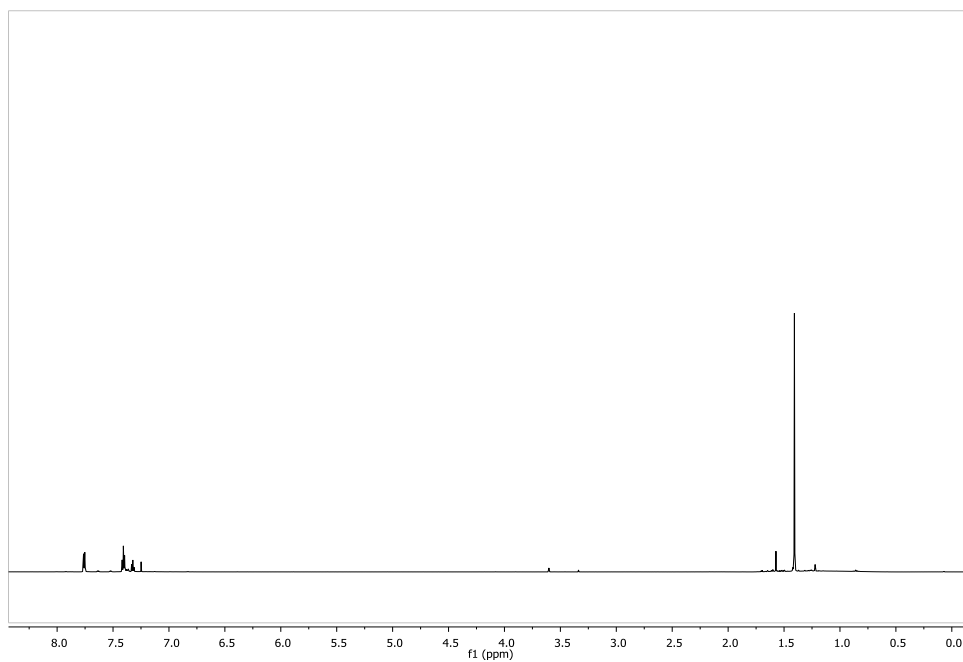
^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)



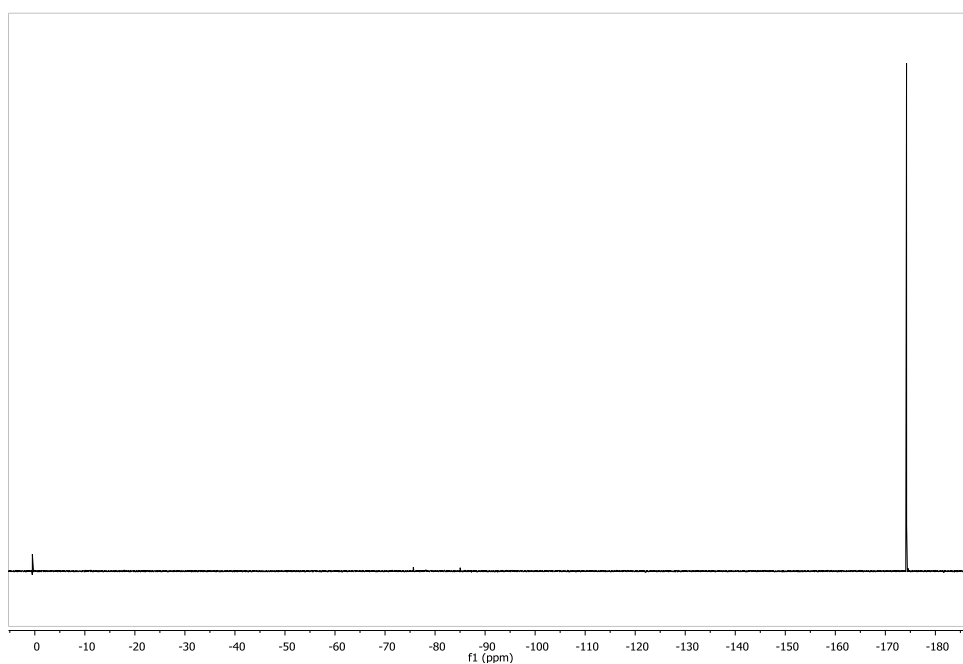
3-tert-Butyl-4-fluoro-5-phenyl-1H-pyrazole (4h)



^1H NMR (700 MHz, CDCl_3 , Me_4Si)



^{19}F NMR (658 MHz, CDCl_3 , CFCl_3)



^{13}C NMR (176 MHz, CDCl_3 , Me_4Si)

