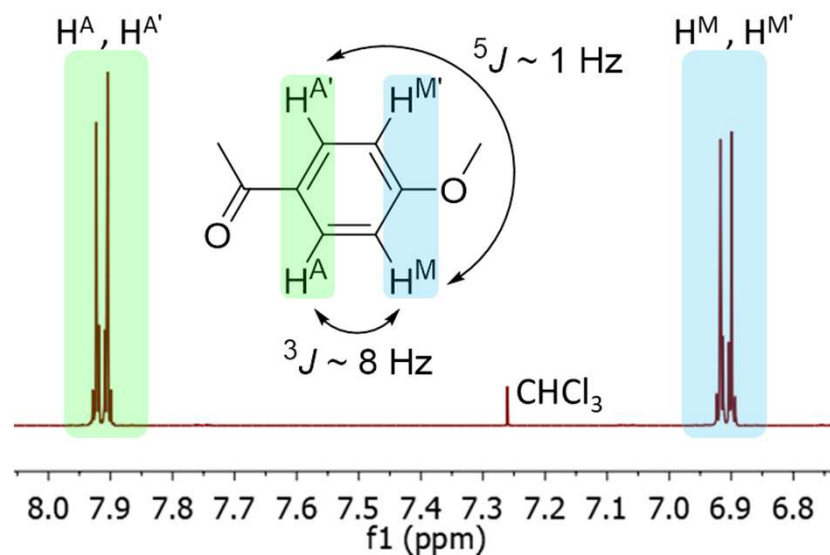
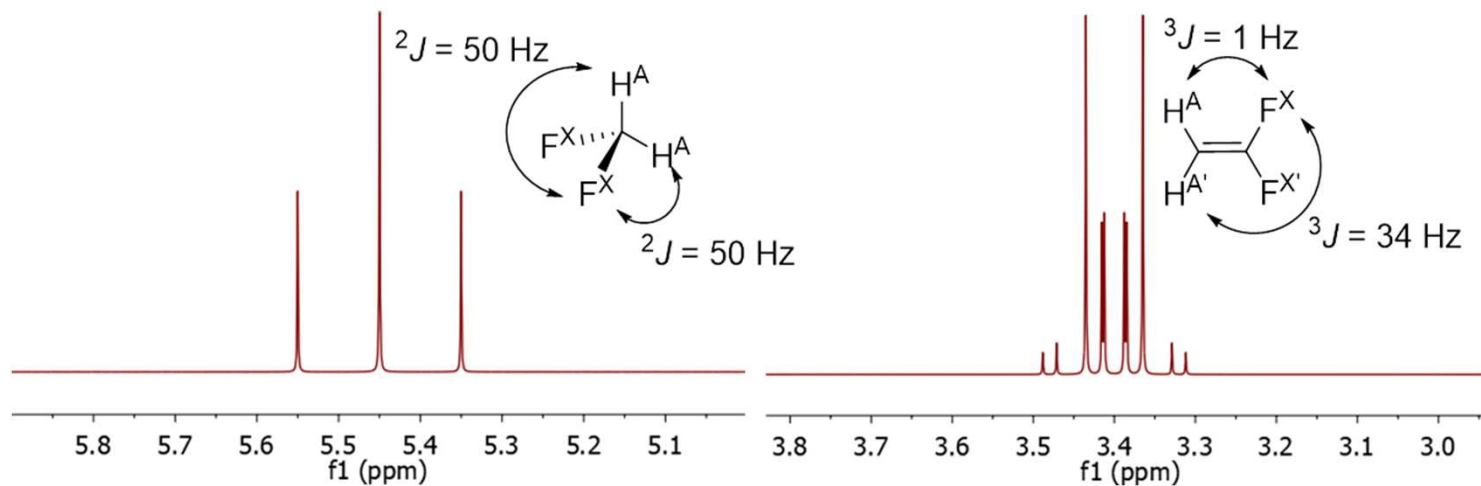

NMR Spektroskopie

Lekce 5: Ekvivalence, chiralita, spinové systémy, řád spektra

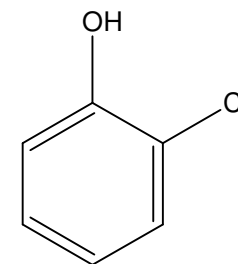
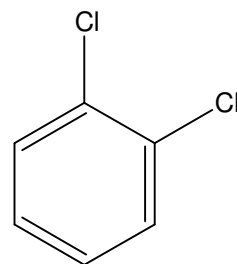
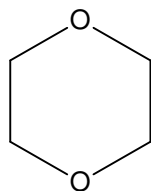
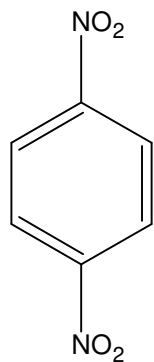
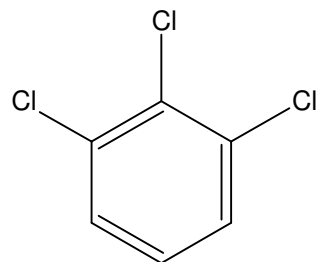
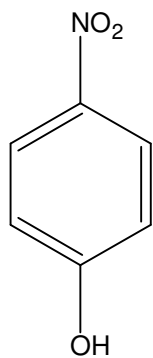


Martin Dračínský

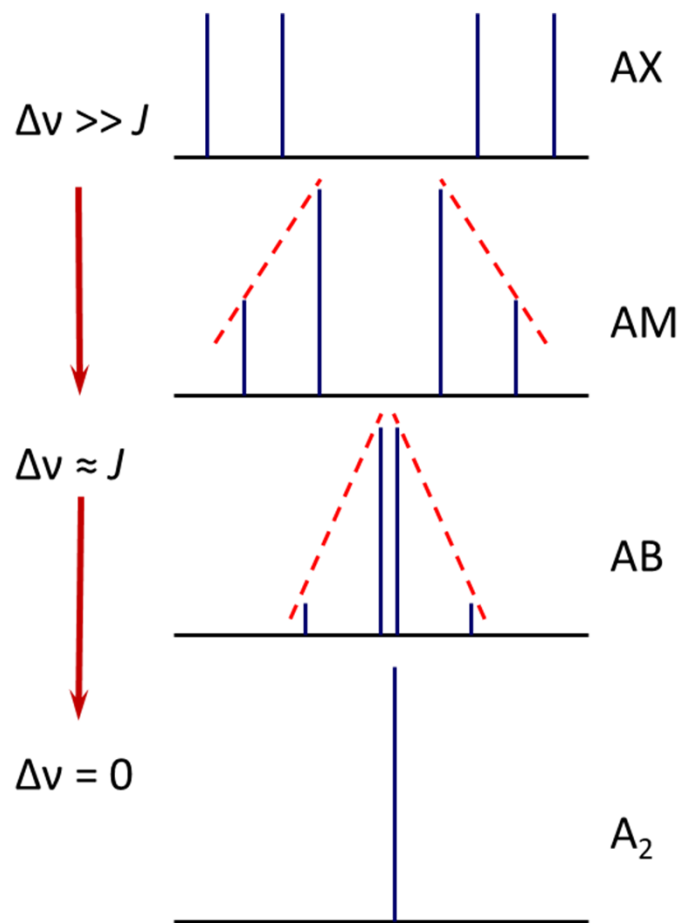
Chemická ekvivalence, magnetická ekvivalence



Chemická ekvivalence, magnetická ekvivalence



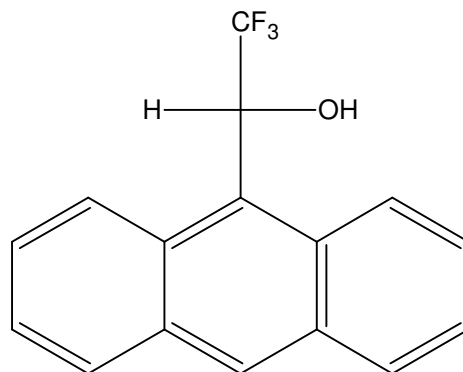
Spinové systémy, řád spektra



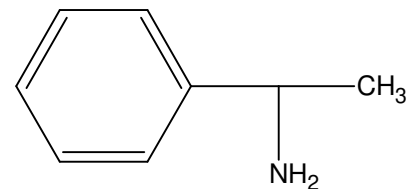
Chiralita

V achirálním prostředí nelze rozlišit enantiomery

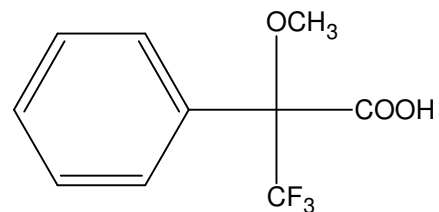
NMR: chirální posunová činidla (2,2,2-trifluor-1-anthrylethanol)



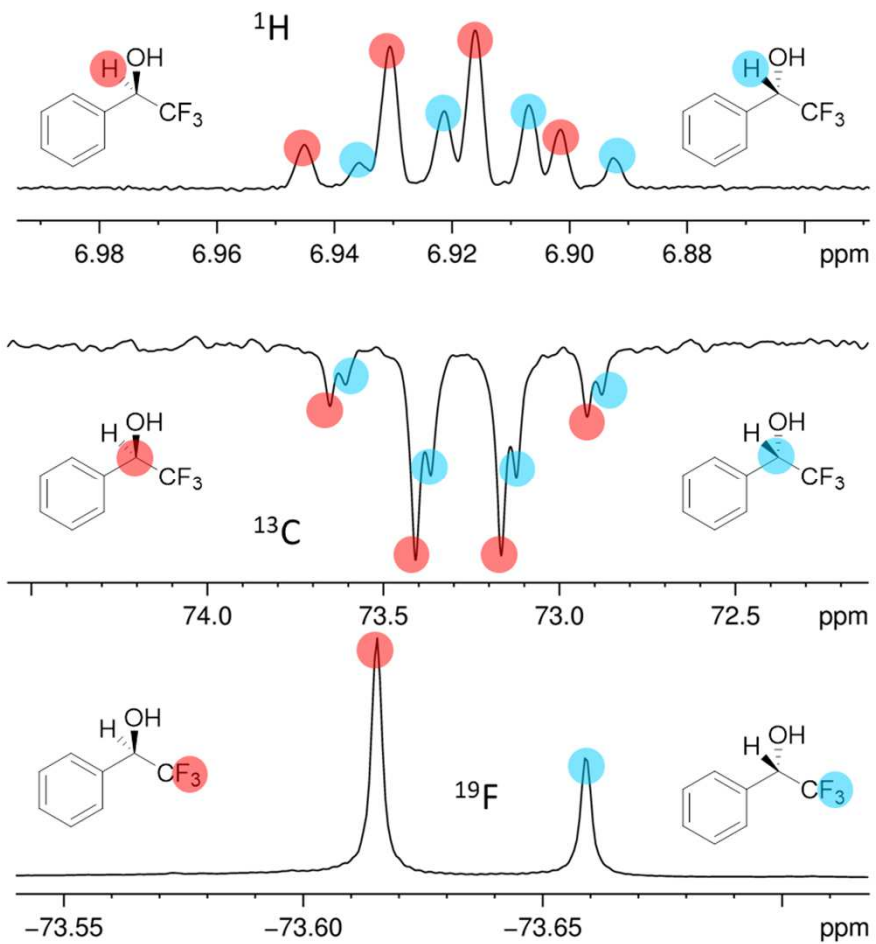
chirální rozpouštědlo (1-fenylethanamin)



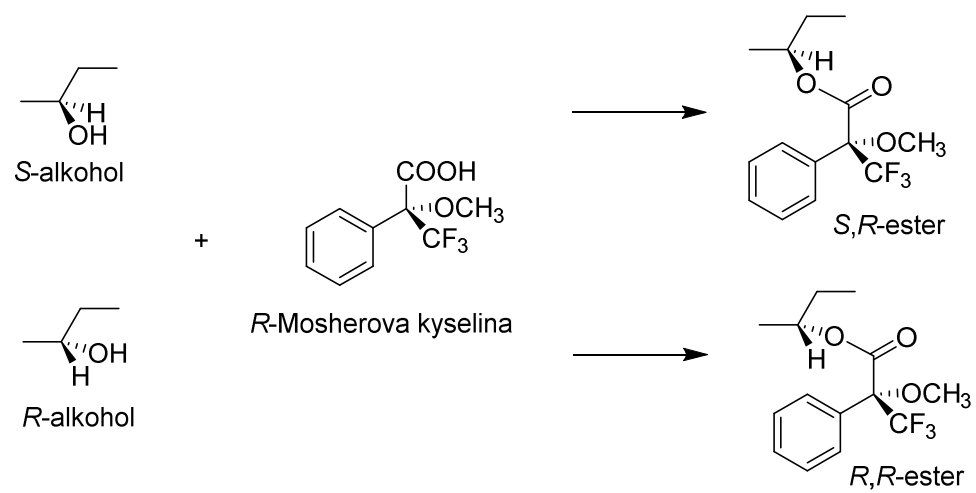
derivatizace (Mosherova kyselina)



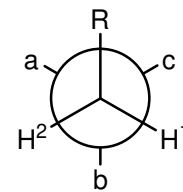
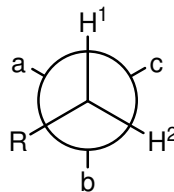
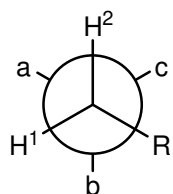
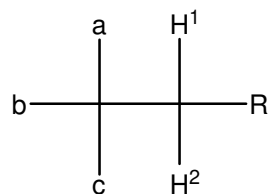
Chiralita



Chiralita



Chiralita



Vodíky H¹ a H² nejsou ekvivalentní!!!

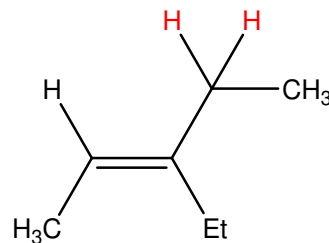
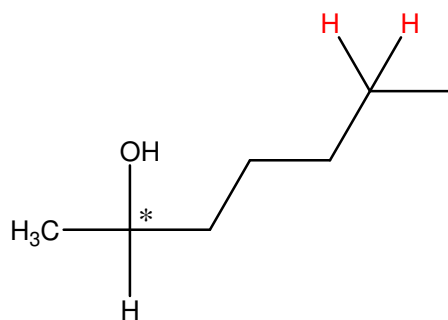
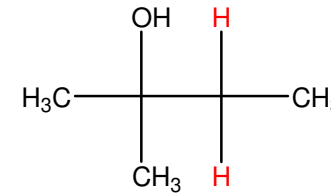
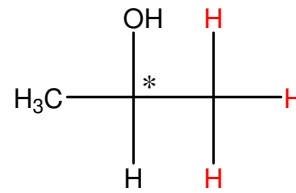
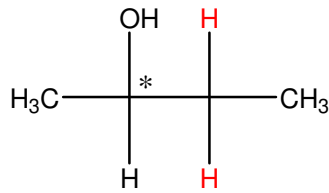
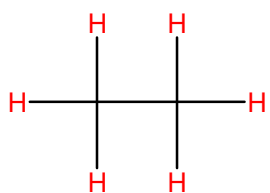
Jsou diastereotopní.

Chiralita

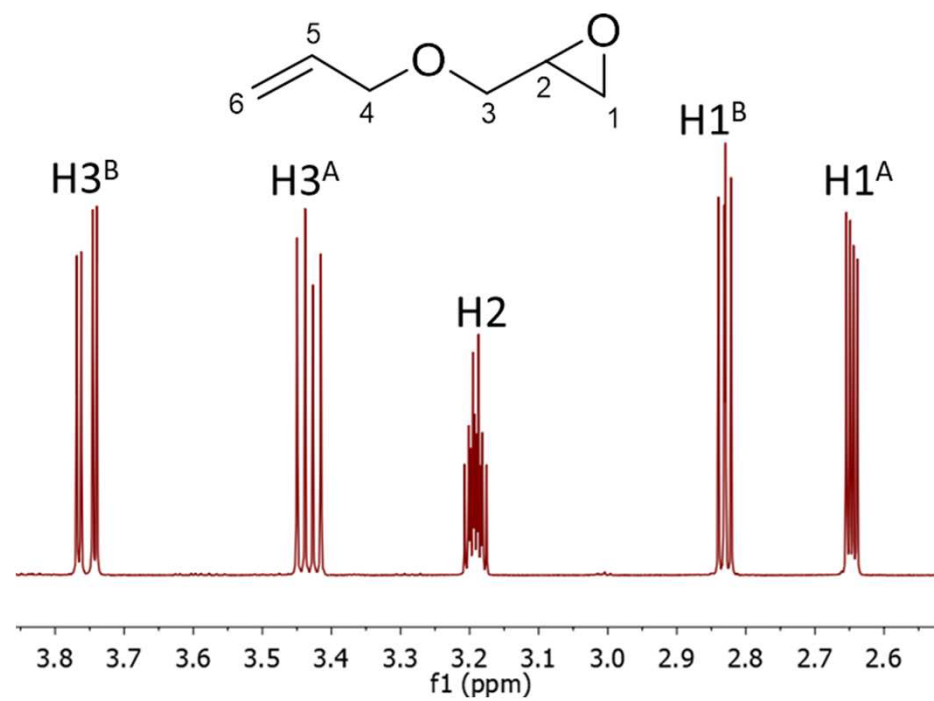
ekvivalentní (homotopní)

enantiotopní

diastereotopní



Chiralita



Pravidla pro spektrální analýzu

- 1) Systém $A_n X_m \Rightarrow$ signál A je štěpen na $m+1$ linií, signál X na $n+1$ linií
- 2) Vzdálenost v Hz mezi liniemi je interakční konstanta
- 3) Chemický posun je ve středu multipletu
- 4) Relativní intenzity linií odpovídají Pascalovu trojúhelníku
- 5) Více skupin interagujících spinů \Rightarrow multiplety multipletů
- 6) Magneticky ekvivalentní protony se neštěpí \Rightarrow spinový systém A_n je vždy singlet
- 7) Spinové systémy chemicky ekvivalentních protonů, které nejsou magneticky ekvivalentní nemohou být analyzovány jako systémy prvního řádu