

Módulo 3 – Espectroscopia de Ressonância Magnética Nuclear (RMN)

Parte 2 – Análise de espectros de ^1H



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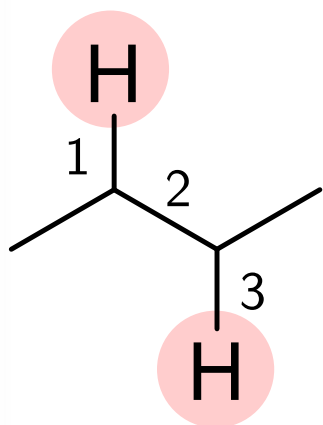
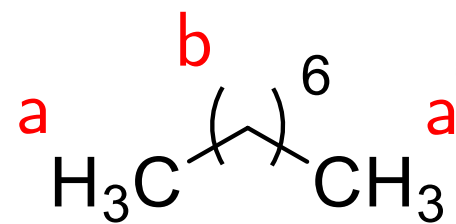
Instituto de Física e Química (IFQ)

Universidade Federal de Itajubá (UNIFEI)

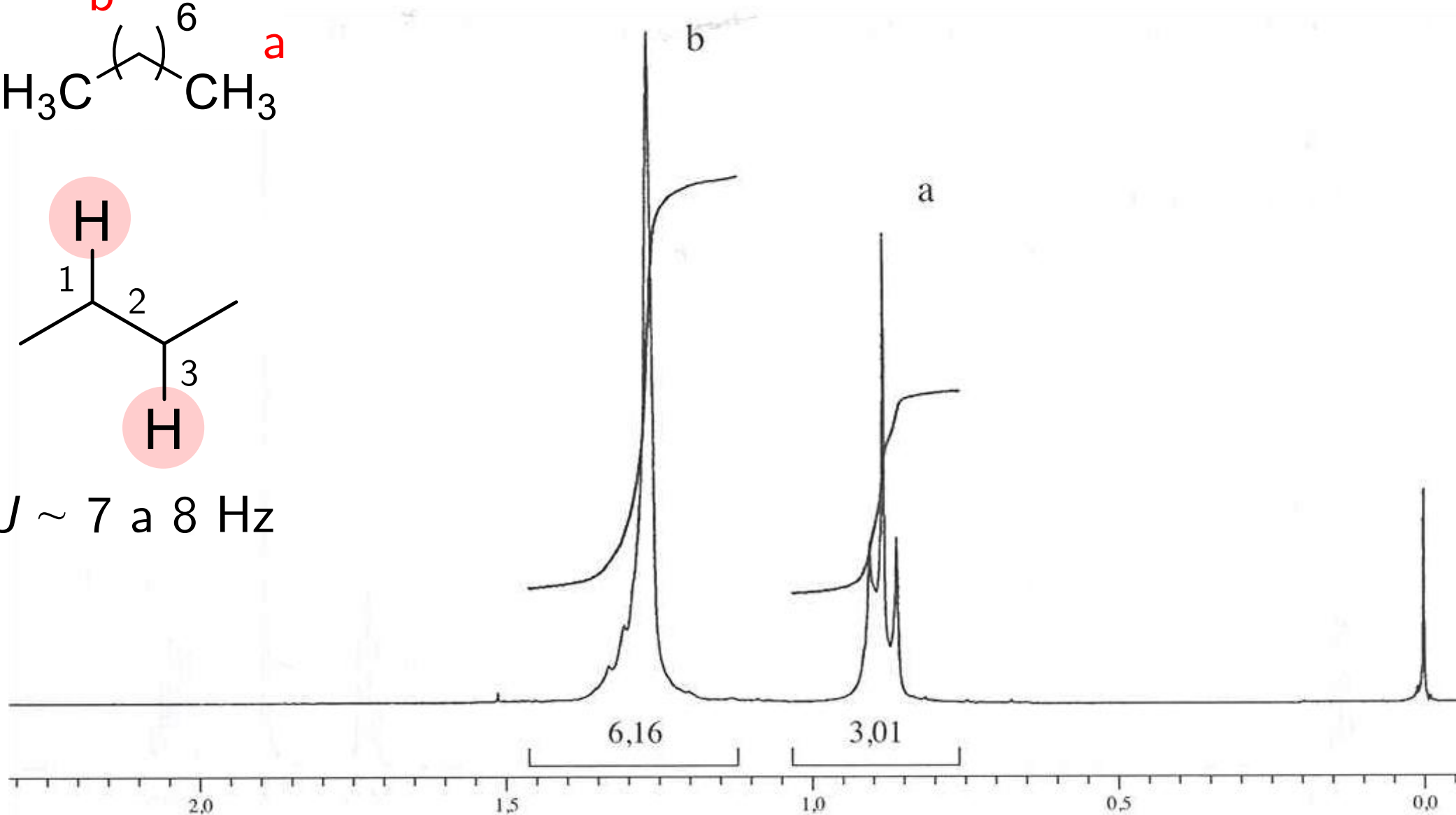
QUI070 - Métodos Físicos de Análise, 2025.1



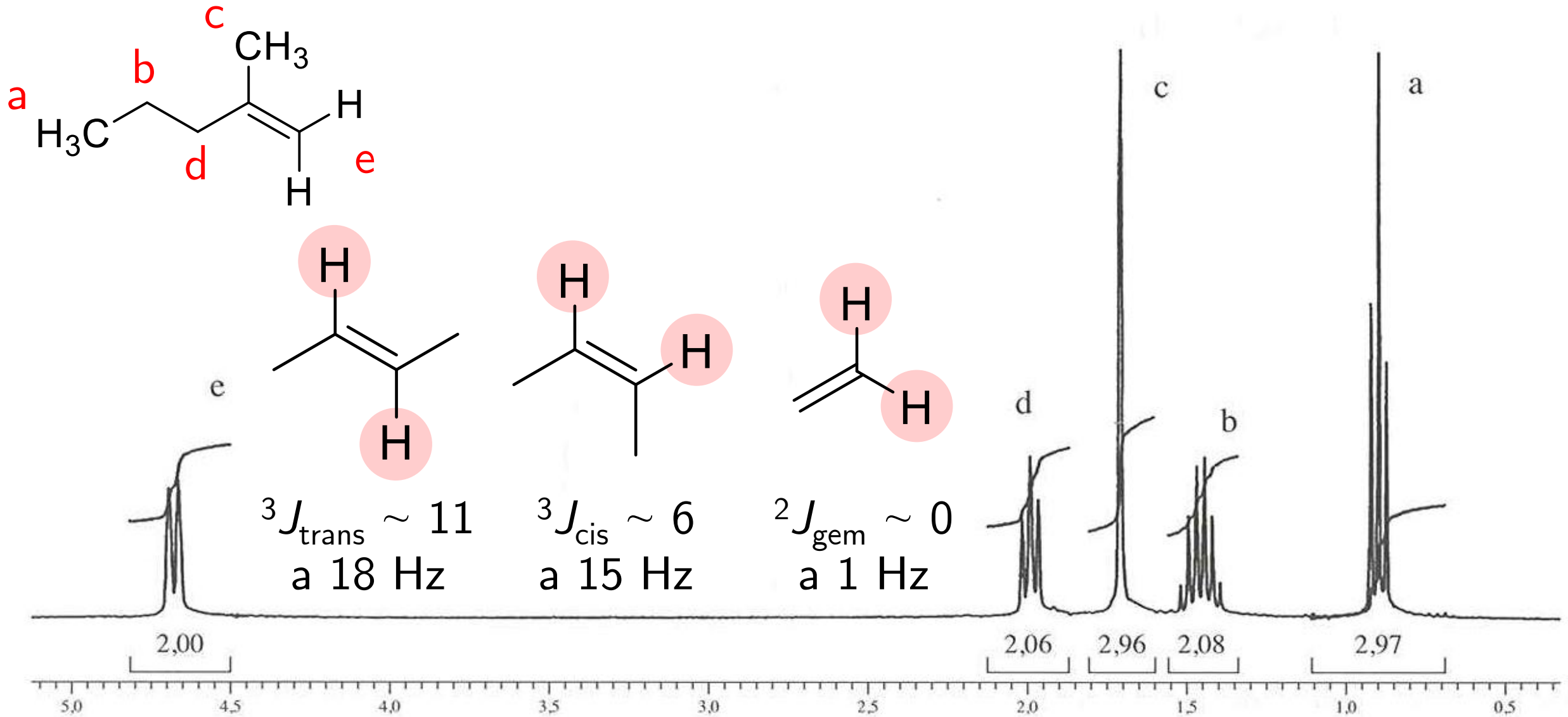
1. Espectros de RMN de ^1H de alcanos

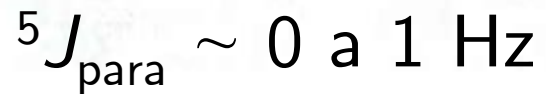


$^3J \sim 7 \text{ a } 8 \text{ Hz}$

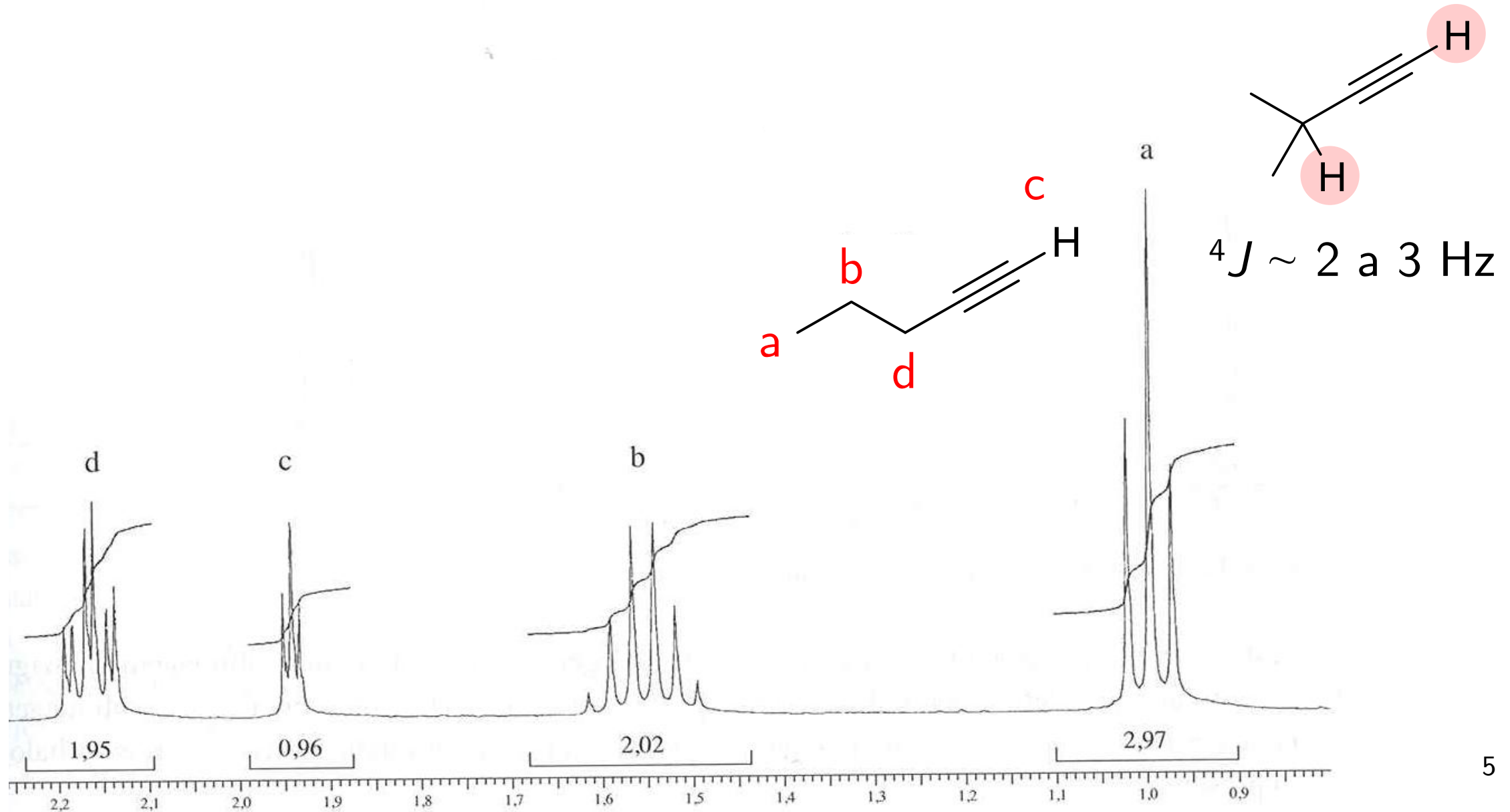


2. Espectros de RMN de ^1H de alkenos

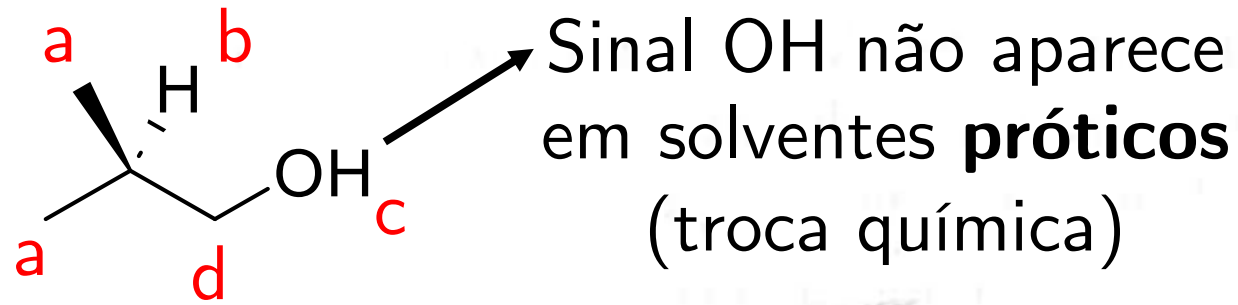




4. Espectros de RMN de ^1H de alcinos

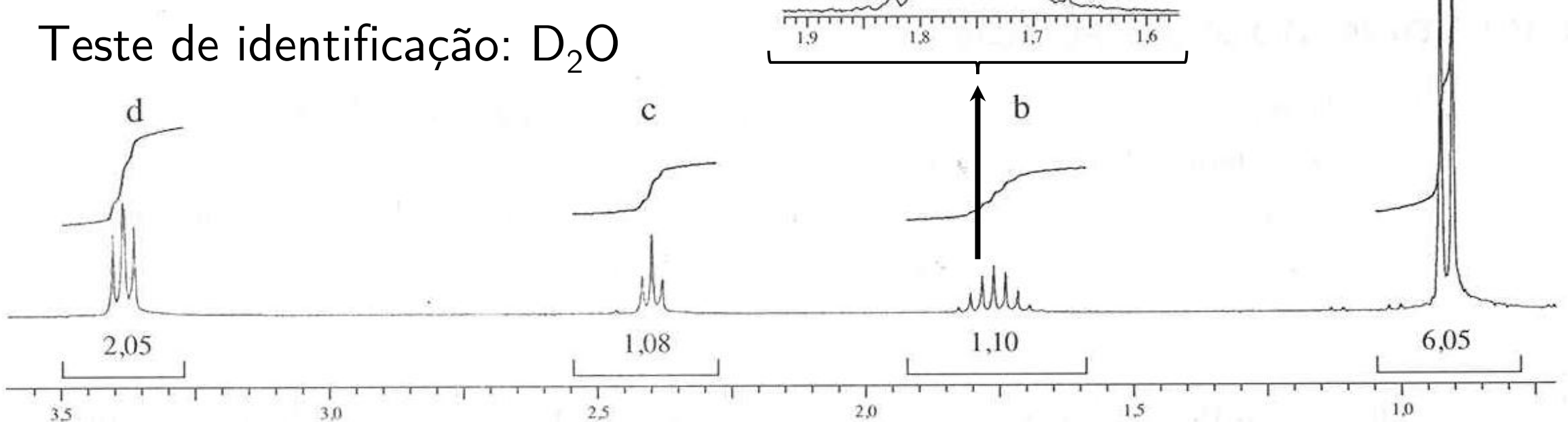
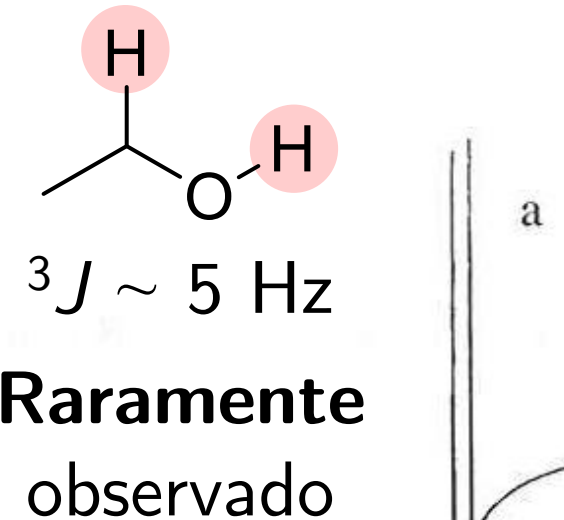


5. Espectros de RMN de ^1H de álcoois

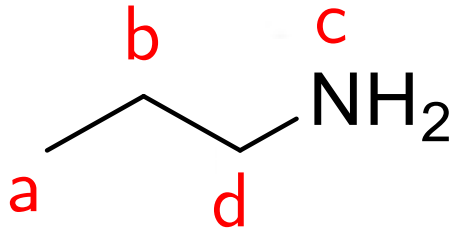


Solventes ideais para H lábeis:
DMSO- d_6 , CCl_4

Teste de identificação: D_2O



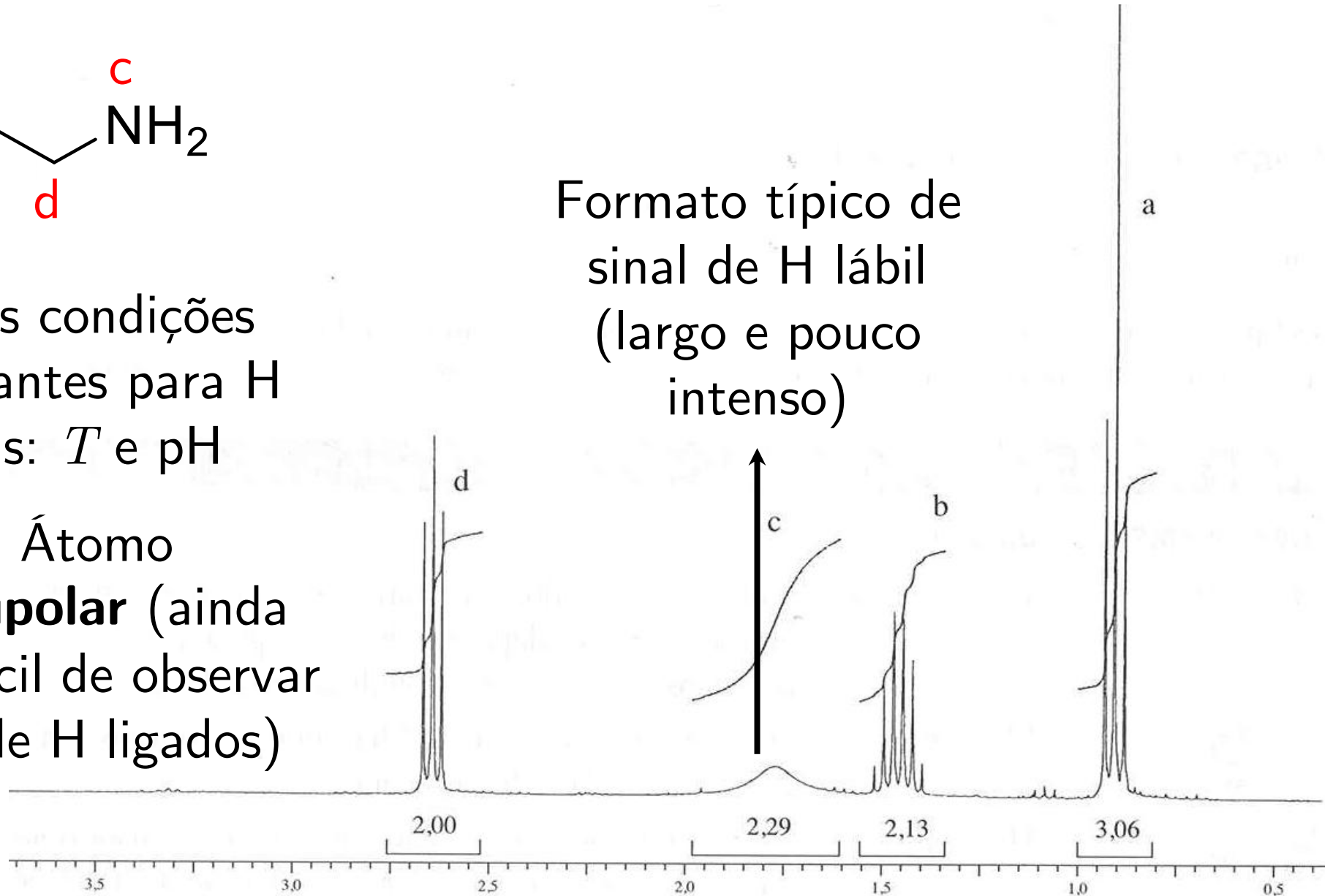
6. Espectros de RMN de ^1H de aminas



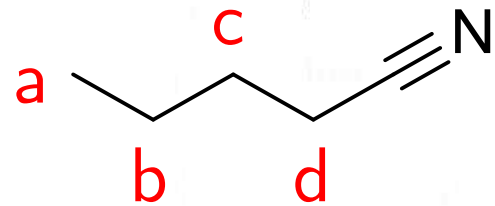
Outras condições importantes para H lábeis: T e pH

N: Átomo **quadrupolar** (ainda mais difícil de observar sinais de H ligados)

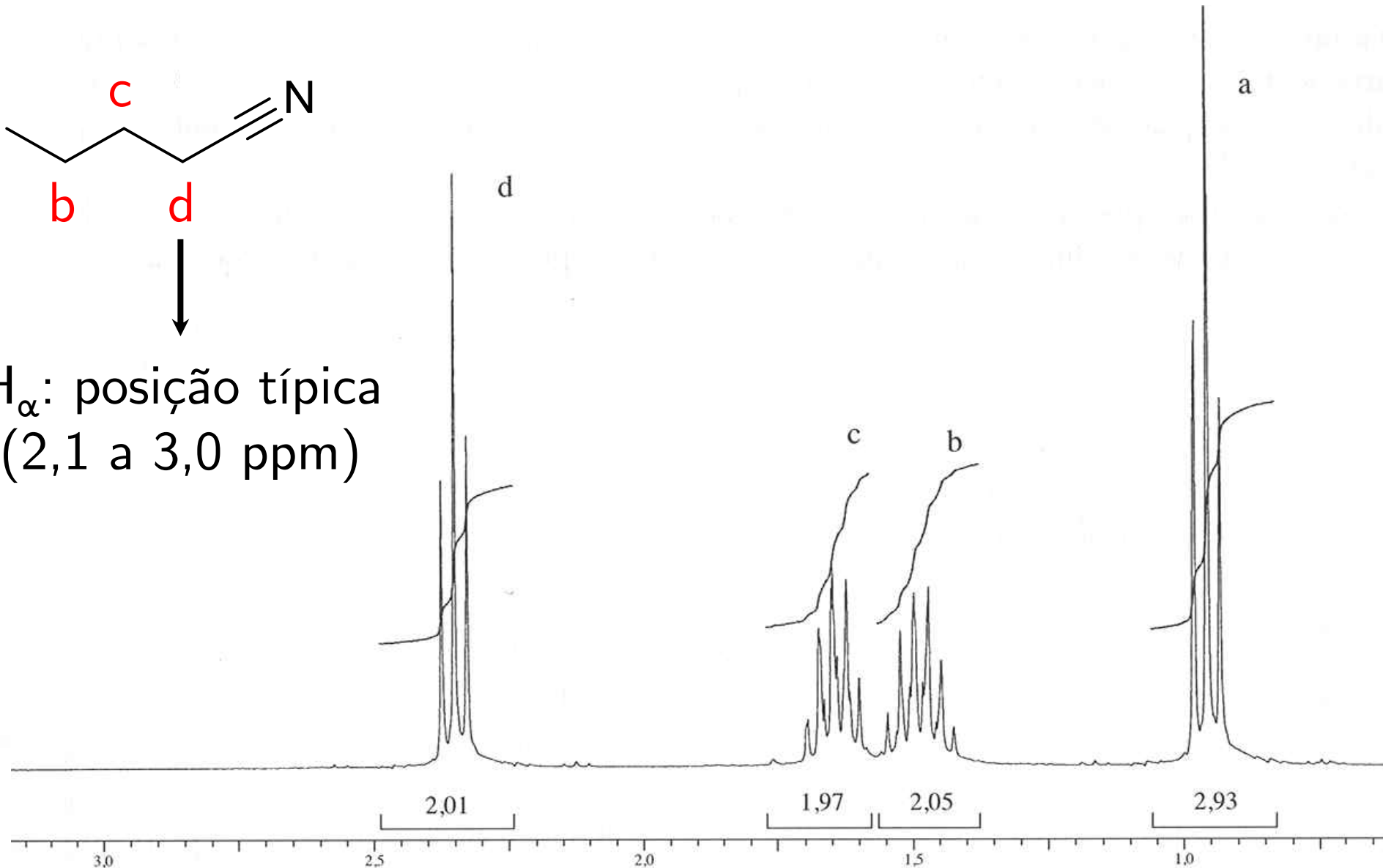
Formato típico de sinal de H lábil (largo e pouco intenso)



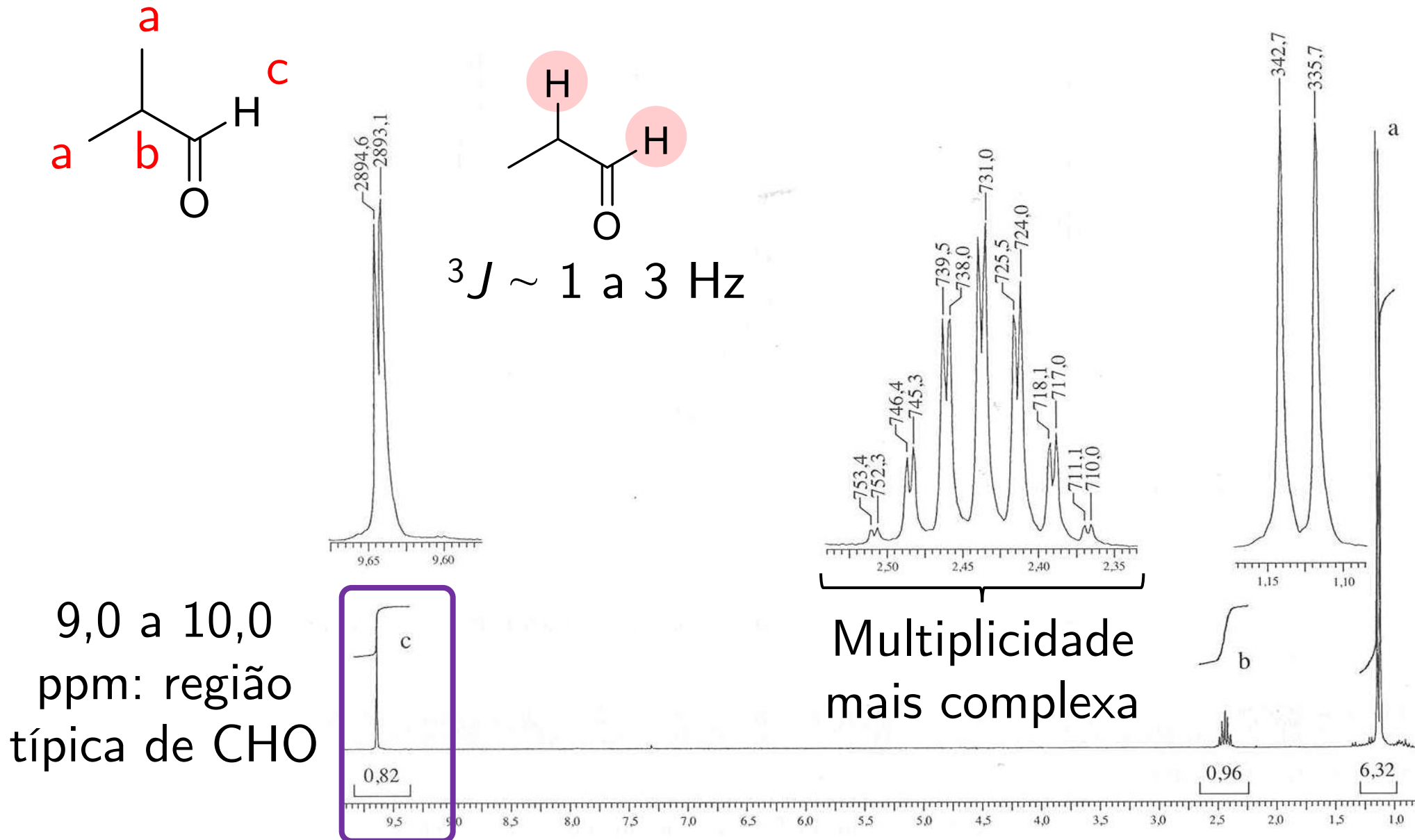
7. Espectros de RMN de ^1H de nitrilas



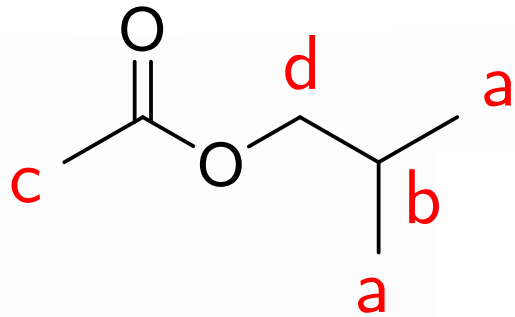
H_α : posição típica
(2,1 a 3,0 ppm)



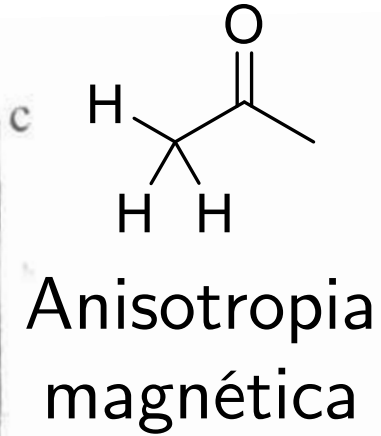
8. Espectros de RMN de ^1H de aldeídos



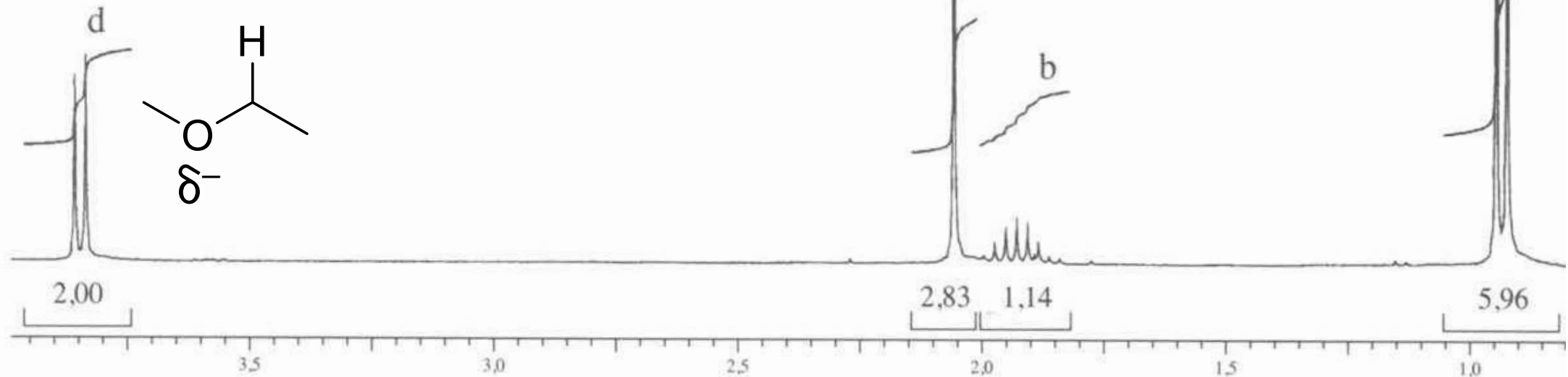
9. Espectros de RMN de ^1H de ésteres



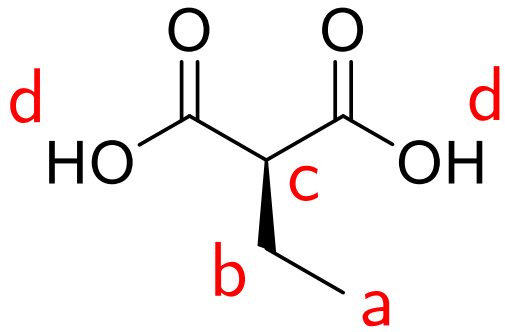
Região comum
para H α -
carbonílicos
(2,1 a 2,4 ppm)



Eletronegatividade

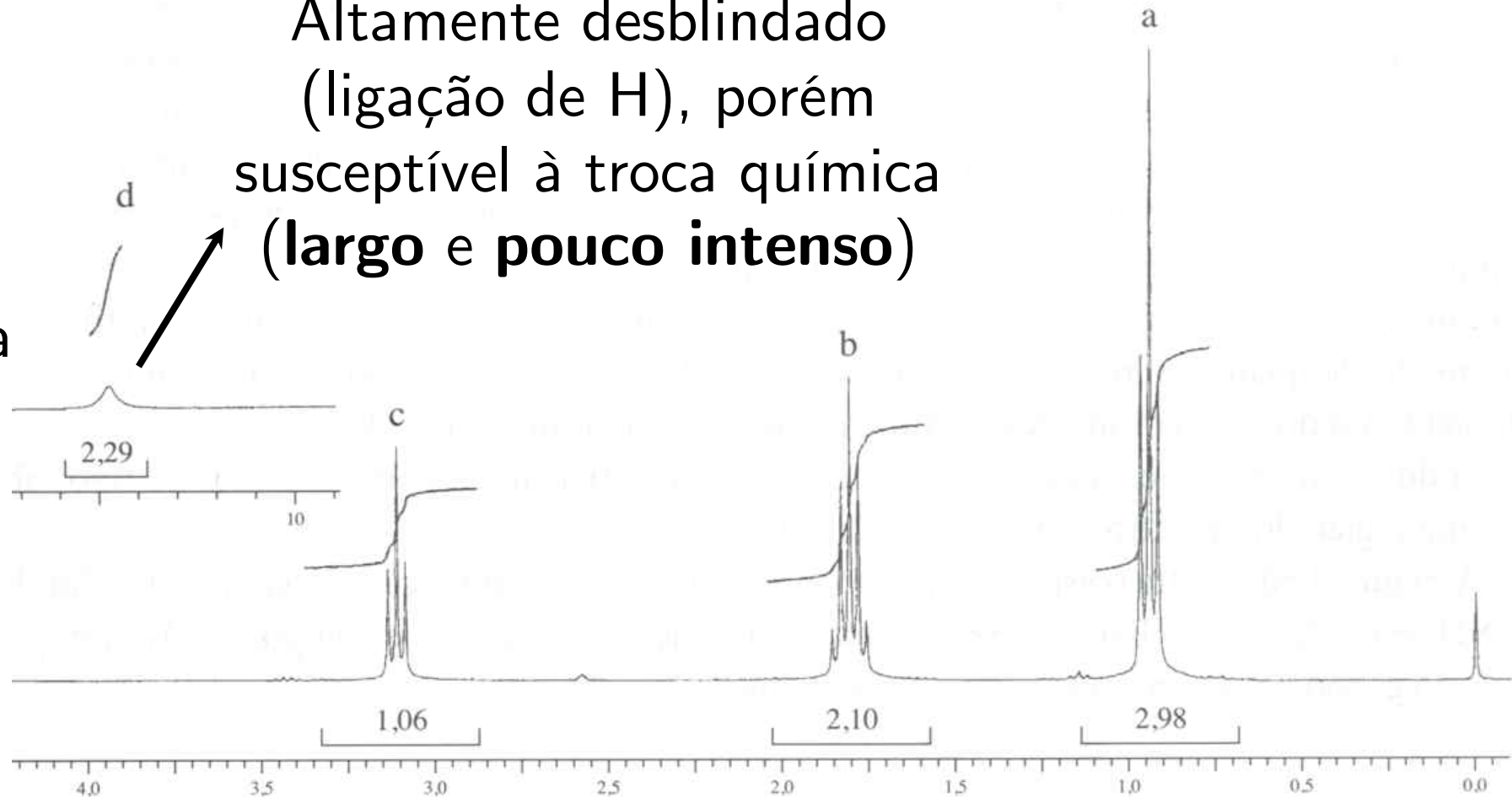


10. Espectros de RMN de ^1H de ácidos carboxílicos

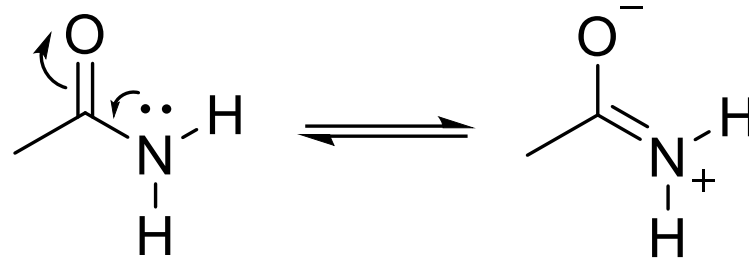
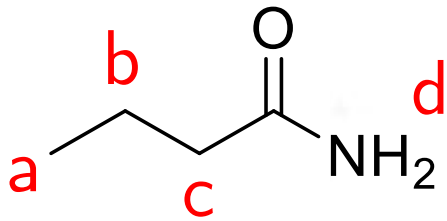


Altamente desblindado
(ligação de H), porém
susceptível à troca química
(**largo e pouco intenso**)

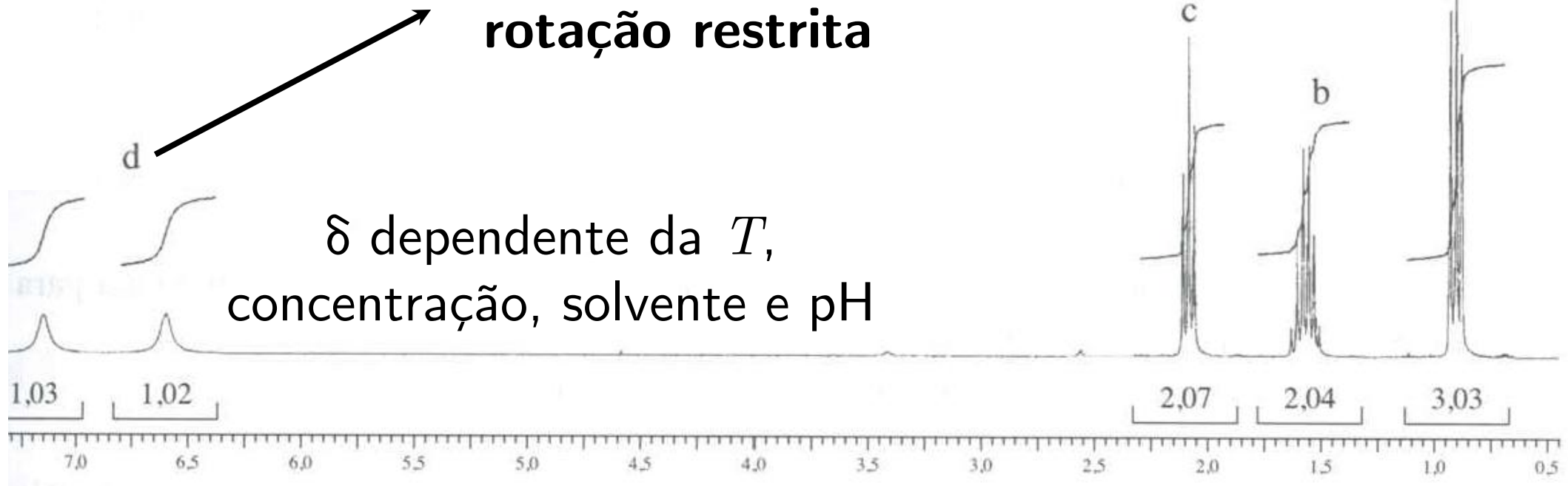
Região
característica
de COOH
(11 a 12
ppm)



11. Espectros de RMN de ^1H de ácidos amidas

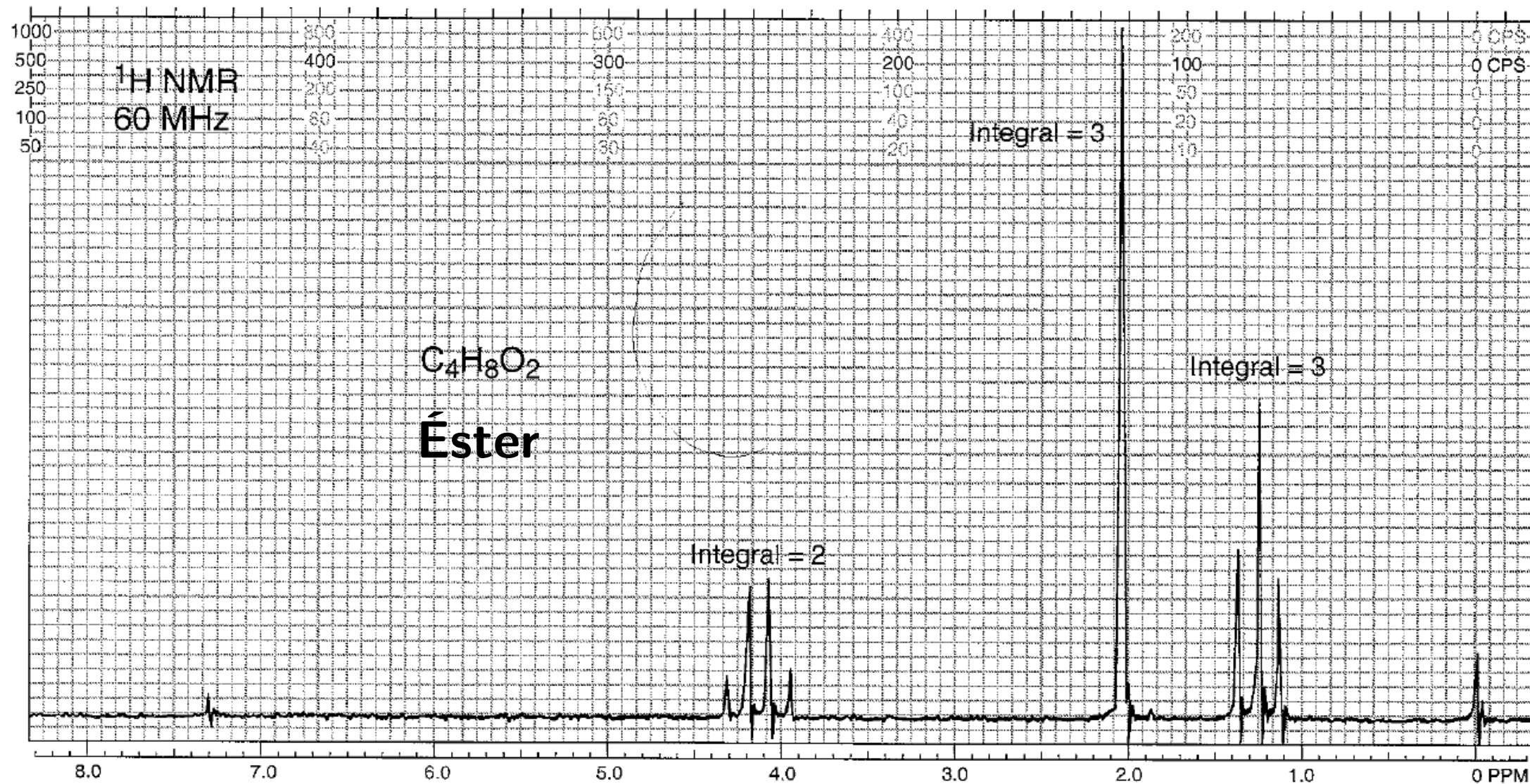


Conjugação: C-N possui
alto caráter de C=N e
rotação restrita



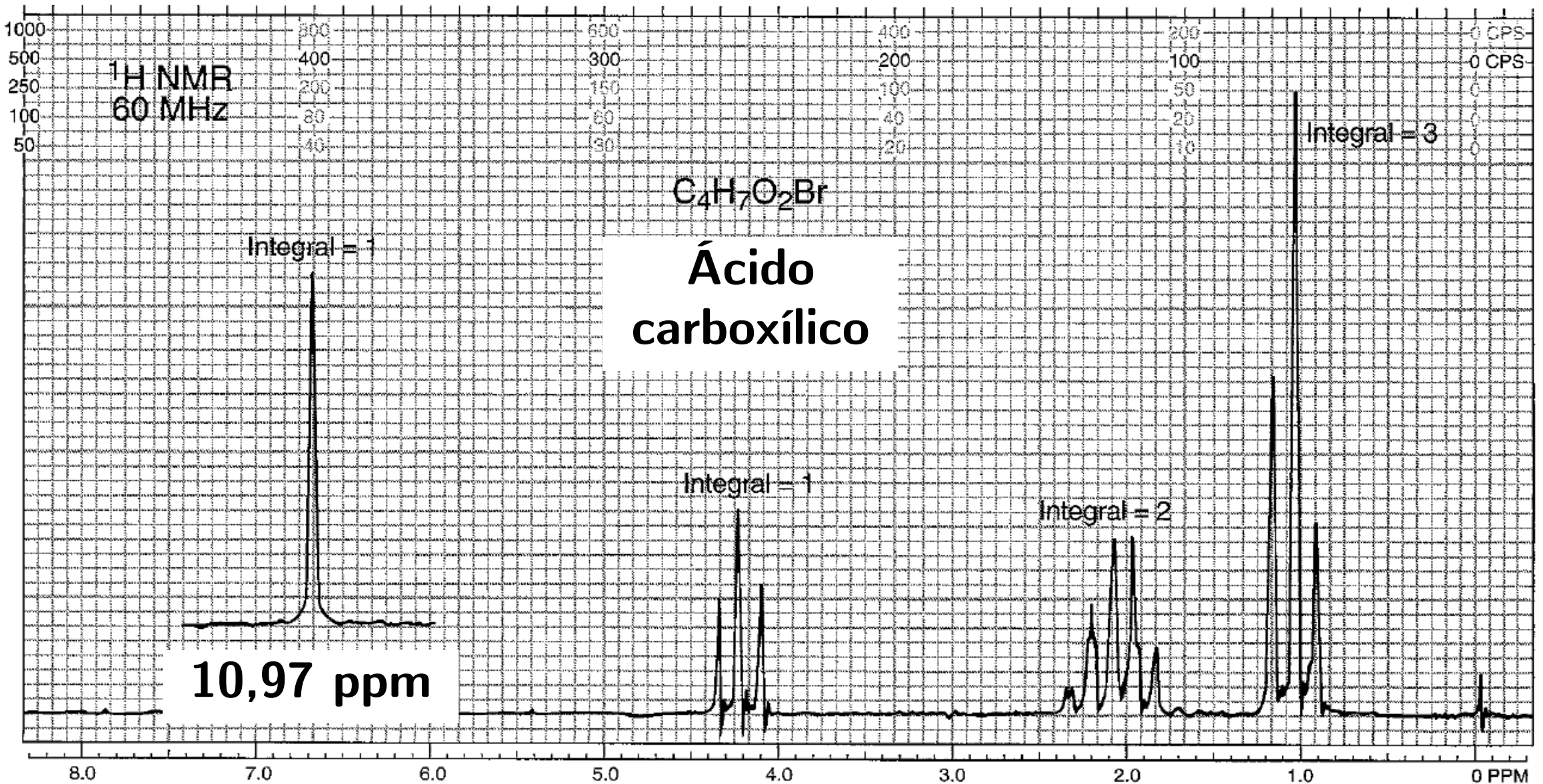
Exercícios – Estrutura a partir de espectro de ^1H

1



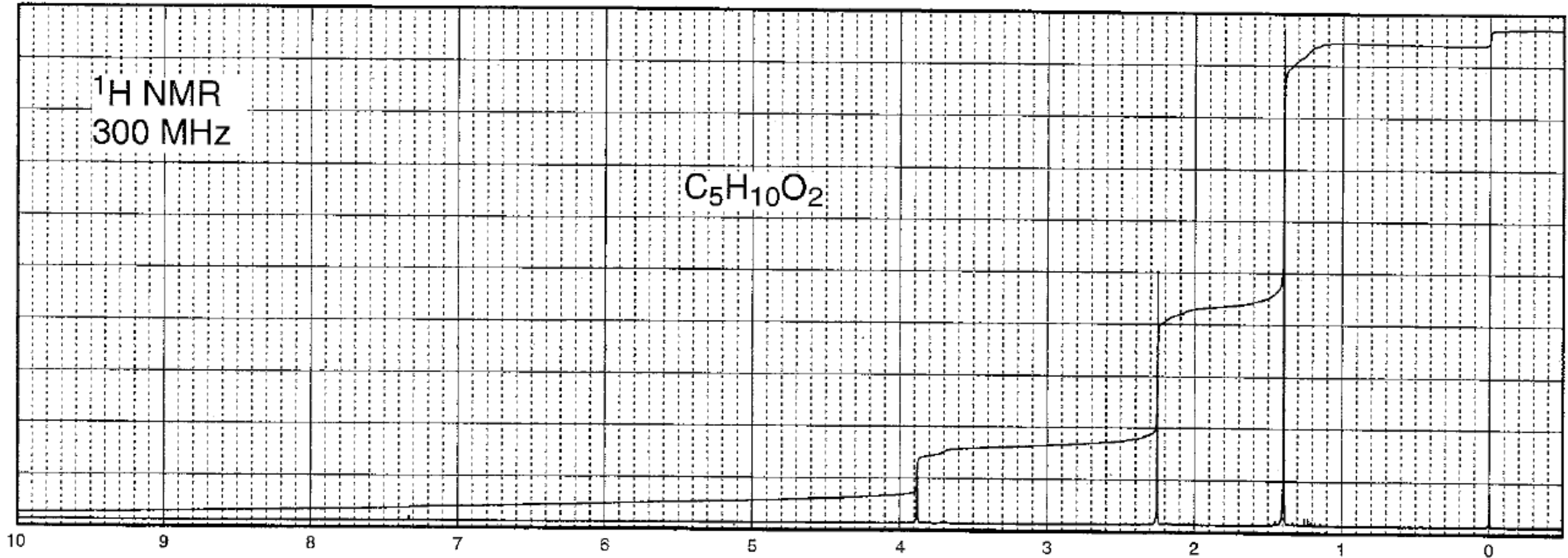
Exercícios – Estrutura a partir de espectro de ^1H

2



Exercícios – Estrutura a partir de espectro de ^1H

3



Infravermelho: Uma banda larga em 3450 cm^{-1} e uma banda intensa em 1713 cm^{-1}