

Course CHEM 345Lecturer GellmanDay WedDate 1/18/17Notes Taken By EileenTotal # of Pages 2

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NO NOT STAPLE - ONLY WRITE NOTES INSIDE THE SQUARE BELOW

* Hand-out available on course website

Recommended Problems:

Ch 12 - 8, 10-15, 23-28, 29(a)
 30, 32, 33

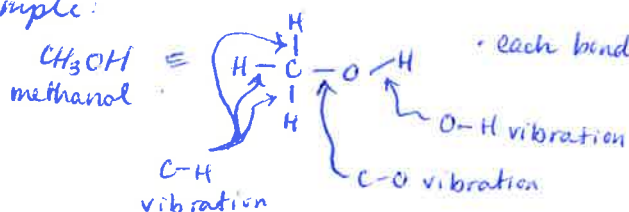
Chapter 12 - Infrared (IR) Spectroscopy

Wavelength of EM radiation (λ)

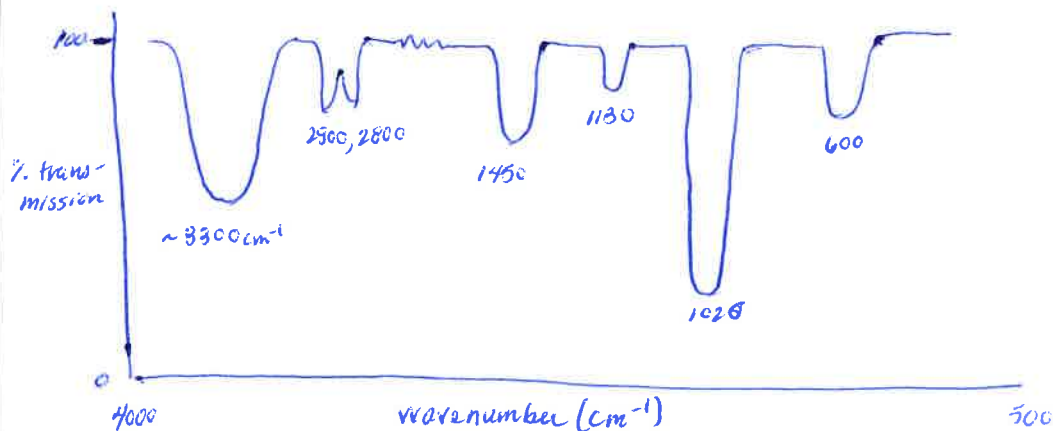
400-700nm = visible light

700-10⁴ nm = IR \rightarrow corresponds to internal motions within molecules

example:



IR spectrum of CH₃OH:



wavenumber = $1/\lambda$

interpretation:

~3300 cm⁻¹ = O-H stretch
 2900 = C-H stretch
 1020 = C-O stretch

* How are signals identified?

* match with values in table (Appendix 2 or Table 12.2)

- Appendix 2 will be available on exams
- Should practice using tables prior to exam

* What about the IR features not matched w/ a bond stretch?

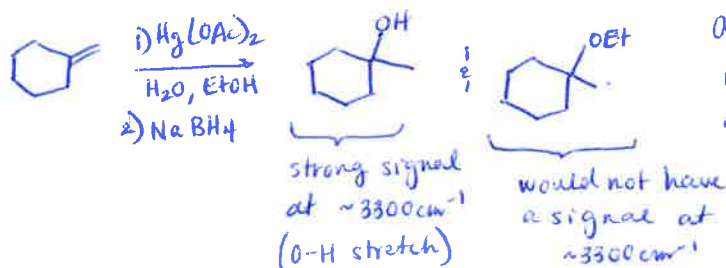
* Ignore them

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- How does an organic chemist deploy IR data?
- To test hypotheses about molecular structure.

example:

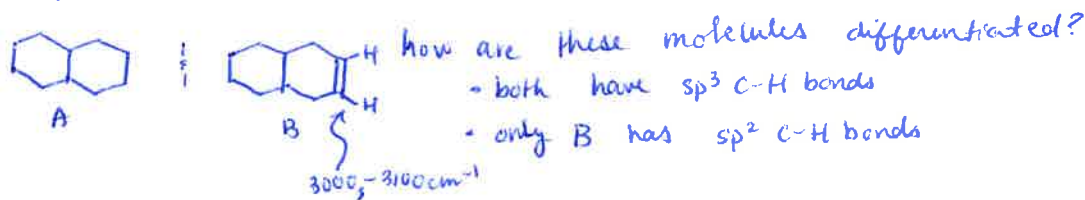


Guidelines for Interpretation of IR data:

- 1) Strong signal - polar bonds
- 2) look for uncrowded regions of IR spectrum
- 3) focus on ~~uncrowded~~ ^{uncommon} bonds

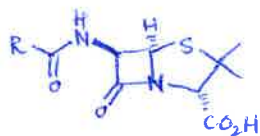
common: sp^3 C-H $2850-2950\text{cm}^{-1}$
 uncommon: sp^2 C-H $3000-3100\text{cm}^{-1}$
 sp C-H $\sim 3300\text{cm}^{-1}$

example:



Historical Significance:

Penicillin - "The Enchanted Ring" JC Sheehan - structure elucidation



Correct structure

