Course Chem 345 Lecturer Gellman
Day Wednesday Date 1-20-16
Notes Taken By Lu Liu Total # of Pages 3

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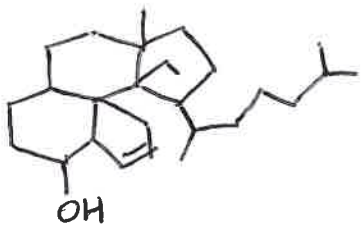
Chap 12 – Infrared Spectroscopy [Mass Spectrometry]
↓
"IR"

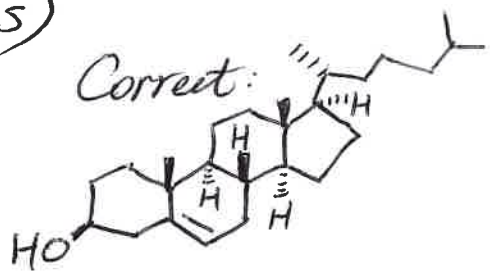
Rec Problems – 8, 10-15, 23-28, 29(a), 30, 32 & 33

Historical example – challenge of structure determination
→ cholesterol = $C_{27}H_{46}O$
1928, Nobel Prize (Windaus)

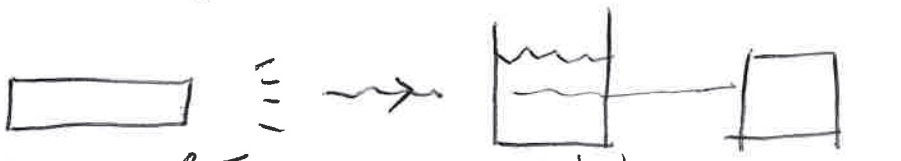
Proposed:



Correct:



Spectroscopy (general)



Key question – which portion of EM spectrum are absorbed, which pass through?

What we can learn about molecular ~~sp~~ structure depends on wavelength range of EM radiation used.

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Define EM radiation by wavelength.

λ = wavelength

Recall: visible light

λ: 400 – 700 nm.

Violet Red

A bit shorter ... ultraviolet (UV)

~~400~~ 400 – 10 nm

A bit longer ... Infrared

700 – 10^6 nm

Visible / UV spectroscopy (§15.2, skipped)

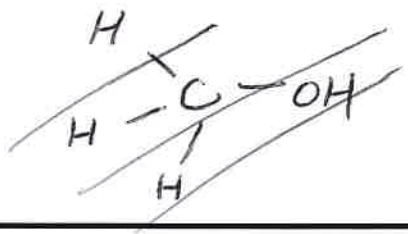
→ Learn about conjugated π system (electronic transitions)

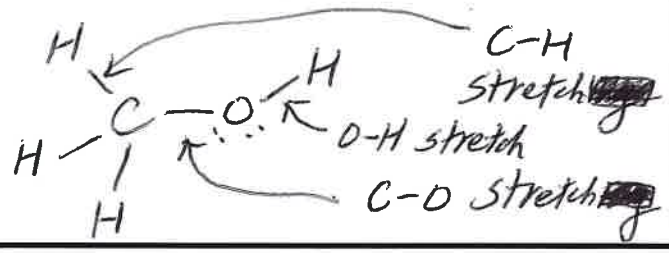
IR spectroscopy – Internal vibrations w/in molecules

Ex: Bond stretching

More complex motions, see Fig 12.8.

Example: Bond stretch motions in CH_3OH





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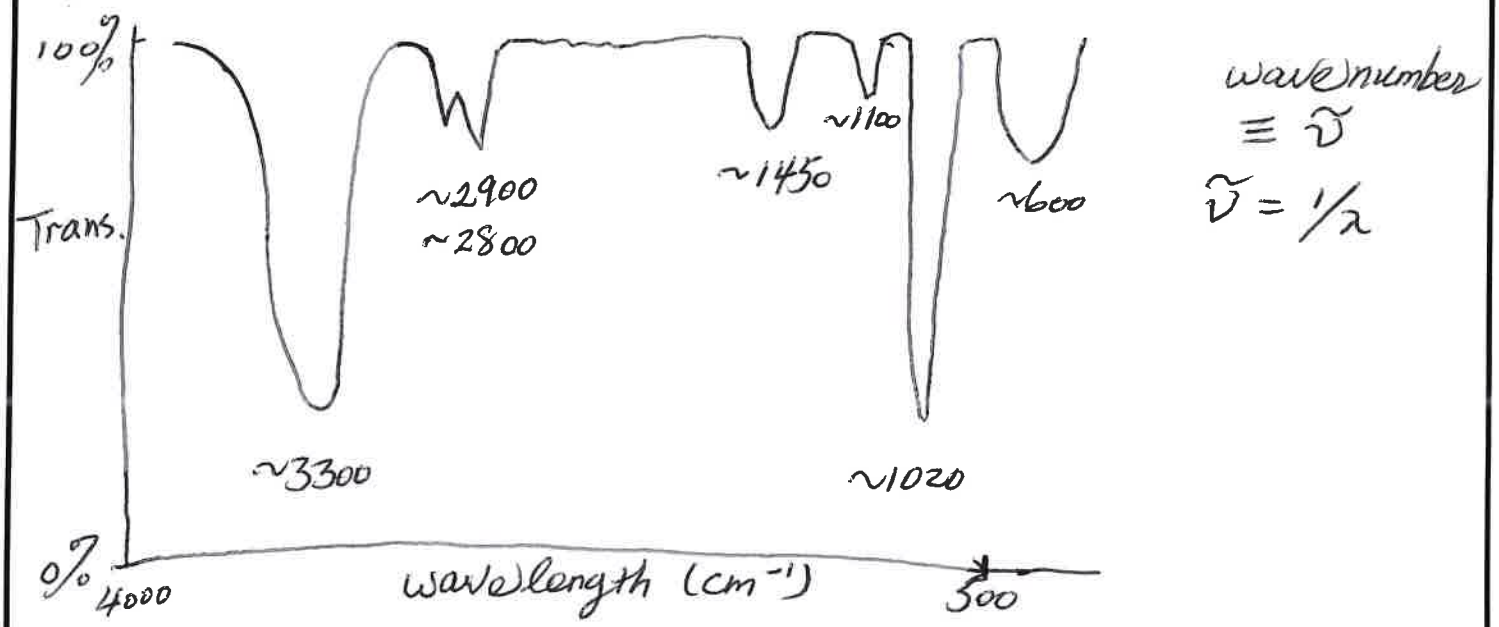

Interpretation:

~3300 cm^{-1} — O-H stretch

~2900 cm^{-1} — C-H stretch

~1020 cm^{-1} — C-O stretch

How do we make "assignments"? → Appendix 2. of Table 12.2

- Not all IR features are interpreted (at least by organic chemists)

How does an organic chemist make use of IR data?