CHEM 008L-01
Lab 2: Alkene Qualitative Tests

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(generally responds within 0-5 hours Monday-Friday, ~8 am- 5 pm, and within 24 hours on weekends and holidays)

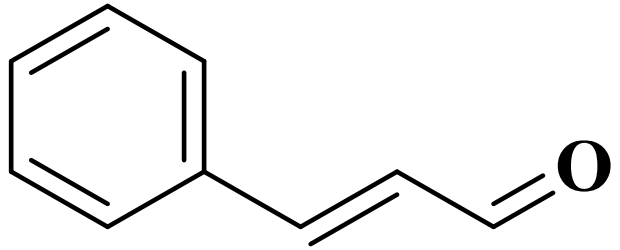
Office Hours: T/R 1:30-2:30 pm on ZOOM

Lab 2 Learning Objectives

- Explore reactivity of 1-hexene and 3-phenylpropenal in qualitative tests: bromine test, permanganate test, Jones test, Tollens test and 2,4-dinitrophenylhydrazine test.
- Introduction to IR spectroscopy: learning where the peaks associated with alkenes are.
- Introduction to ^{1}H NMR spectroscopy: learning where the peaks associated with alkenes are.
- Introduction to ^{13}C NMR spectroscopy: learning where the peaks associated with alkenes are.

Alkene Compounds

1-hexene



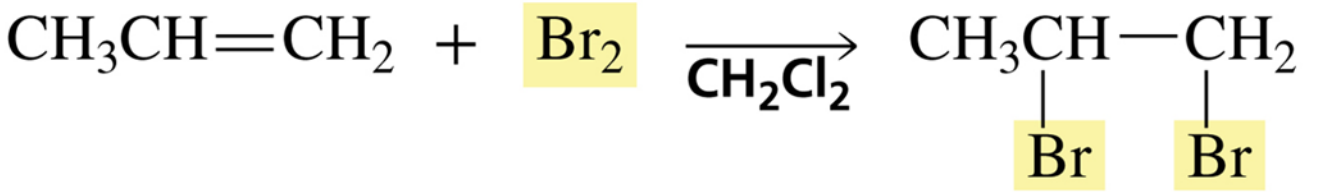
3-phenylpropenal,
AKA: *trans*-cinnamaldehyde


Qualitative Analysis
Alkenes
Alcohols
Aldehydes
Ketones
Acids
Esters
Amines
Amides
Halides
Ethers
Natural Products
General Unknowns
chalkboard, functional group selection
EXIT
Reagents
flask
TEST TUBES
NMR
clamp
IR spectrometer
test solutions
cork ring support
waste container

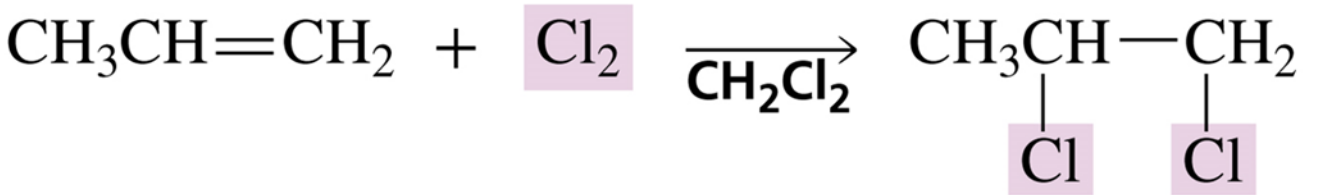
Qualitative Tests- Bromine

The Addition of a Halogen to an Alkene (section 6.9, Bruice)

The addition of Br_2 or Cl_2 in an inert organic solvent such as CH_2Cl_2 results in the formation of a vicinal dihalide.



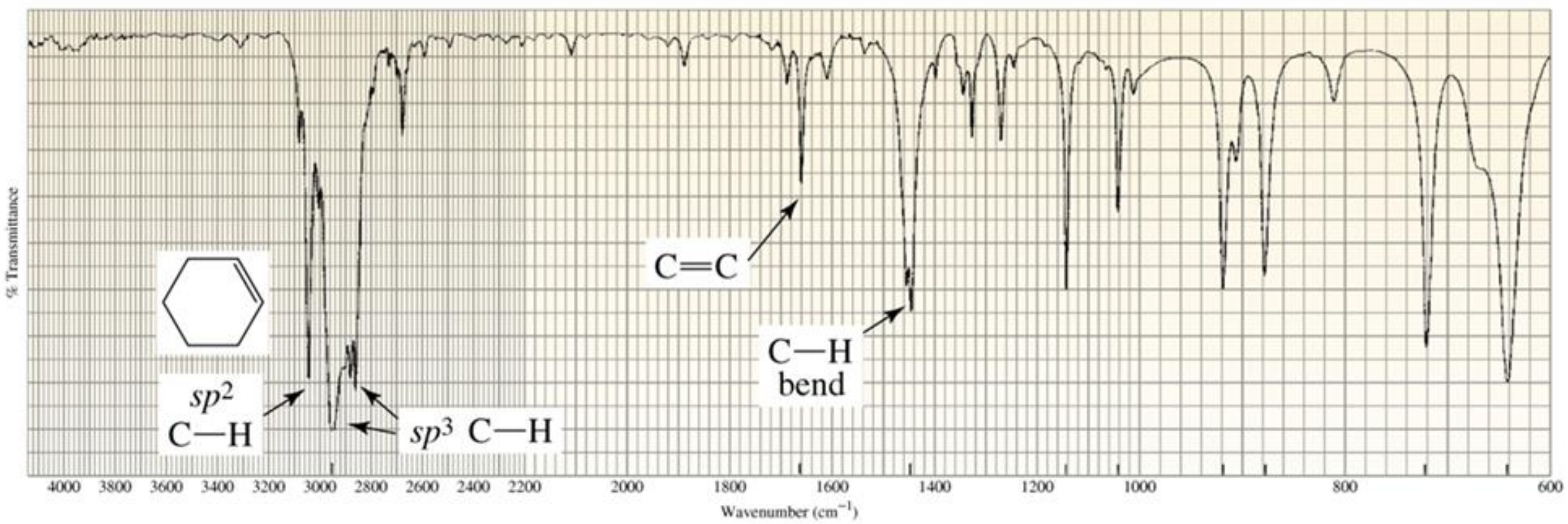
vicinal dibromide



vicinal dichloride

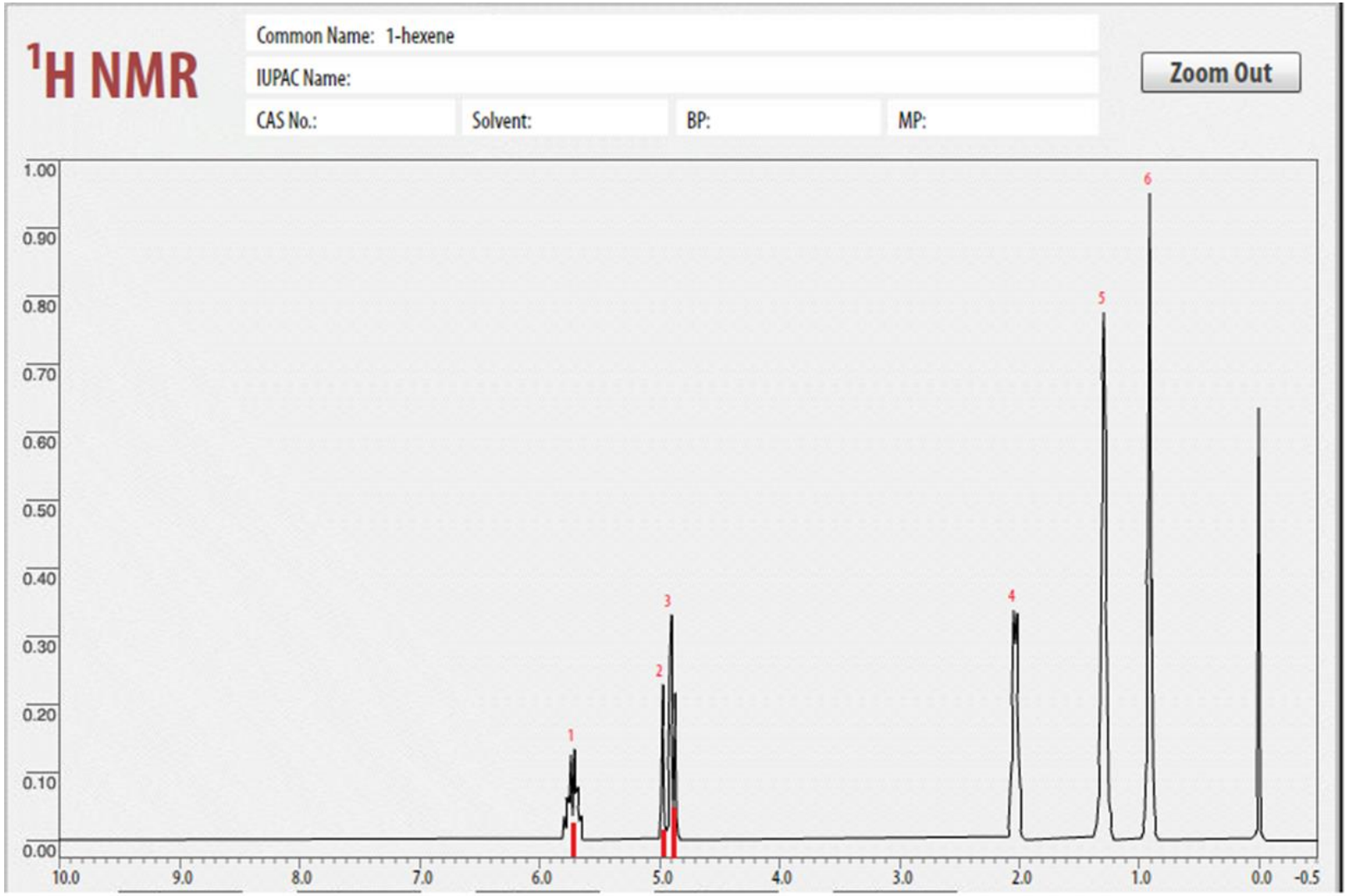
IR spectrum 1-hexene

You will use the Beyond Labz virtual platform to record the IR spectrum for 1-hexene. You will look for the bond absorptions that are characteristic of alkenes: sp^2 C-H stretch (~3100-3000 cm^{-1}) and the C=C stretch (~1600-1680 cm^{-1}).



^{1}H NMR spectrum 1-hexene

You will use the Beyond Labz virtual platform to record the ^{1}H NMR spectrum and the ^{13}C NMR spectrum for 1-hexene. In the ^{1}H NMR spectrum you will identify the 3 signals that correspond to the 3 hydrogen atoms attached to the sp^2 carbon atoms of the alkene (~4.5-6.5 ppm).



^{13}C NMR spectrum 1-hexene

You will use the Beyond Labz virtual platform to record the ^{1}H NMR spectrum and the ^{13}C NMR spectrum for 1-hexene. In the ^{13}C NMR spectrum you will identify the 2 signals that correspond to the 2 alkene carbon atoms (~100-150 ppm)