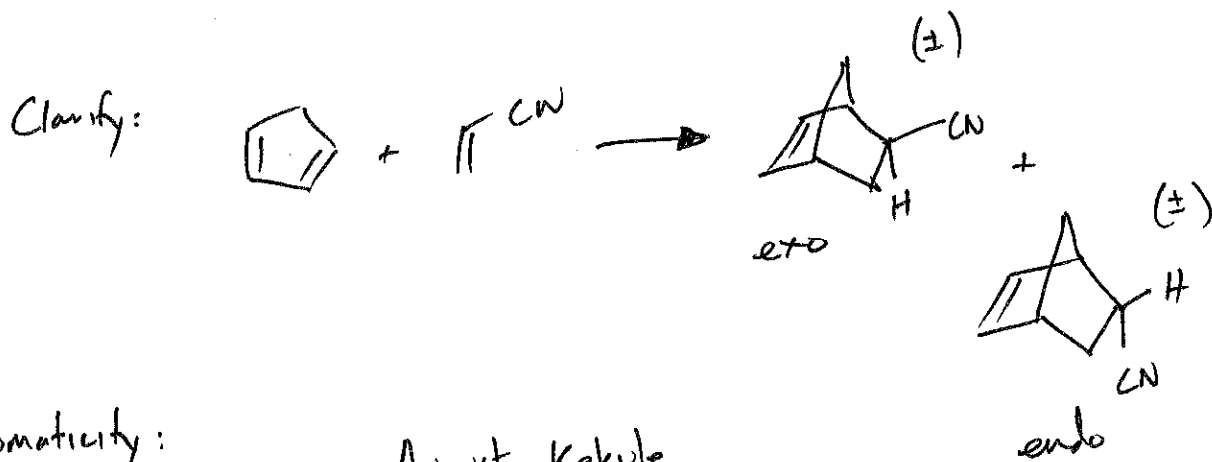


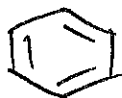
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PLEASE COMPLETE NOTES IN INK AND DO NOT STAPLE.

Office hours: Today until 1 pm

- Last lecture:
- stereochemistry in Diels-Alder rxn
 - different pairs of dienes/dienophiles
 - HX addition to conjugated dienes

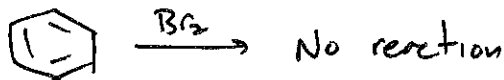


Aromaticity: August Kekule



benzene, C₆H₆

• Benzene does not possess the reactivity of typical alkenes/dienes



Course 343

Instructor Hockenberger

Day Fr

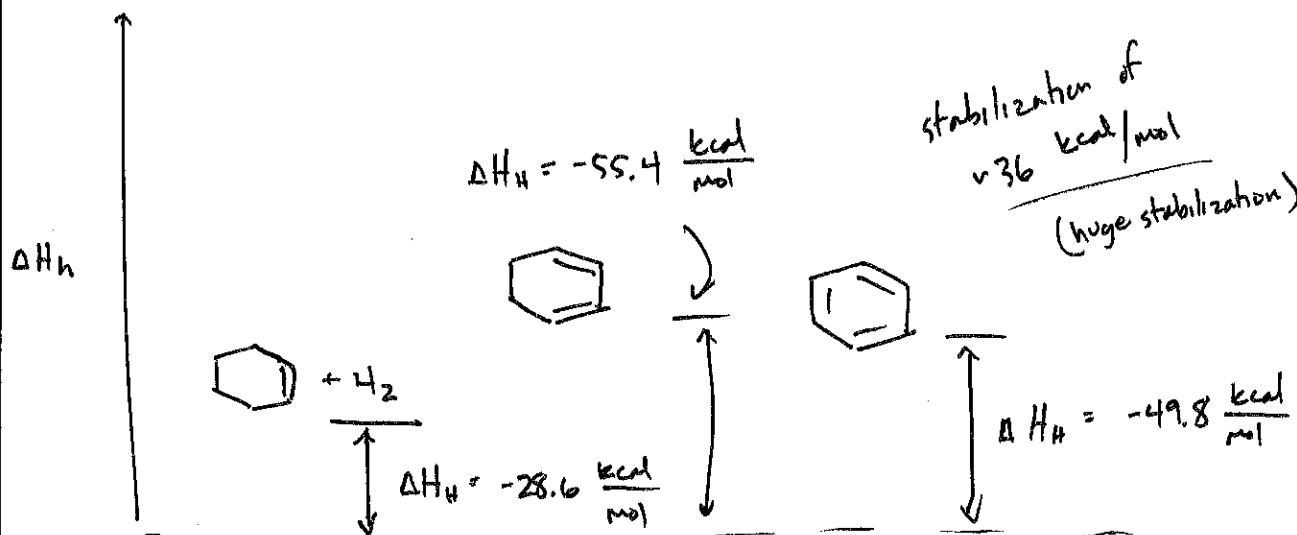
Date 12/13

Notes Taken By _____

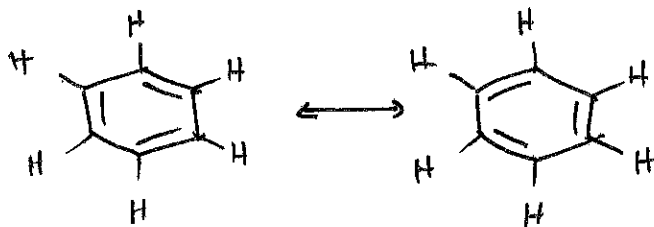
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• Look at experimental data. Similar to conjugated dienes



resonance of benzene:



(don't draw it this way)

• Extra cyclic stabilization for ~~conjugated~~ fully conjugated compounds
→ aromaticity

Course 243

Instructor Hockenberger

Day Fri

Date 12/13

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Total # of Pages _____

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PLEASE COMPLETE NOTES IN INK AND DO NOT STAPLE.

• Aromatic compounds have distinct reactivity

• Characteristics of aromatic compounds

1) Correct # of π electrons!

Hückel's Rule: Aromatic compounds have $(4n+2)$
 π electrons (i.e., 6, 10, 14, 18, etc)

~~2) Cyclic structures~~



8 π (not aromatic)

2) Cyclic structure:

- closed loop of p-orbitals (i.e. conjugated system)



not aromatic

no p orbital



not aromatic

3) Ring must be planar

Course 343

Instructor Hackenberg

Day Fri

Date _____

Notes Taken By _____

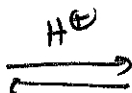
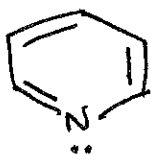
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• Heterocycles: at least one atom in the ring is not carbon.

— Some can be ~~not~~ aromatic (i.e. pyridine)

Aromatic

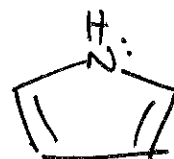


still aromatic

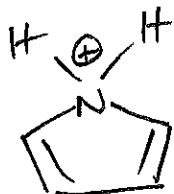
N lone pair is not part of aromatic system (is in sp^2 orbital)

• in contrast:

pyrrolidine



• in this case, the N lone pair is part of the aromatic ring (lone pair e's are in p orbital)

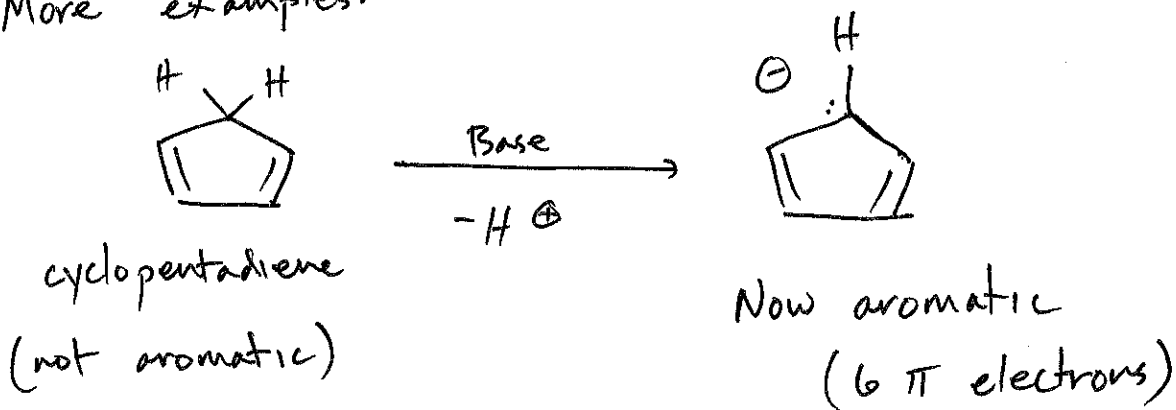


not aromatic

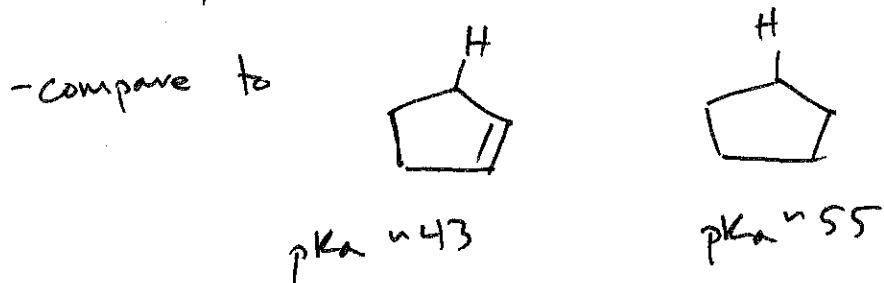
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More examples:



\cdot pK_a of cyclopentadiene is ≈ 16 (similar to H_2O)



Acidity of cyclopentadiene is due to the high stability of the aromatic carbanion.