

Ch 16 Aromatic Compounds

Note Title

2/8/2006

benzene isolated early 1800s

CH empirical formula (low C:H ratio)

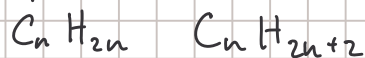
C_6H_6 molecular formula (vapor density measurements)
(f.p. depression)

Aromatic hydrocarbons: similar properties to benzene
(low H)

Pleasant odor

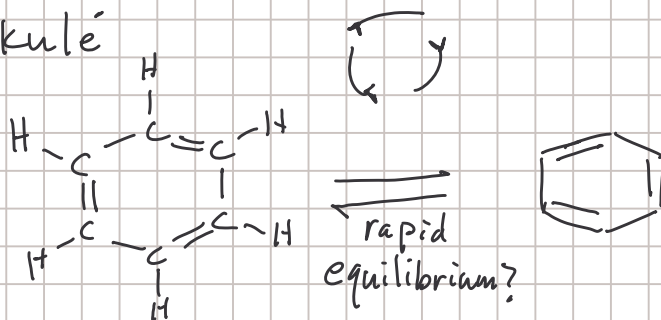
aliphatic hydrocarbons: "fat-like"

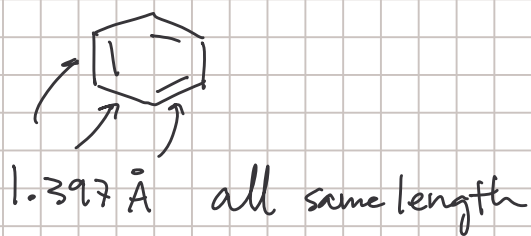
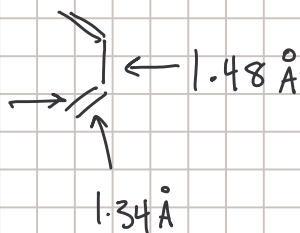
larger amt of H



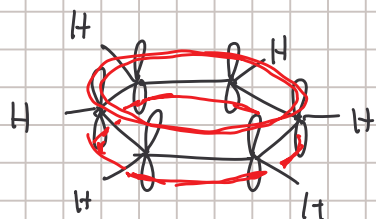
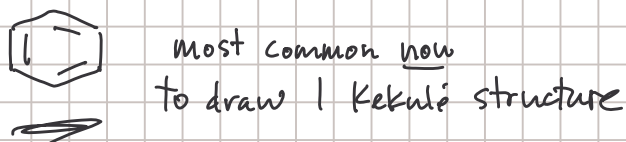
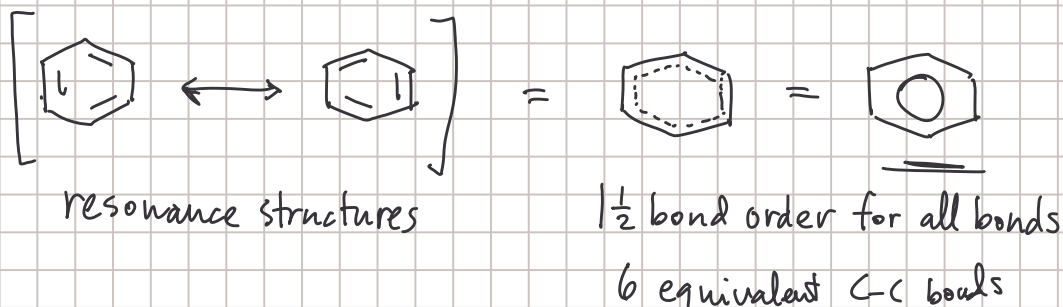
Structure of benzene

Kekulé





All C's are equivalent

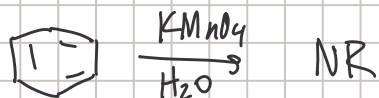
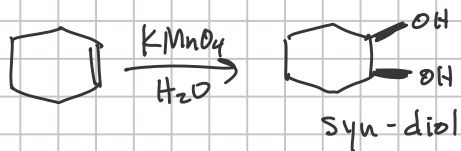


sp^2 hybridized

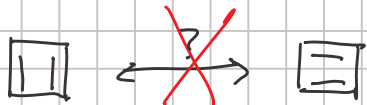
planar molecule

(overlap between each adjacent pair of p orbitals)

Unusual stability



Resonance not the only factor

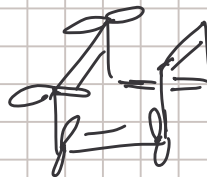


cyclobutadiene: very unstable!

Can only be isolated $< -200^\circ\text{C}$



cyclooctatetraene not planar!

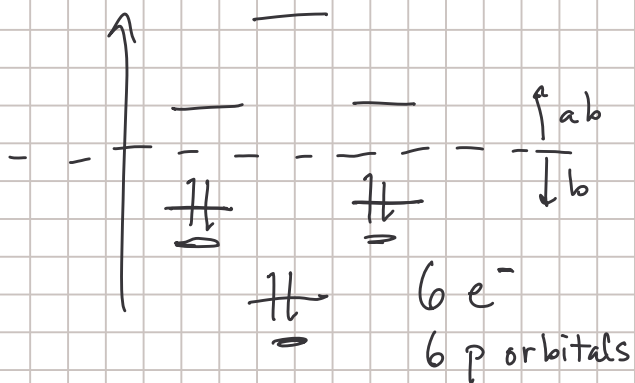
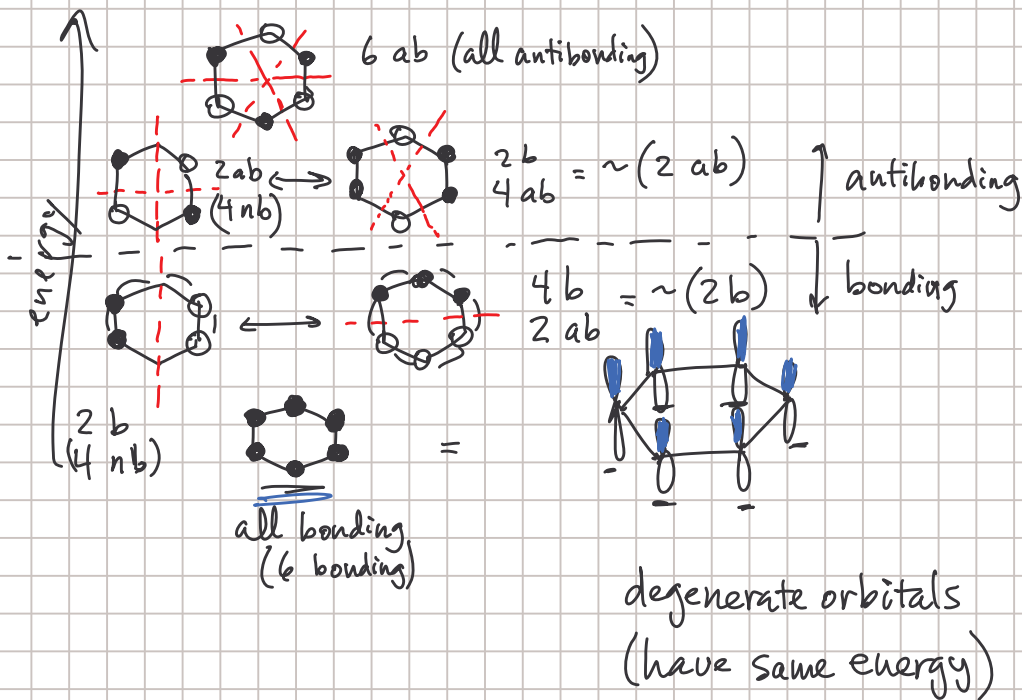


"tub" conformation

MOs of benzene

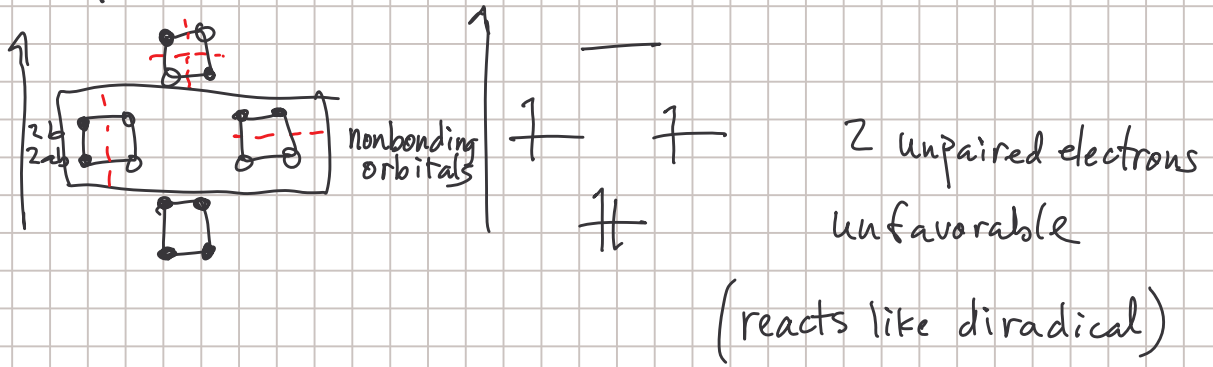
6 p orbitals

6 MOs



all e⁻ paired
all in bonding orbitals

Cyclobutadiene



Polygon rule

cyclic orbital diagram will look like the compound itself!

- 1 single lowest-energy (all-bonding) orbital

Cyclooctatetraene

8 e⁻

