

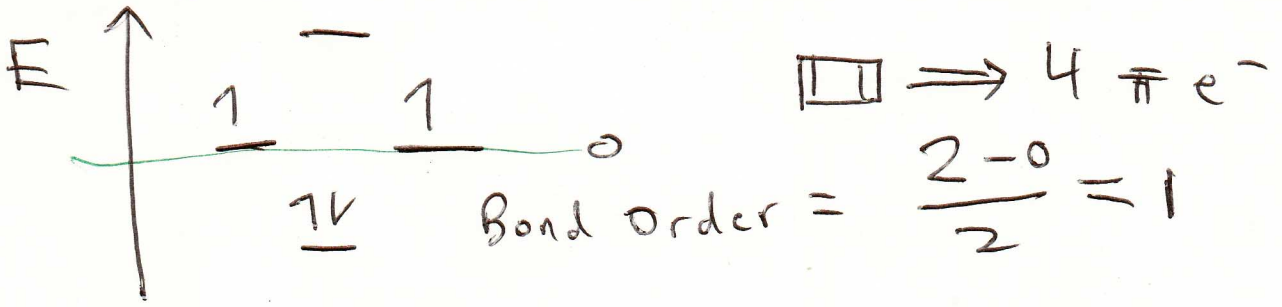
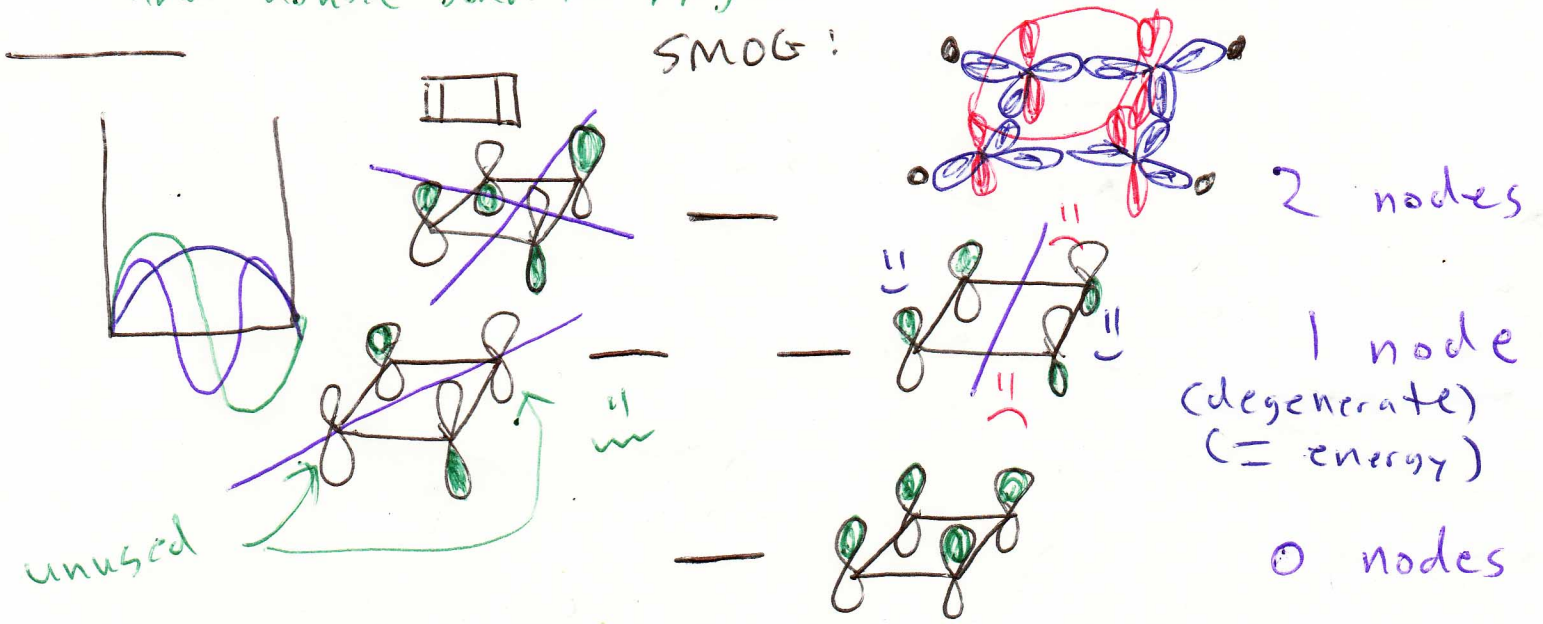


Cyclobutadiene - can only be isolated @ sub-zero temperatures; extremely reactive

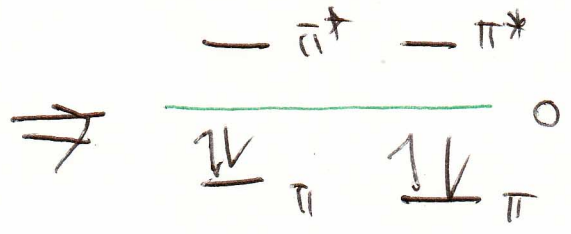
The single bonds are unusually long and weak.

Benzene - easily isolated across a range of temperatures; can only react w/ strong electrophiles or nucleophiles.

There is no difference between any of the C-C bonds in benzene. all of the bonds are between a single and double bond in length.

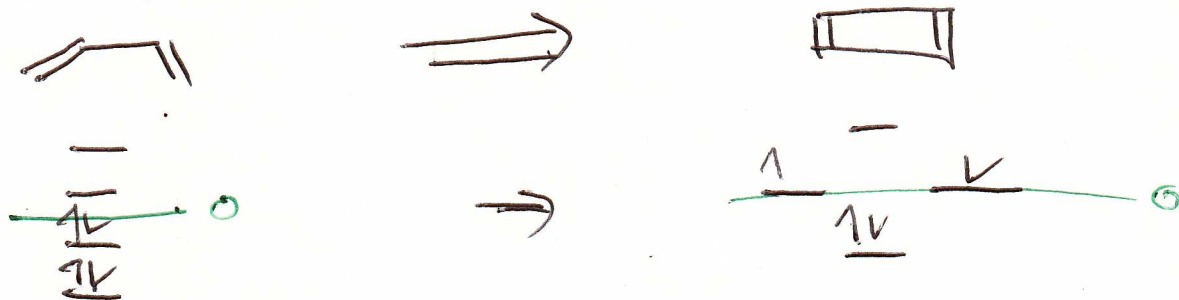


two molecules of ethene



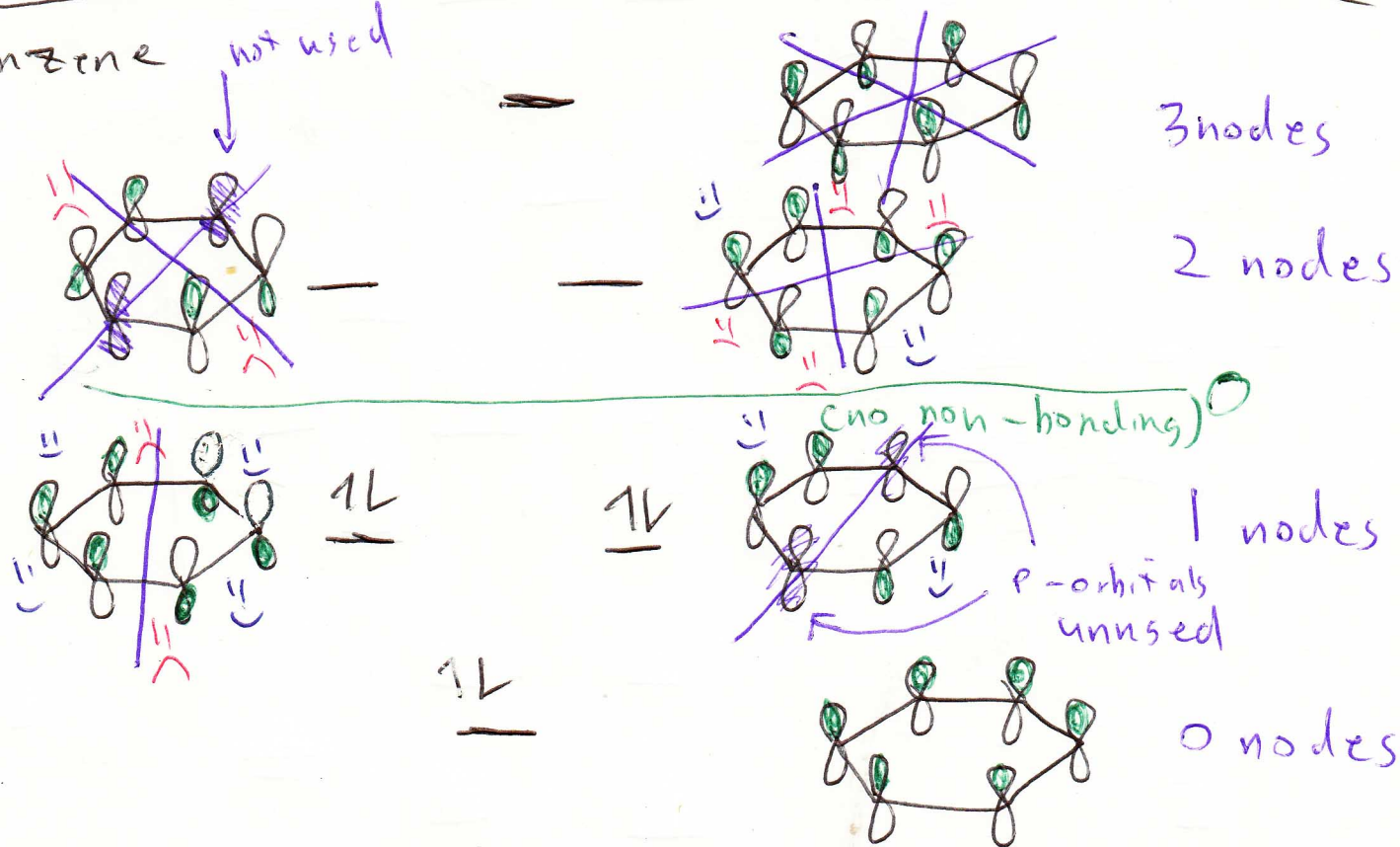
total bond order = 2

Antiaromaticity - A significant destabilization of a  $\pi$  system caused by the full cyclic conjugation of that  $\pi$  system.



When linear buta-1,3-diene is forced to cyclize, two bonding electrons are forced into higher-energy non-bonding orbitals (energetically unfavorable), to avoid this situation, the molecule attempts to distort to prevent full cyclic conjugation. This explains why the shape of cyclobutadiene is not square and the molecule cannot be isolated @ RT.

Benzene *not used*



Hückel