

9.5 Combining the Localized Electron and Molecular Orbital Models

Electrons are not localized. This is apparent in which resonance structures are needed to account for the various Lewis structures. Ex. O_3 and NO_3^- are not described very well.

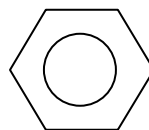
For these structures:

The σ bond can be described as being localized, the single bond between bound atoms.

The π bond has different locations in different resonance structures.

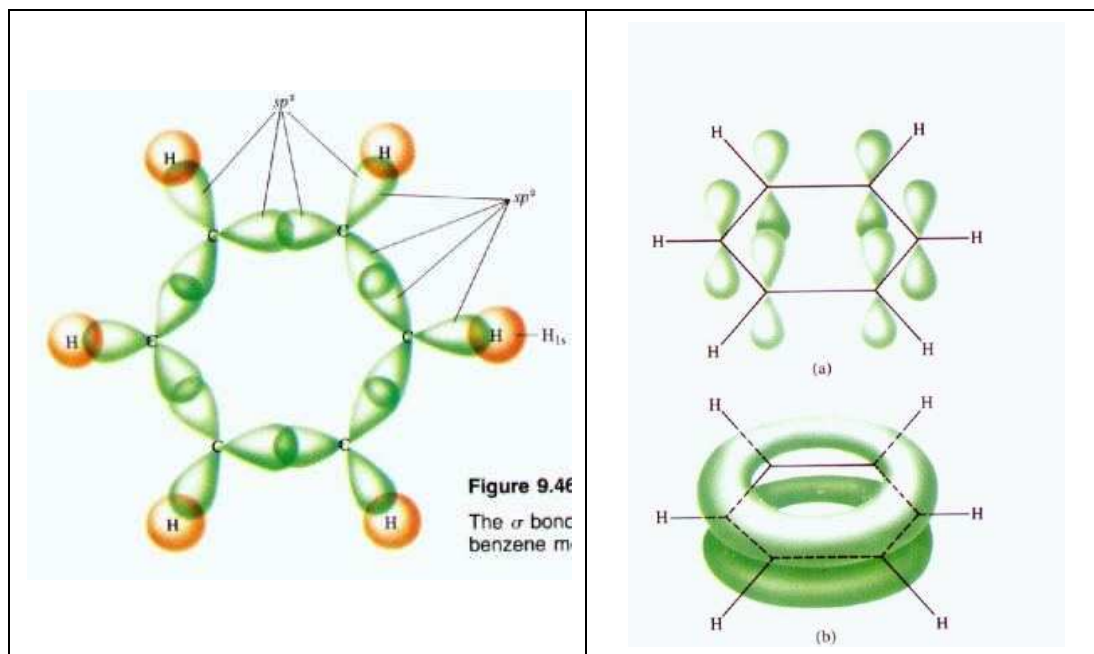
The π bonding is delocalized. Consider benzene, C_6H_6 .

The 6 carbon and H atoms are in the plane of the molecule. Each C uses sp^2 hybrid orbitals. Each C has equivalent energies. This leaves 6 pure p orbitals perpendicular to the plane of the hexagonal ring. This delocalized π ring is above and below the plane of the molecule. The delocalized π electrons can be used to explain the resonance forms in example O_3 , NO_2^- , NO_3^- , etc. Benzene, C_6H_6 , is often drawn as:



sp^2 planar ring

delocalized p clouds



Homework Practice:

P. 418 #14, 51, 52, 74, 76, 79