

ORGANIC CHEMISTRY

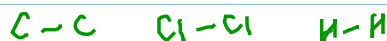
→ C compounds
covalent bonding → shared e⁻ pair(s)
C-C, C=C, C≡C

unless an fan C C⇒4 bonds, N⇒3, O⇒2, H⇒1

Lewis Structures

→ shows bonding CH_4 $\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{H} \end{array}$

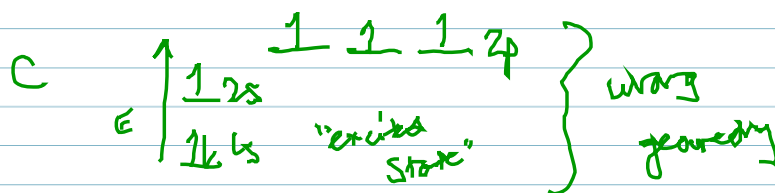
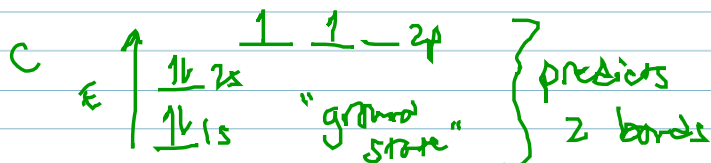
⇒ DON'T EXPLAIN ΔE for similar bonds



⇒ DON'T PREDICT ACTUAL GEOMETRY
→ USE VSEPR HELPS

VALENCE BOND THEORY (VBT)

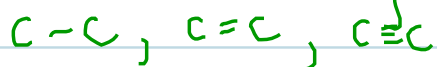
→ bonds are formed when atomic orbitals on two different atoms overlap and e⁻s are shared



ORGANIC CHEMISTRY

→ C compounds

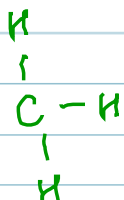
covalent bonding → shared e⁻ pairs



unless an ion C ⇒ 4 bonds, N ⇒ 3, O ⇒ 2, H ⇒ 1

Lewis Structures

→ show bonding CH₄



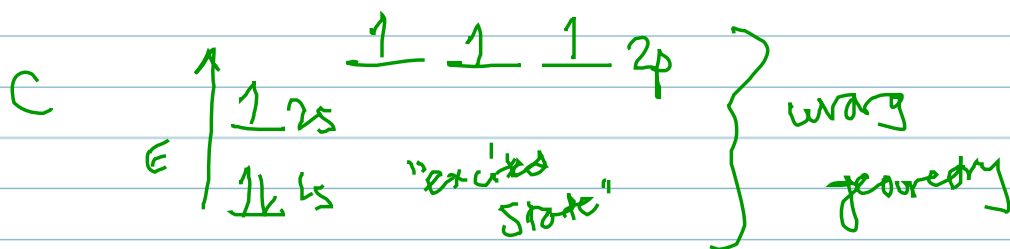
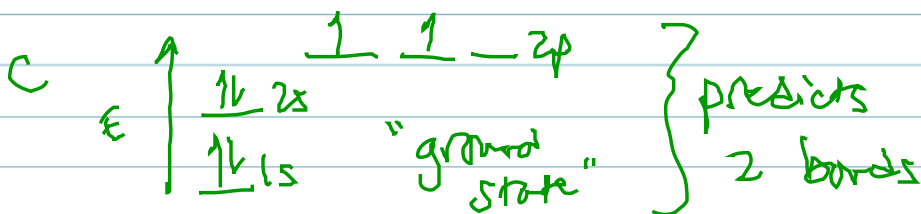
⇒ DON'T EXPLAIN SE for similar bonds



⇒ DON'T PREDICT ACTUAL GEOMETRY
→ VSEPR HELPS

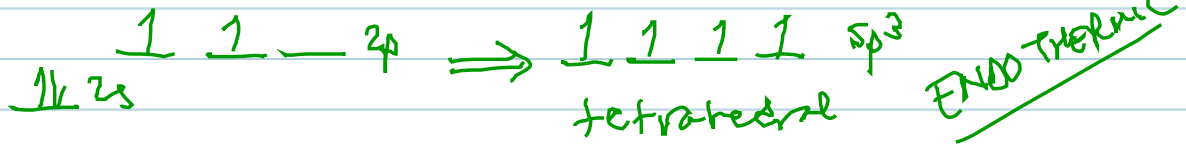
VALENCE BOND THEORY (VB)

→ bonds are formed when atomic orbitals on two different atoms overlap and e⁻s are shared

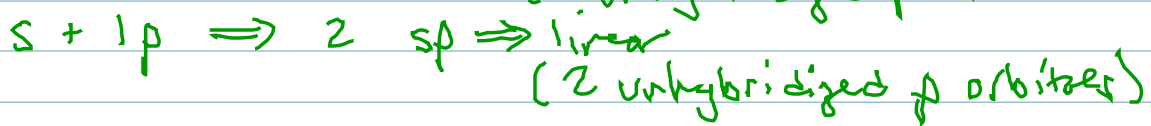
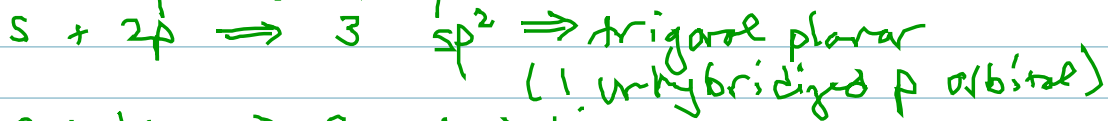
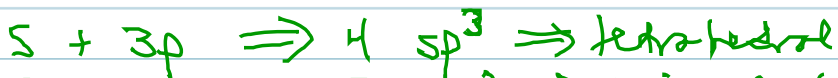


HYBRID ORBITALS

→ 2 or more different types of orbitals combining to form a new type of orbital



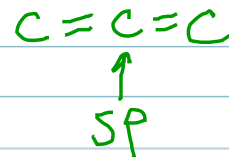
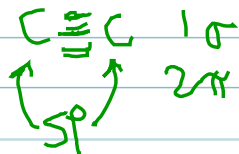
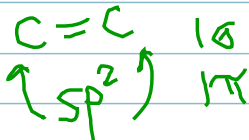
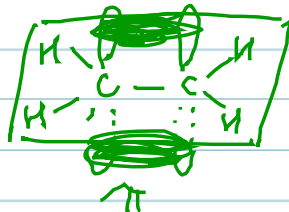
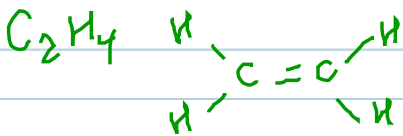
atomic orbitals used = # hybrid orbitals made

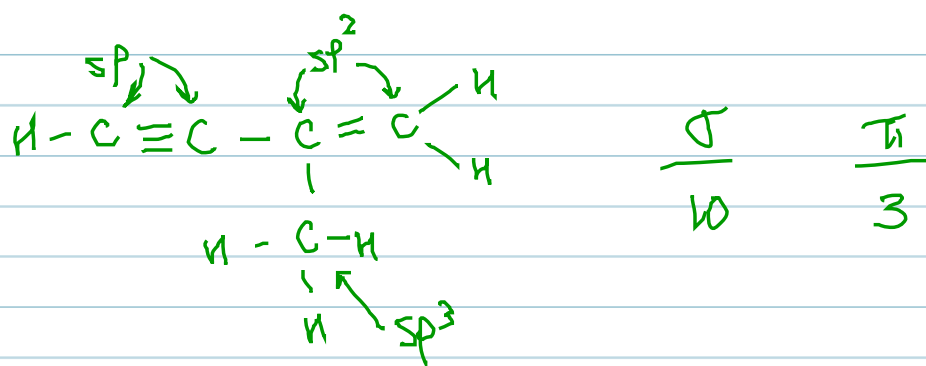


2 kinds of covalent bonds

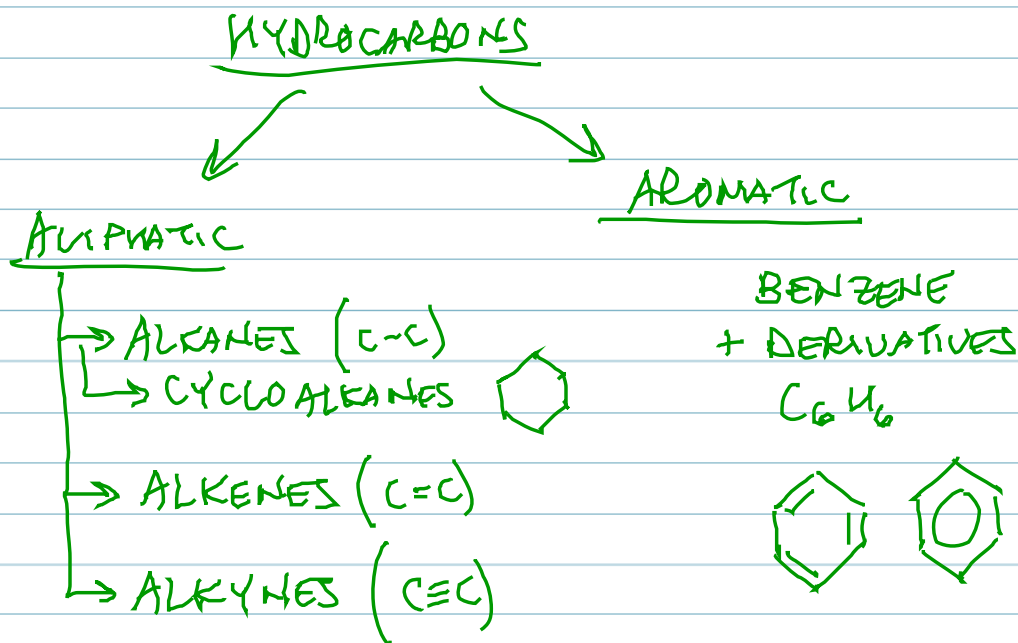
1) sigma bonds (σ) \Rightarrow direct end-to-end overlap
• single bond

2) pi bonds (π) \Rightarrow sideways overlap of unhybridized p orbitals





- HYDROCARBONS H, C
- FUNCTIONAL GROUPS \rightarrow interchangeable clusters of atoms that determine the chemical properties of the molecule



ALKANES only C-C bonds sp^3

$C_n H_{2n+2}$ "saturated" hydrocarbons
max # of H's

$C_1 H_4$ methane

$C_2 H_6$ ethane

$C_3 H_8$ propane

$C_4 H_{10}$ butane

$C_5 H_{12}$ pentane

$C_6 H_{14}$ hexane

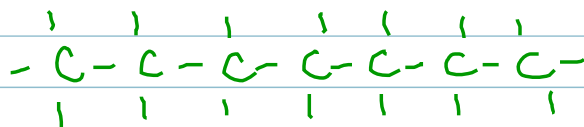
$C_7 H_{16}$ heptane

$C_8 H_{18}$ octane

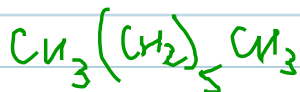
$C_9 H_{20}$ nonane

$C_{10} H_{22}$ decane

Structure:



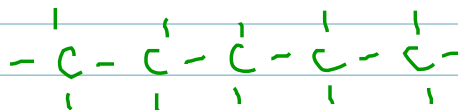
Condensed: $CH_3 CH_2 CH_2 CH_2 CH_2 CH_2 CH_3$



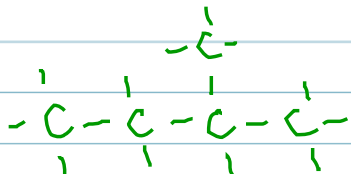
STRUCTURAL

ISOMERS

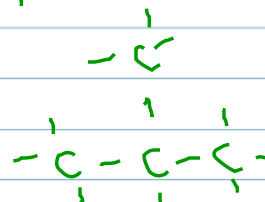
$C_5 H_{12}$



n-pentane



2-methyl butane



2,2-dimethyl propane