Introduction to
Organic Chemistry

HSSP

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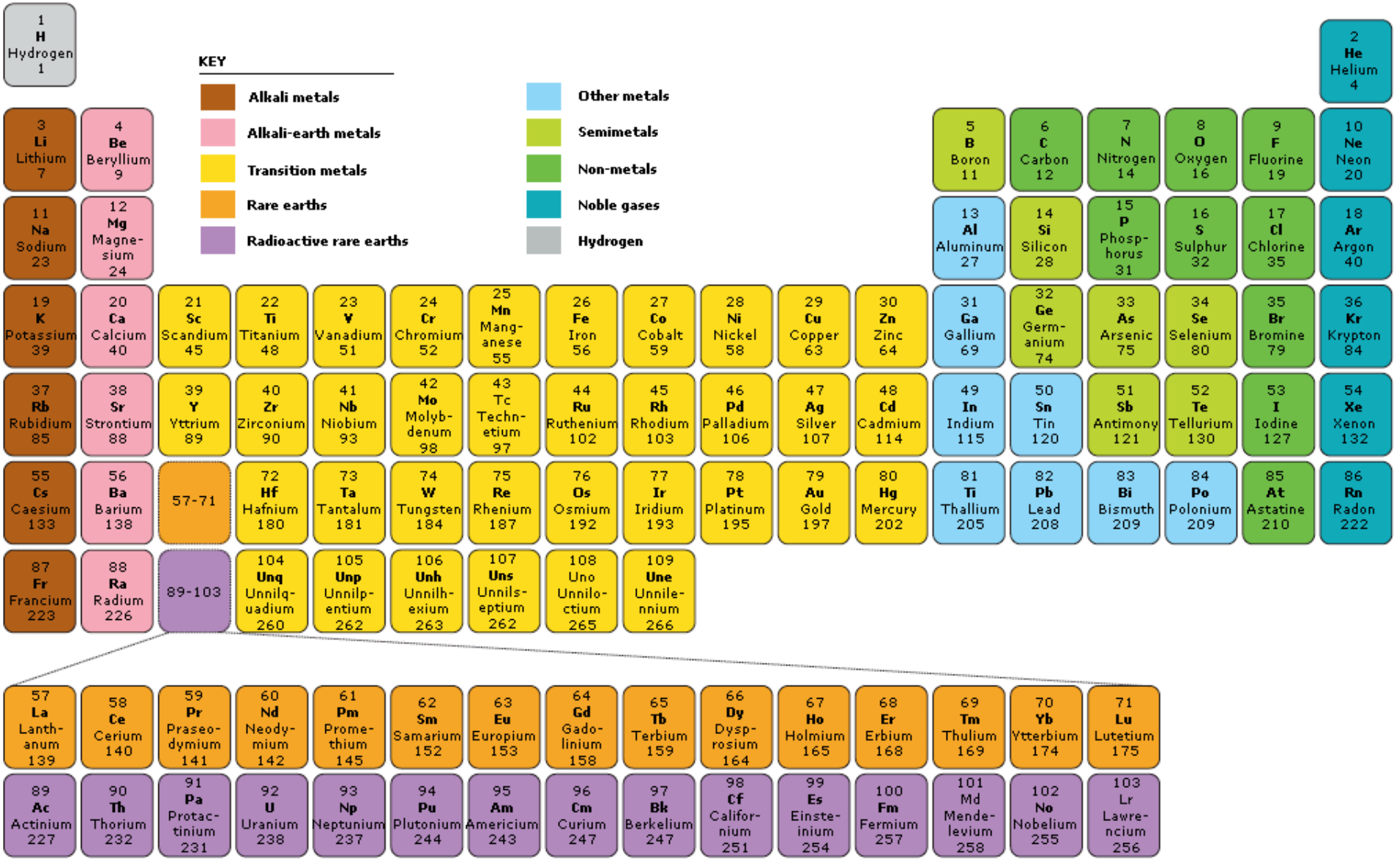
Periodic Table



Bonding in Carbon

- Carbon-12
  - $1s^2\ 2s^2\ 2p^2$
  - How many valence electrons in carbon? How can you tell?

- Organic Chemistry
  - Study of carbon containing compounds and its properties
  - Synthesis

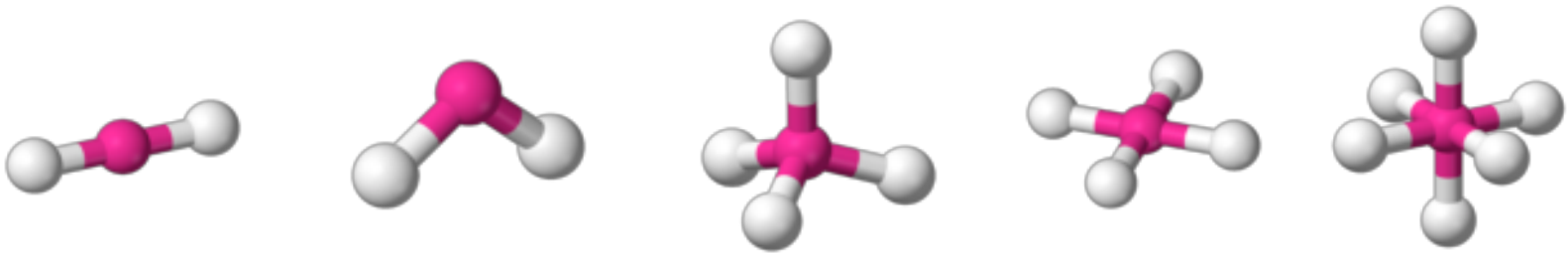
Quick Review

- Covalent Bonds
  - Sharing of electrons between atoms in a molecule
- Octet Rule
  - Atoms combining together to give stable structure with 8 valence electrons in outer shell

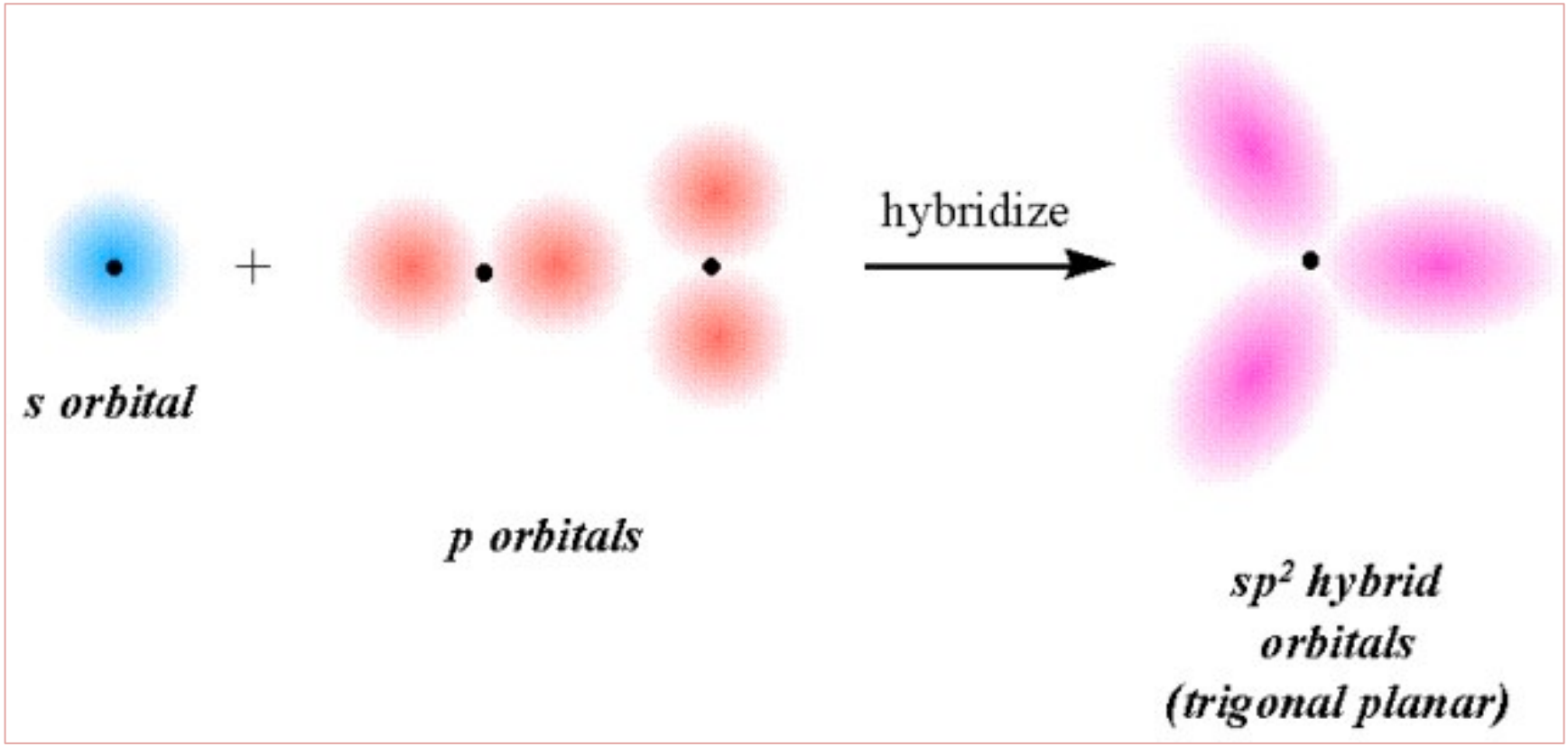
Quick Review Contd.

- Valence Shell Electron Pair Repulsion Theory (VESPR)
  - Geometry of compound determined by electrostatic repulsion of valence electrons
- Hybridization Theory
  - Mixing of atomic orbitals to form new hybrid orbitals
- Molecular Orbital Theory (MO)
  - Determining molecular structures with moving electrons

VESPR

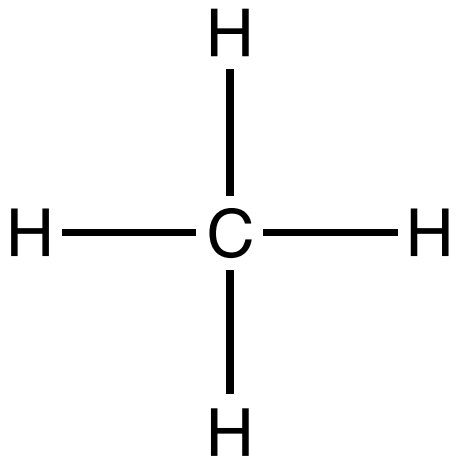


Hybridization



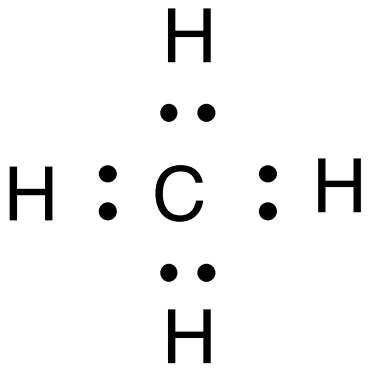
Methane – CH_4

Structural formula

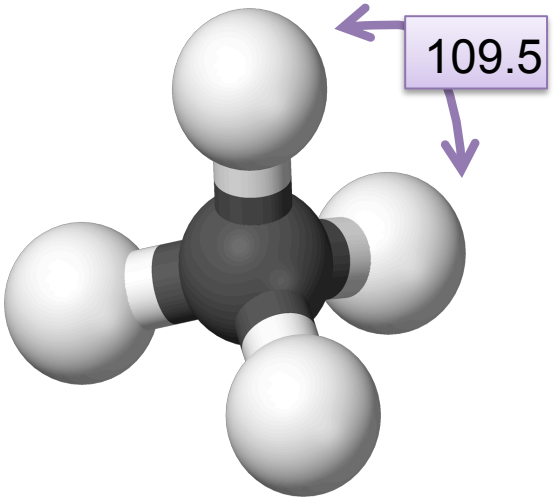


- Valence Shell Electron Pair Repulsion model (VSEPR)
  - Carbon has four valence electrons
  - Forms 4 bonds
  - Tetrahedral

Lewis Dot Structure

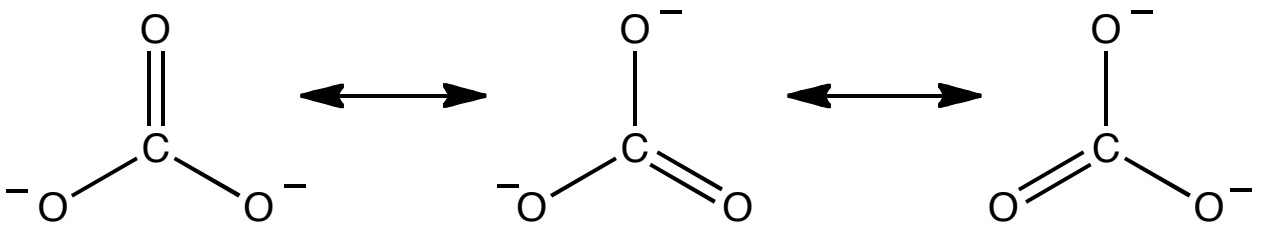


- Hybridization
  - sp^3 orbitals



Resonance

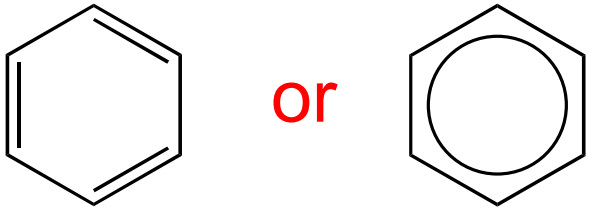
- Movement of delocalized electrons in compound that gives more than 1 Lewis Structure
  - Major & Contributing structures
  - Gives compound stability!



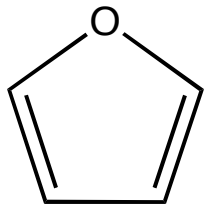
Carbonate ion

Resonance

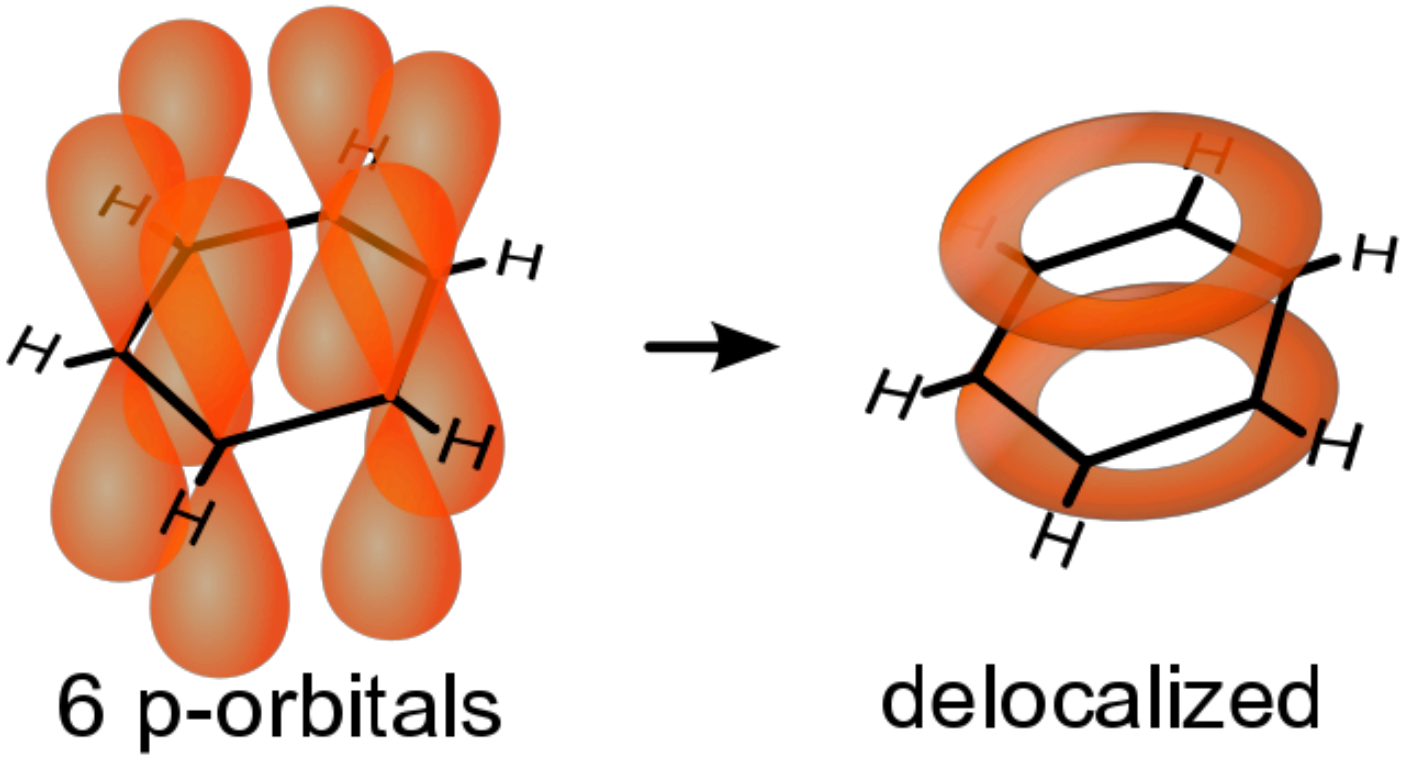
- Conjugation
  - System where atoms are covalently bonded with alternating single and multiple bonds

benzene  or

  - Can have atoms with electrons available in p-orbitals (like oxygen)

furan 

Benzene



P-orbitals (lobes on top) mix together to form delocalized “donut” from moving e-

Same occurs for bottom lobes of p-orbitals