

Chapter 9

Chemical Bonding I: Lewis Theory

Georgia Gwinnett College
Chem 1212K
Fall 2013

Preliminaries

- Our knowledge of atomic structure, electron configurations and periodic properties gives a foundation for understanding bonding.
- Electrons can be divided into:
 - Core electrons (e⁻ in a filled shell)
 - Valence electrons (e⁻ in an unfilled shell, outermost electrons)
- Valence electrons participate in bonding through:
 - Sharing of e⁻ by atoms: **covalent bonding**
 - Transfer of e⁻ from one atom to another: **ionic bonding**
- Nature tends to prefer states of lower energy
 - **Atoms come together to form bonds to lower their energy.**

Octet Rule

- When atoms bond, they tend to gain, lose, or share electrons to result in eight valence electrons.
- ns^2np^6
 - noble gas configuration
- many exceptions
 - H, Li, Be, B attain an electron configuration like He
 - He has two valence electrons: a **duet**.
 - expanded octets for elements in period 3 or below
 - using empty valence *d* orbitals