

Section 6-1 Chemical Bonding

Chemical Bond

A mutual electrical attraction between the nuclei and valence electrons of different atoms that binds atoms together

Ionic Bonding (Metal/Nonmetal Electron Transfer)

Chemical bonding that results from the electrical attraction between large numbers of cations and anions

Covalent Bonding (Nonmetal/Nonmetal Electron Sharing)

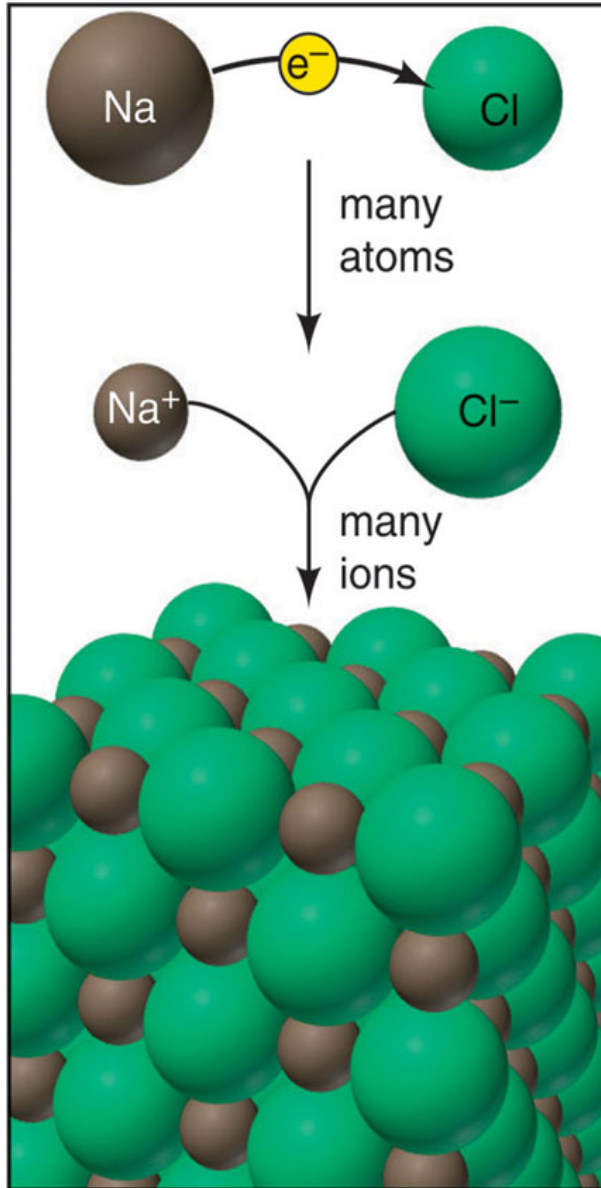
Chemical bonding from the sharing of electron pairs between two atoms

Metallic Bonding (Metal/Metal Electron Delocalization)

Chemical bonding that results from the attraction between metals atoms and the surrounding sea of electrons

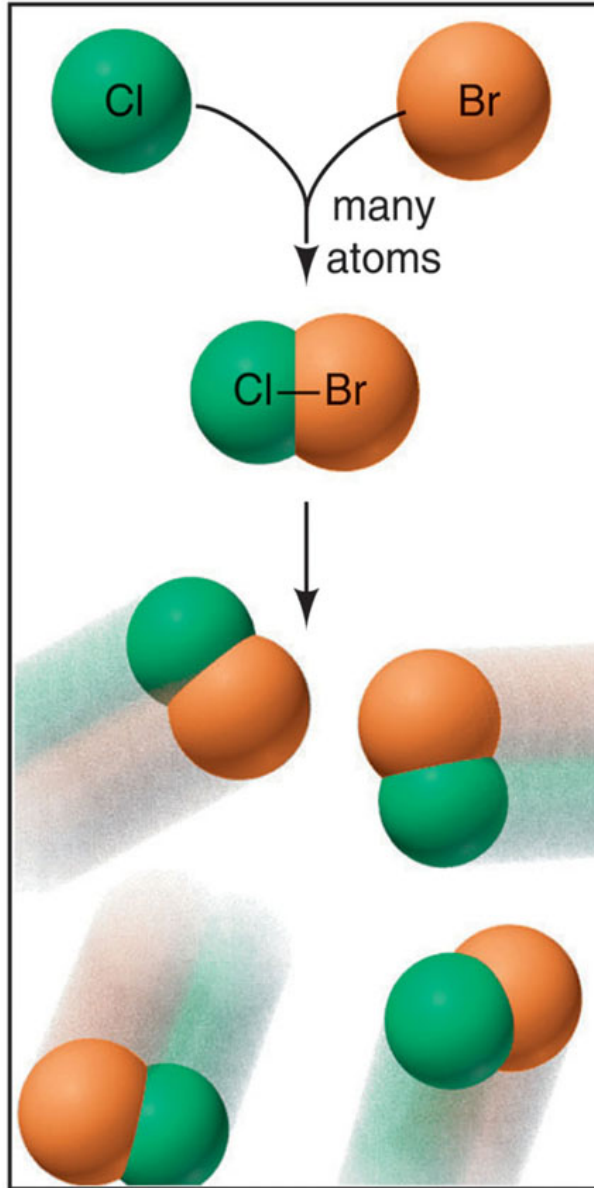
The three models of chemical bonding

Ionic Bonding



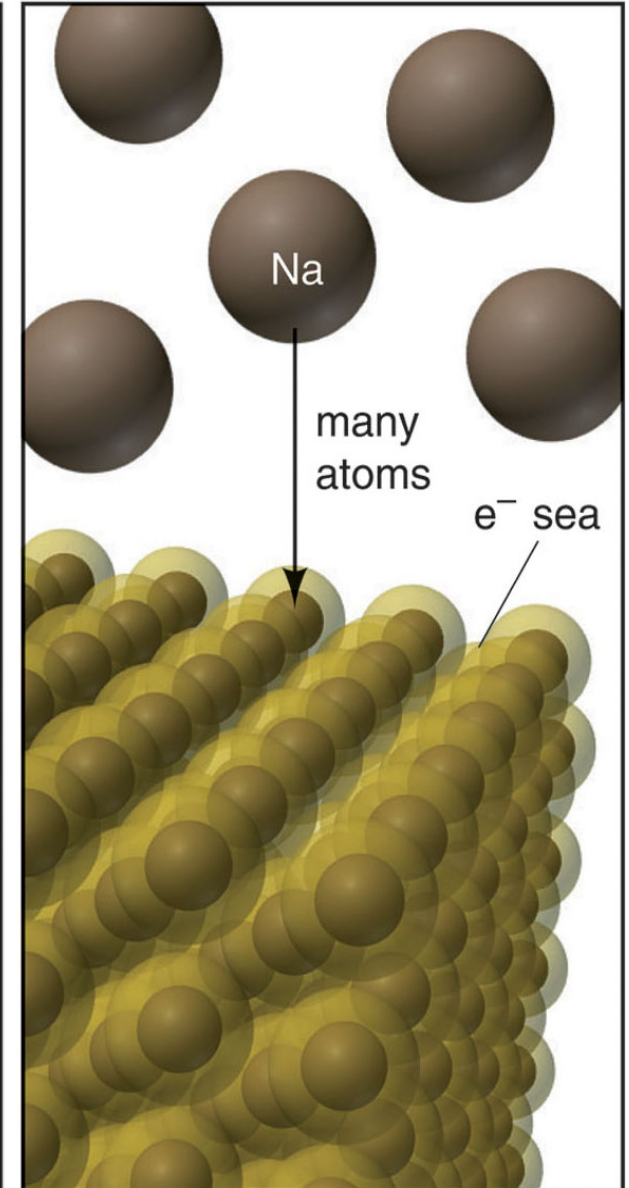
Metal/Nonmetal
Electron Transfer

Covalent Bonding



Nonmetal/Nonmetal
Electron Sharing

Metallic Bonding



Metal/Metal
Electron Delocalization²

Section 6-1 Chemical Bonding

Determining Ionic or Covalent

Bond types are determined from taking the difference of electronegativities between the bonded atoms

Ex. Cesium Fluoride has a difference of 3.3 (4.0 – 0.7)

Ionic Bonding

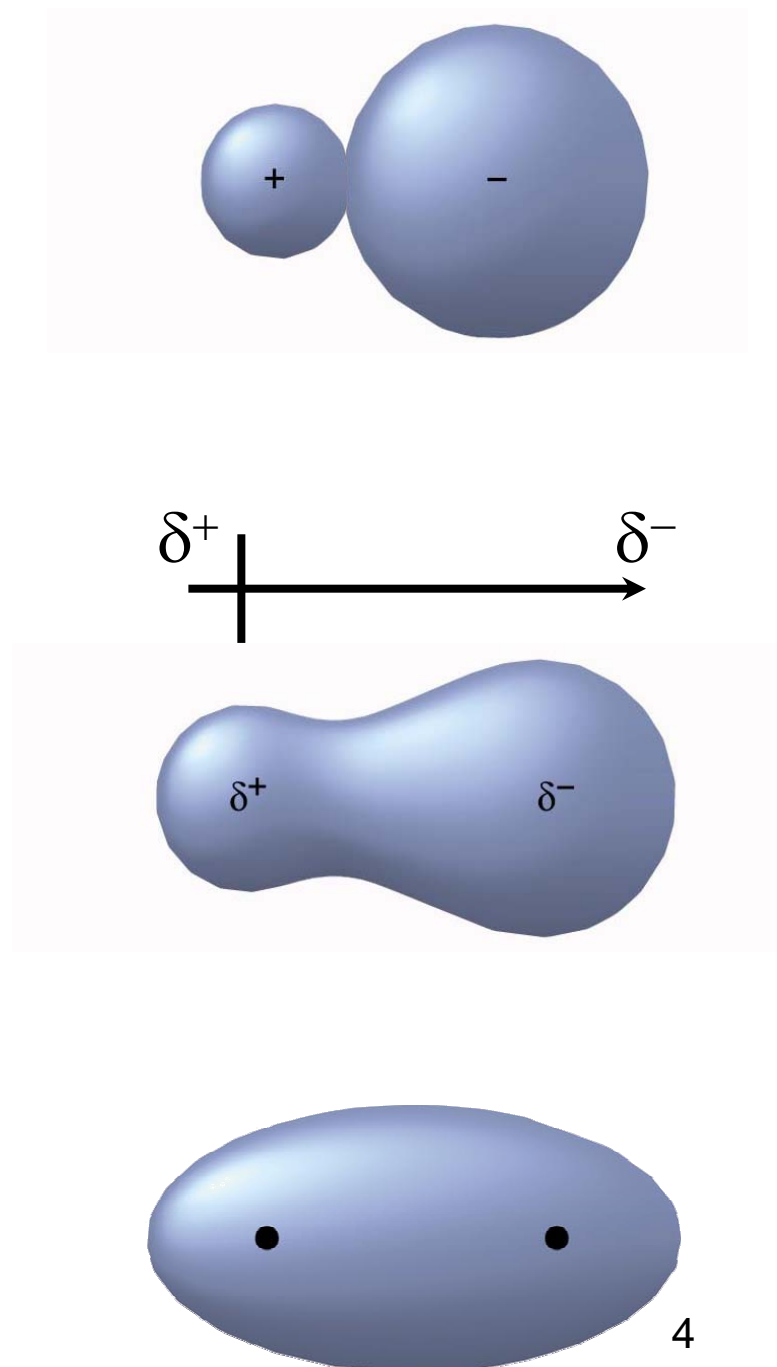
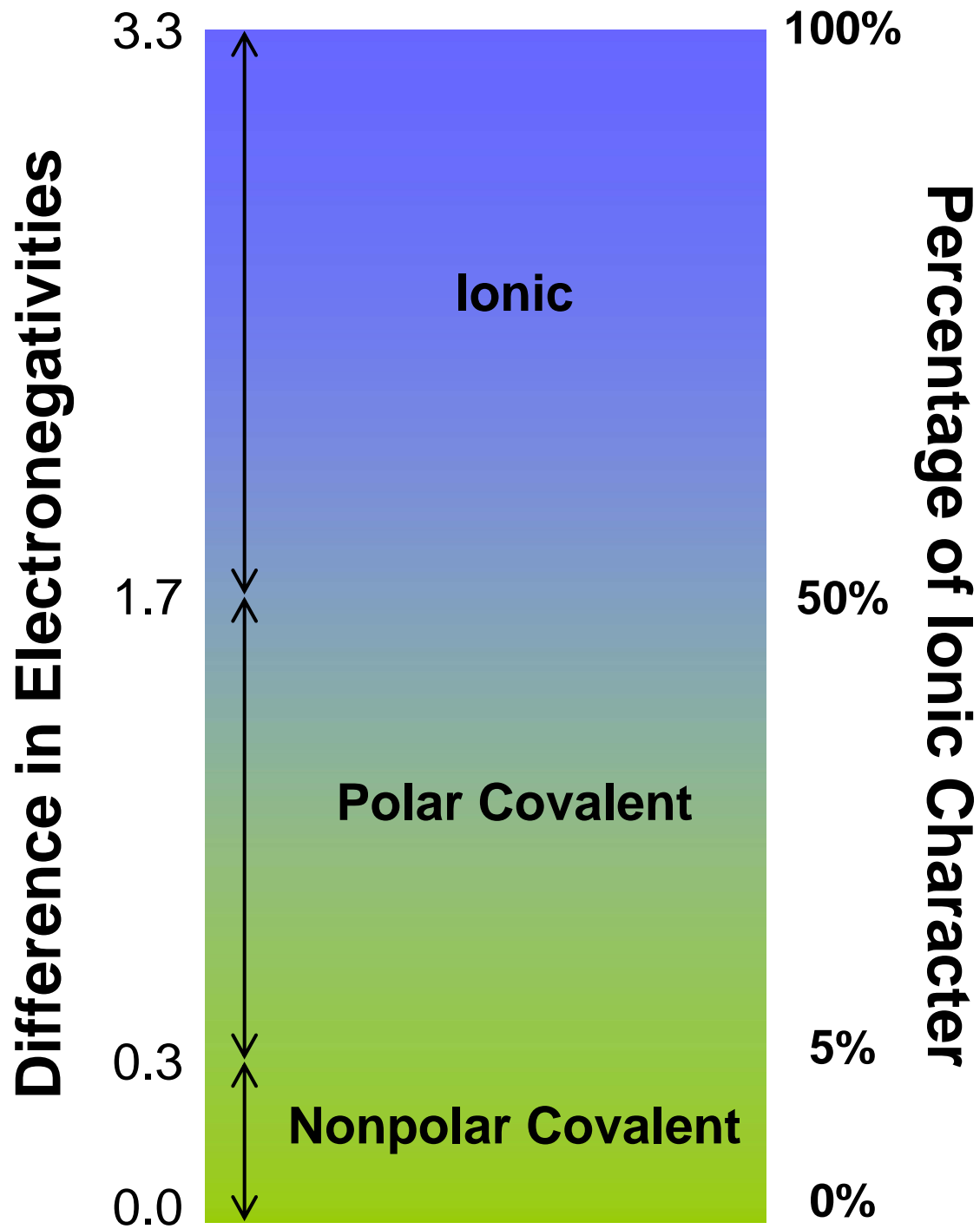
- Between 50% to 100% ionic character
- Electronegativity difference of 1.7 or greater

Polar Covalent Bonding

- Between 5% to 50% ionic character
- Electronegativity difference of 0.3 to 1.7

Nonpolar Covalent Bonding

- Between 0% to 5% ionic character
- Electronegativity difference of 0.0 to 0.3



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Covalent Bonding Types

Nonpolar-covalent Bond

A covalent bond in which the bonding electrons are shared equally by the bonded atoms, resulting in a balanced distribution of electrical charge

Polar-covalent bond

A covalent bond in which the bonded atoms have an unequal attraction for the shared electrons

Polar

Uneven distribution of charge

Dipole $\delta^+ \text{---} \longrightarrow \delta^-$

Equal but opposite charges that are separated by a short distance (δ^+ for positive end and δ^- for negative end)

Representation of Polar Bonds

