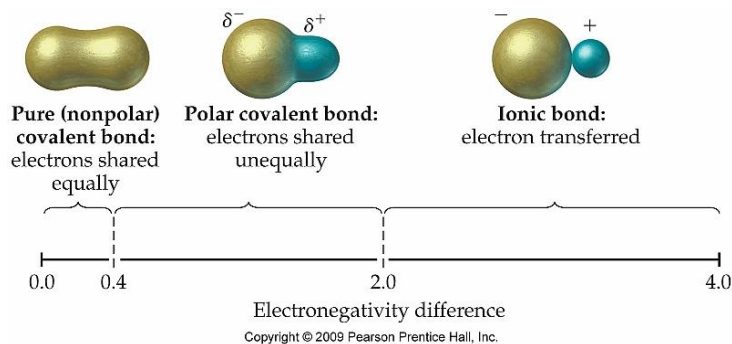


Success 24/7 Chemistry: Polarity and Intermolecular Forces



Type of bond	Bond between :	Electrons are:
Ionic	metal and nonmetal	transferred
Polar Covalent	two nonmetals	shared unevenly
Nonpolar Covalent	two nonmetals	shared evenly

Polar bonds are caused by an uneven sharing of electrons.

Nonpolar bonds are caused by an even sharing of electrons.

An entire molecule is polar if it has polar bonds that do not cancel. This happens in nonsymmetrical molecules. The chart below will help you determine if a molecule is polar or not.

Fill in the following table to help you:

# of Elements Bonded to Central Atom	Lone Pairs on Central Atom	Shape	Polar or Nonpolar molecule?
2	No	Linear	
	Yes	Bent	
3	No	Trigonal Planar	
	Yes	Trigonal Pyramidal	
4	No	Tetrahedral	

Compound	Electron Count	Lewis Dot Structure	Shape	Polarity	IMF <i>(fill out after next video)</i>
HI					
CH ₂ O					
NCl ₃					
O ₂					
CO ₃ ²⁻					

Intermolecular Forces:

Two terms describe the forces that hold substances together.

- Intramolecular bonding- the forces inside a molecule or formula unit due to shared electrons or charge interactions.
- Intermolecular bonding- interactions between particles (atoms, molecules or ions)
 - Changes in state are due to changes in intermolecular bonding, not intramolecular bonding.

Attractions Between Molecules

London dispersion forces –an attraction between nonpolar molecules and is caused by movement of electrons to form areas of concentration

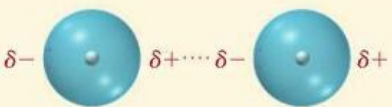

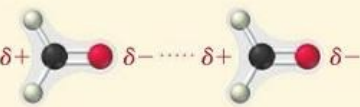
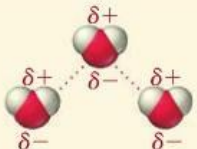
Dipole interactions – an attraction between polar molecules and is caused by a difference in electronegativity.

Hydrogen bonds – attractive forces in which hydrogen, covalently bonded to a very electronegative atom (N, O, or F) is also weakly bonded to an unshared (lone) pair of electrons on another electronegative atom.

Ionic Bonding - occurs between metals and nonmetals when electron are transferred from one atom to another. These bonds are very strong.

Summary of the Strengths of Attractive Forces

- LDF (Weakest strength)
- dipole-dipole attractions
- hydrogen bonds
- Ionic bonds (Highest strength)

Type	Present in	Molecular perspective	Strength
Dispersion	All molecules and atoms		
Dipole-dipole	Polar molecules		
Hydrogen bonding	Molecules containing H bonded to F, O, or N		
Ion-dipole	Mixtures of ionic compounds and polar compounds	