

Name: Key
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Chemistry 11
Solution Chemistry
Lesson #2 Polarity of Molecules

There are two classifications for bonding:

1. Between atoms within a molecule: Intra-molecular
2. Between atoms in adjacent molecules: inter-molecular

In unit IV we focused on intra-molecular bonding and learned that electronegativity differences helps to identify the following three types:

- i. ΔEN 0.0 - 0.5 = true covalent bond
- ii. ΔEN 0.5 - 1.6 = polar covalent bond
- iii. ΔEN > 1.7 = ionic bond

Inter-molecular bonding is also divided into three categories:

- i. di-pole - dipole force / bond
- ii. H-bond
- iii. London force / bond

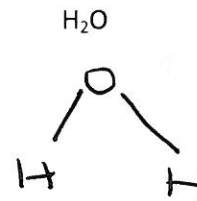
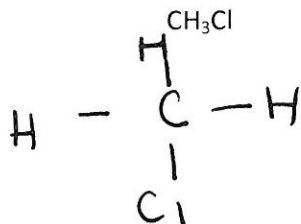
To help determine the type of inter-molecular bonding you first need to determine if the molecule is polar or non-polar.

Polar Molecules:

1. must contain a dipole (2 atoms of different EN)
2. be asymmetric (lack symmetry)

ASYMMETRIC EXAMPLES:

HCl

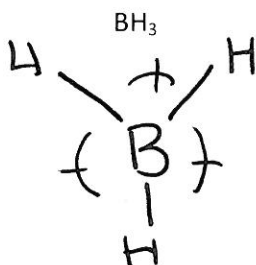


Non-Polar Molecules:

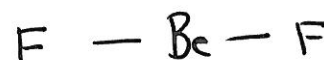
1. might contain a dipole
2. be symmetrical

SYMMETRIC EXAMPLES:

Br₂



BeF₂



Di-pole Di-pole Bond : force that holds polar molecules together due to permanent dipole (electronegativity differences)

Hydrogen Bond : specialized dipole-dipole bond between polar molecules that contain H and one of either N, O or F.

London Force : only force that holds non-polar molecules together due to temporary dipoles created by the movement of electrons.

RELATIVE strengths of bonds :

INTRA >> INTER

IONIC \cong COVALENT >> H-BOND > DIPOLE-DIPOLE >> LONDON FORCES

Process of SOLVATION : the ability for a solute to dissolve in a solvent the saying is:

" like dissolves like "

POLAR solutes are SOLUBLE in POLAR solvents, and NON-POLAR solutes are SOLUBLE in NON-POLAR solvents. salt in water paint in paint-thinner

POLAR solutes are INSOLUBLE in NON-POLAR solvents.....HOWEVER:

NON-POLAR solutes are only SOMEWHAT INSOLUBLE in POLAR solvents

This exception has to do with the fact that all substances (be they polar or non-polar) are held together by LONDON FORCES. Non-polar solutes are ONLY held together by these very WEAK forces and the STRONGER POLAR bonds can overcome the weaker forces and cause the non-polar solute to dissolve.

* why water is the ultimate SOLVENT (it's polar) w/ H-Bond.