

INTERMOLECULAR FORCES

Intramolecular Bonds



bonds between the atoms within the molecule. Can be polar or non-polar
 aka covalent bond. covalent.

Intermolecular Bonds



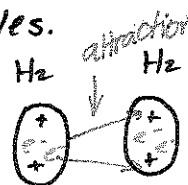
- bonds between one molecule & other molecules nearby.
- strength depends on size of molecule & polarity.
- these attractive forces are considered strong if melting / boiling points are high.

TYPES OF INTERMOLECULAR BONDS

London/dispersion forces



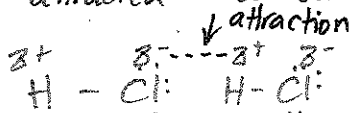
- present in all molecules, polar & non-polar but in non-polar molecules it is only type of intermolecular bond.
- these attractions result when electrons of one molecule are attracted to nuclei of nearby molecules.
- more electrons means stronger London forces.



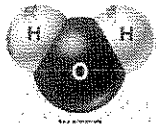
Dipole-Dipole



- a molecule that is polar will be attracted to another polar molecule. Opposite ends of dipoles are attracted to each other.



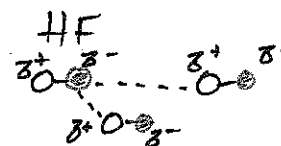
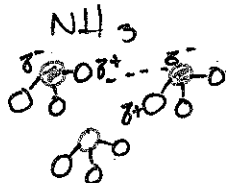
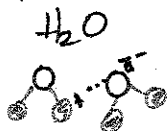
Hydrogen Bonding



Hydrogen bonding is the strongest intermolecular force (IMF). It is about $\frac{1}{10}$ th the strength of a covalent bond.

For hydrogen bonding to exist the molecule must have hydrogen directly bonded to nitrogen, oxygen or fluorine, within the molecule. The molecule contains either H-F or H-O or H-N bonds.

Examples



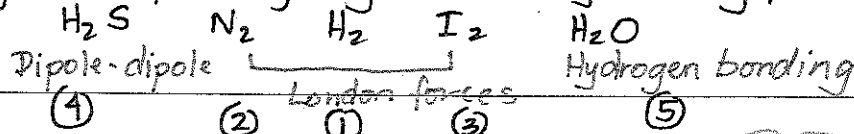
Increasing strength of IMF

London / Dispersion Forces

Dipole - Dipole

Hydrogen Bonding

Sample Arrange the following by increasing boiling pt.



MOLECULAR NAMING RULES

- Use prefixes to indicate how many of each element are present.
- Do not use mono for the first element!
- Drop all prefixes if first element is hydrogen.
- Drop the second o in mono prior to a vowel.
- Drop a in prefix ending in a prior to a vowel.

Exceptions

H_2O water

H_2O_2

hydrogen peroxide

NH_3

ammonia

CH_4

methane

CH_3OH

methanol

Prefixes

1 - mono	6 - hexa
2 - di	7 - hepta
3 - tri	8 - octa
4 - tetra	9 - nona
5 - penta	10 - deca