p. 239 #30, 31

30 a) H and Br

2.1 2.8

0.7

mod. polar covalent

b) K and Cl

0.8 3.0

2.2

ionic

31. H – Cl

2.1 3.0

0.9

H – Br

2.1 2.8

0.7

H – S

2.1 2.5

0.4

H – C

2.1 2.5

0.4

Attraction Between Molecules

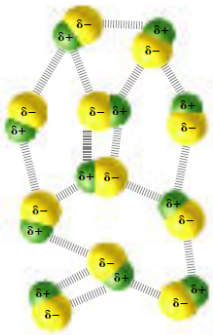
Intermolecular forces are weaker than both ionic and covalent bonds.

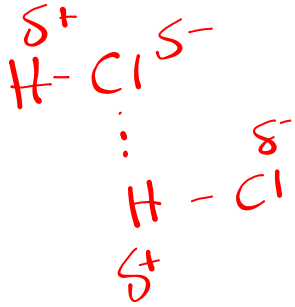
Van der Waals Forces

-Weakest attractions between molecules.
-Can be separated into two categories:

Dipole Interactions

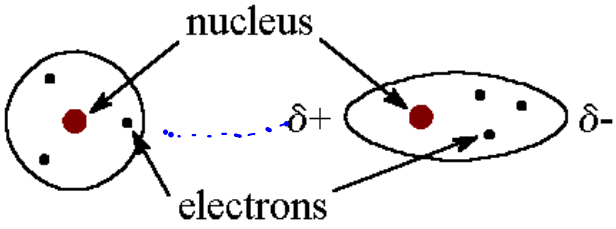
Electrical attraction between oppositely charged regions of polar molecules.

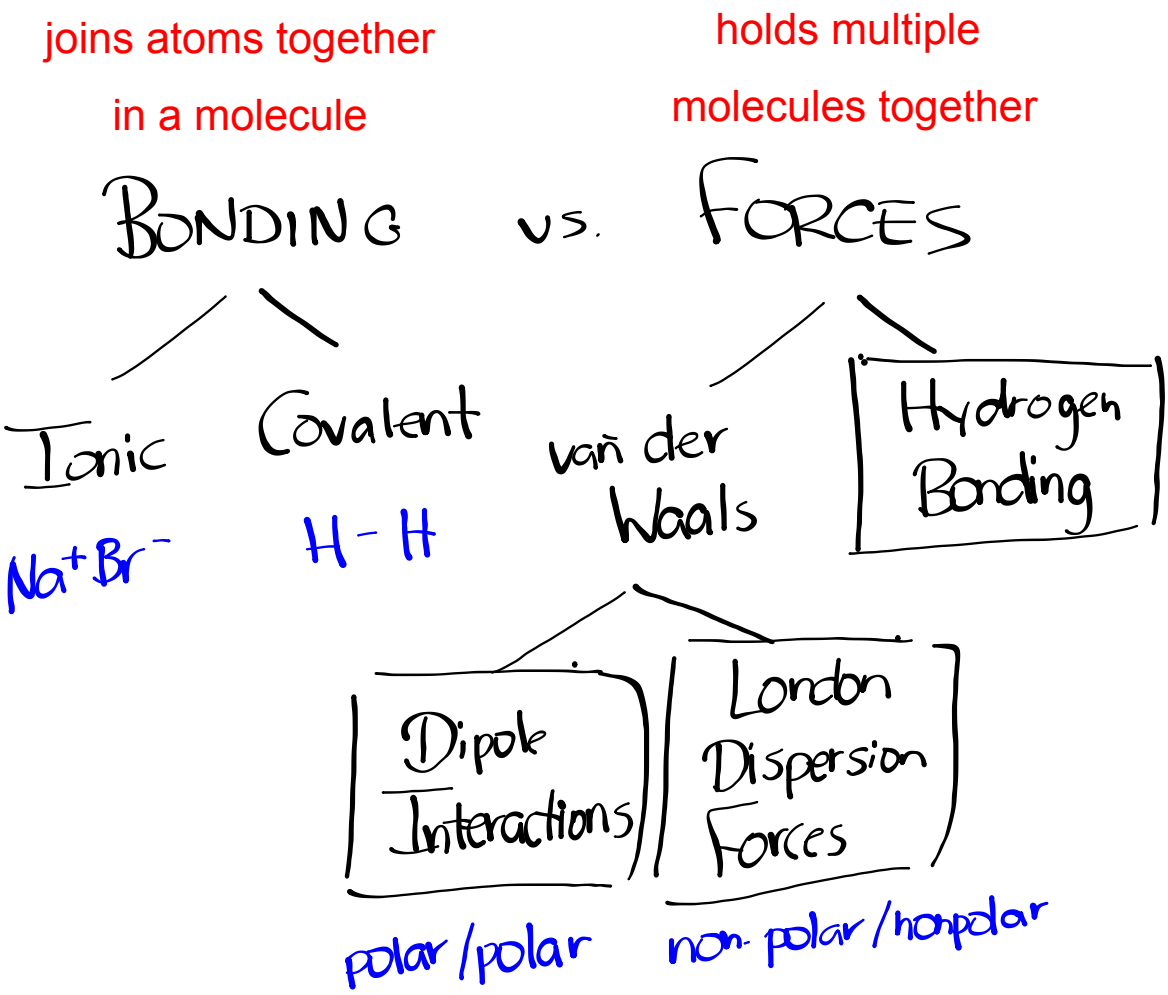




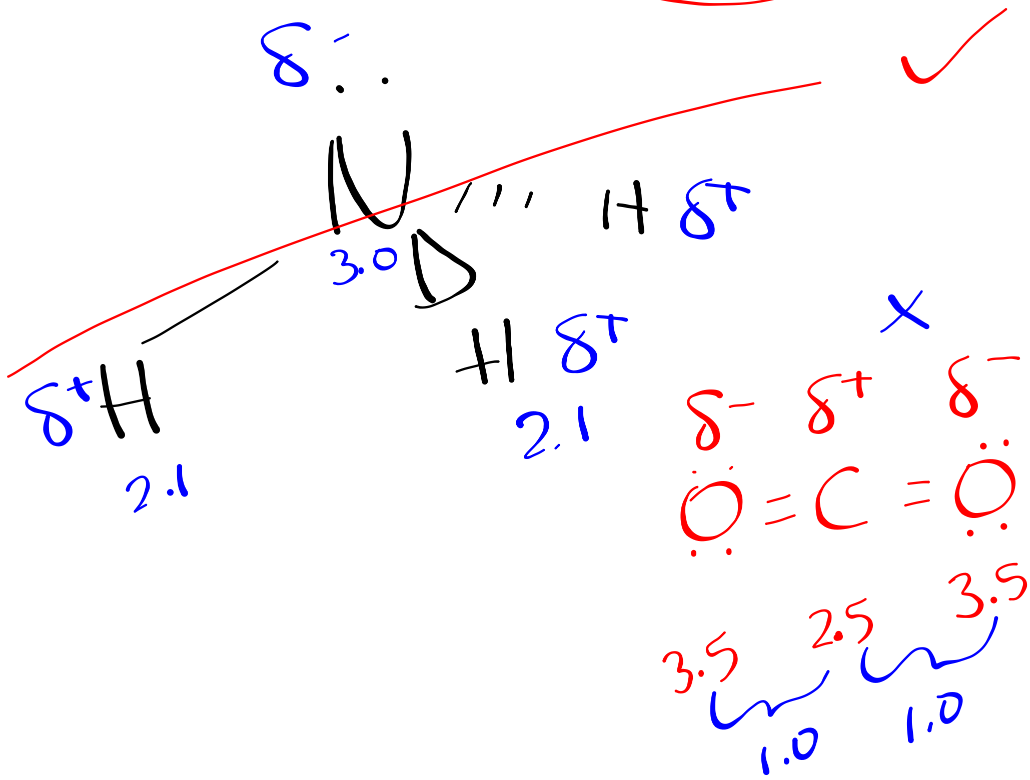
Dispersion Forces (London Dispersion Forces)

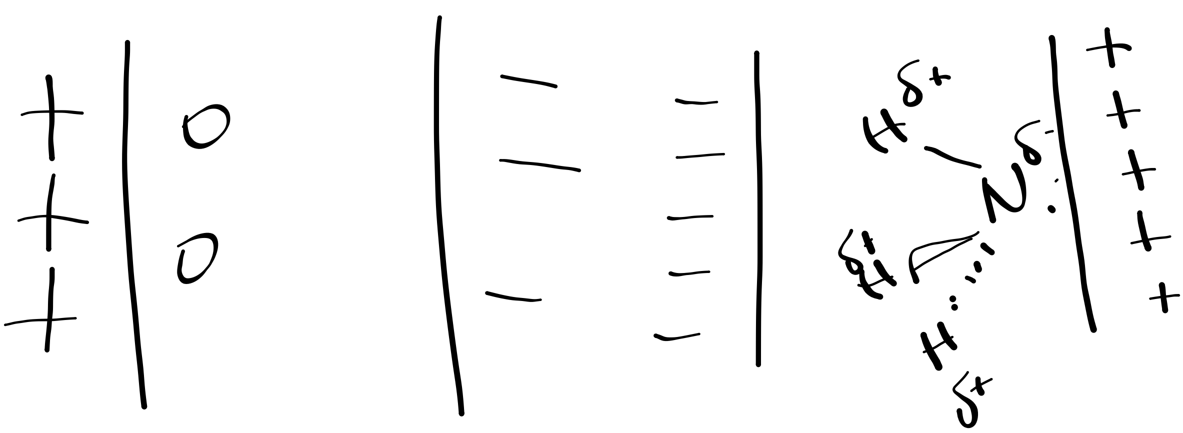
-weakest of all molecular interactions
-occur between even non-polar molecules
-caused by the motion of electrons * momentary dipole
when moving electrons are momentarily on one side of a molecule, the electrons of the neighbouring molecule will move to the opposite side, causing a weak attraction.

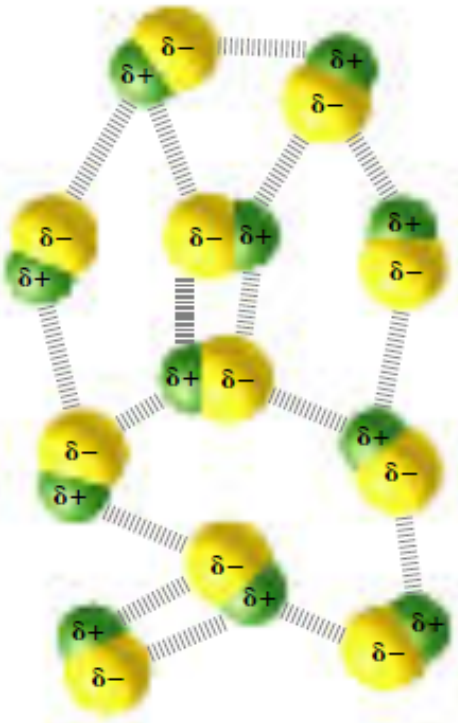


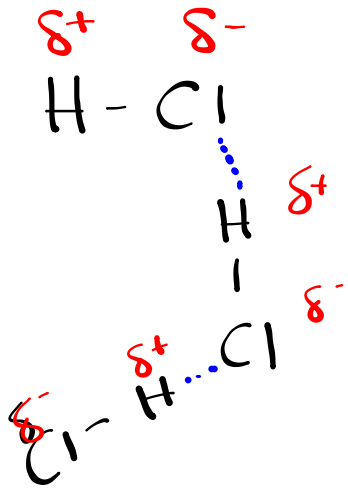

joins atoms together
in a molecule
holds multiple
molecules together
BONDING
vs.
FORCES
Ionic
Covalent
van der
Waals
Hydrogen
Bonding
Na+Br-
H-H
Dipole
Interactions
London
Dispersion
Forces
polar/polar
non-polar/nonpolar

CCl_4

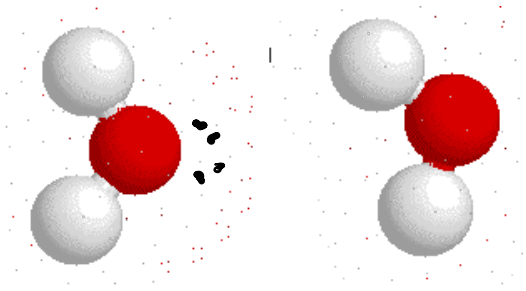


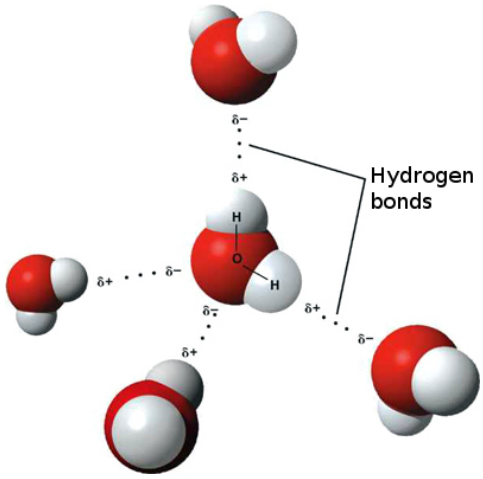



δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+
δ−
δ+


δ+
δ−
H - Cl
δ+
H
Cl
δ−
δ+
δ−
Cl - H

Hydrogen Bonds

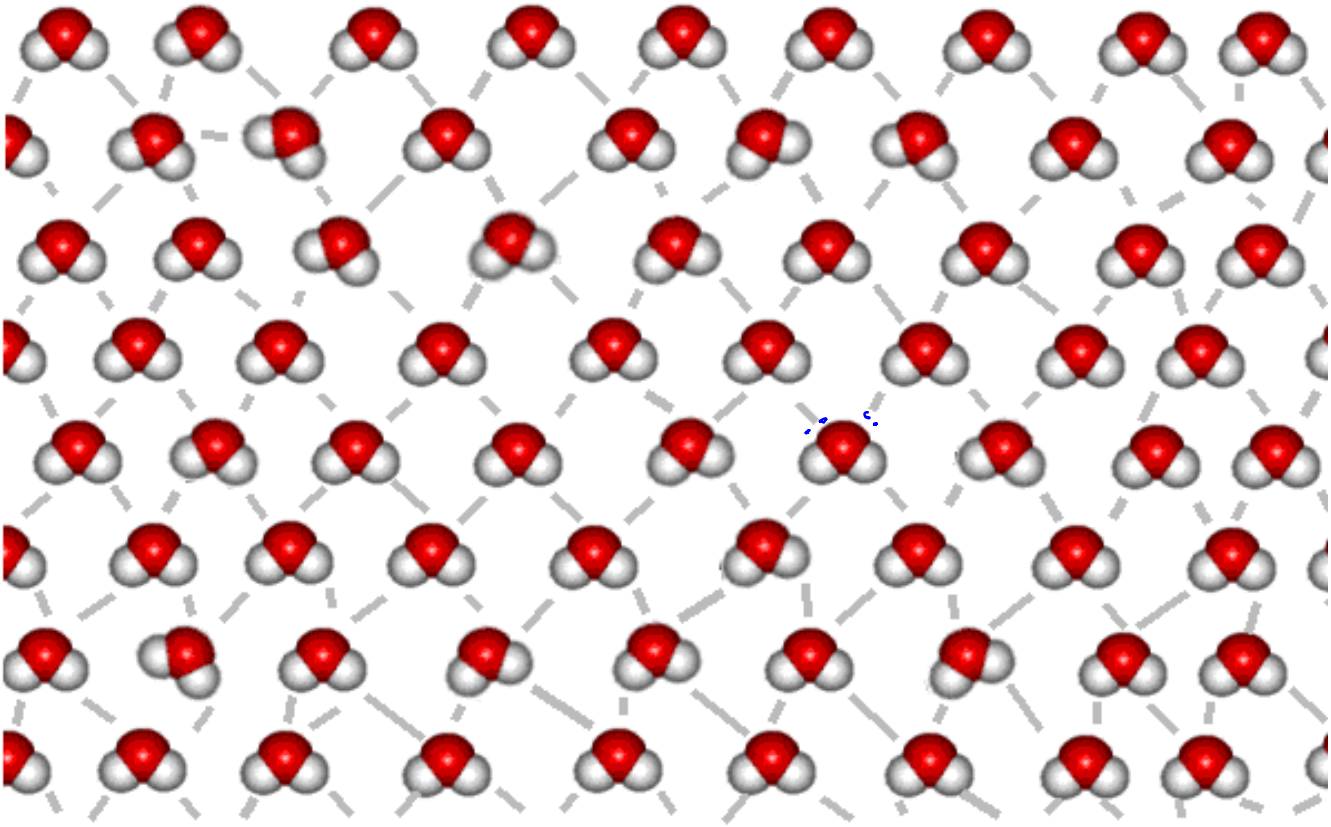




Hydrogen Bonds

Strong attractive forces in which a hydrogen covalently bonded to a very electronegative atom (O, N, F), is weakly bonded to an unshared electron pair of another electronegative atom.

- strongest intermolecular force
- not as strong as an ionic or covalent bond



Homework

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