p. 239 #30, 31

Attraction Between Molecules

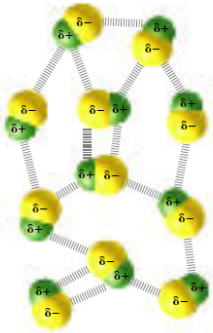
Intermolecular forces are weaker than both ionic and covalent bonds.

Van der Waals Forces

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

Dipole Interactions

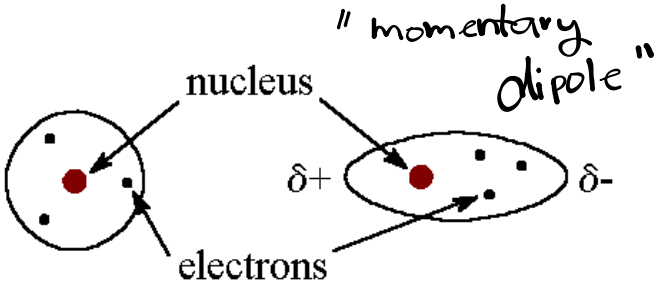
Electrical attraction between oppositely charged regions of polar molecules.

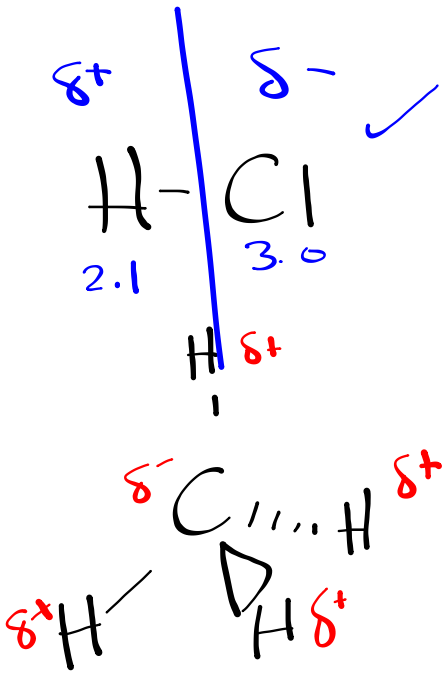


Dispersion Forces (London Dispersion Forces)

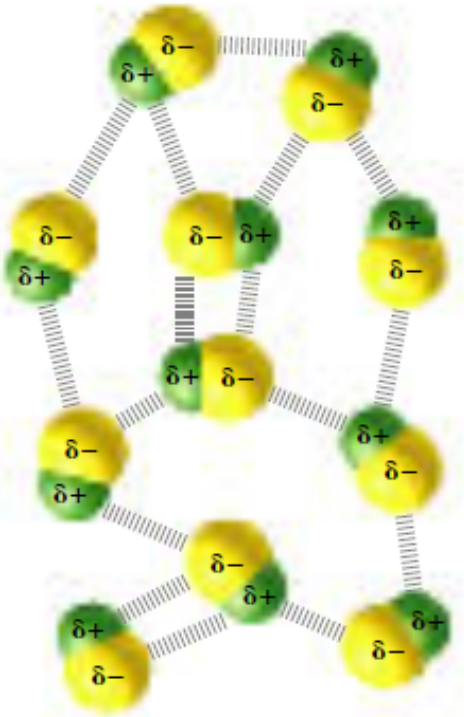
-weakest of all molecular interactions
-occur between even non-polar molecules
-caused by the motion of electrons

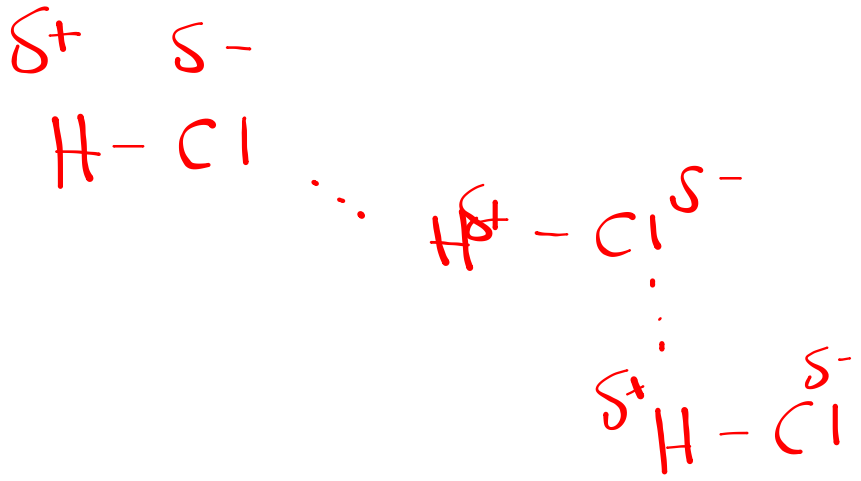
when moving electrons are momentarily on one side of a molecule, the electrons of the neighbouring molecule will move to the opposite side, causing a weak attraction.



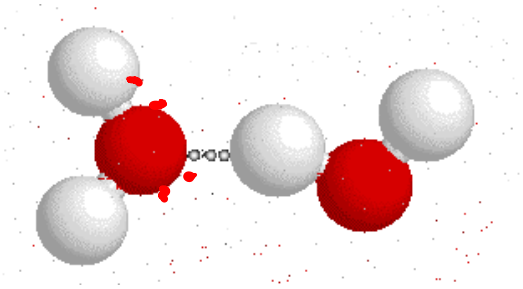


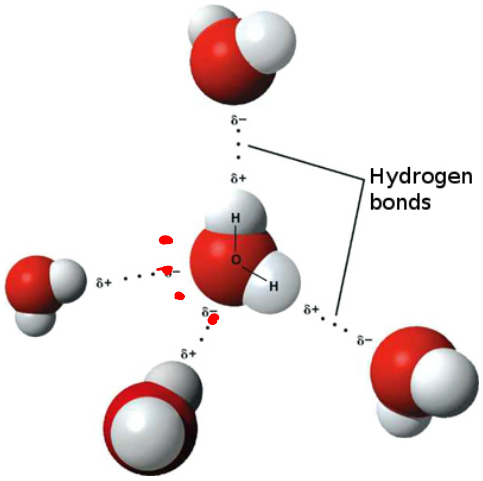
$Na^+ Cl^-$


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+
H - Cl δ-

Hydrogen Bonds

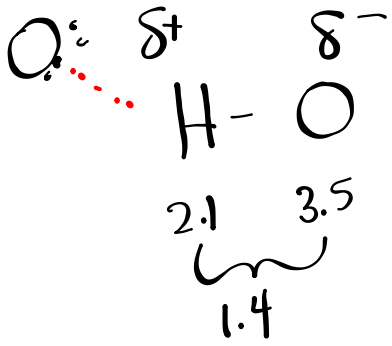


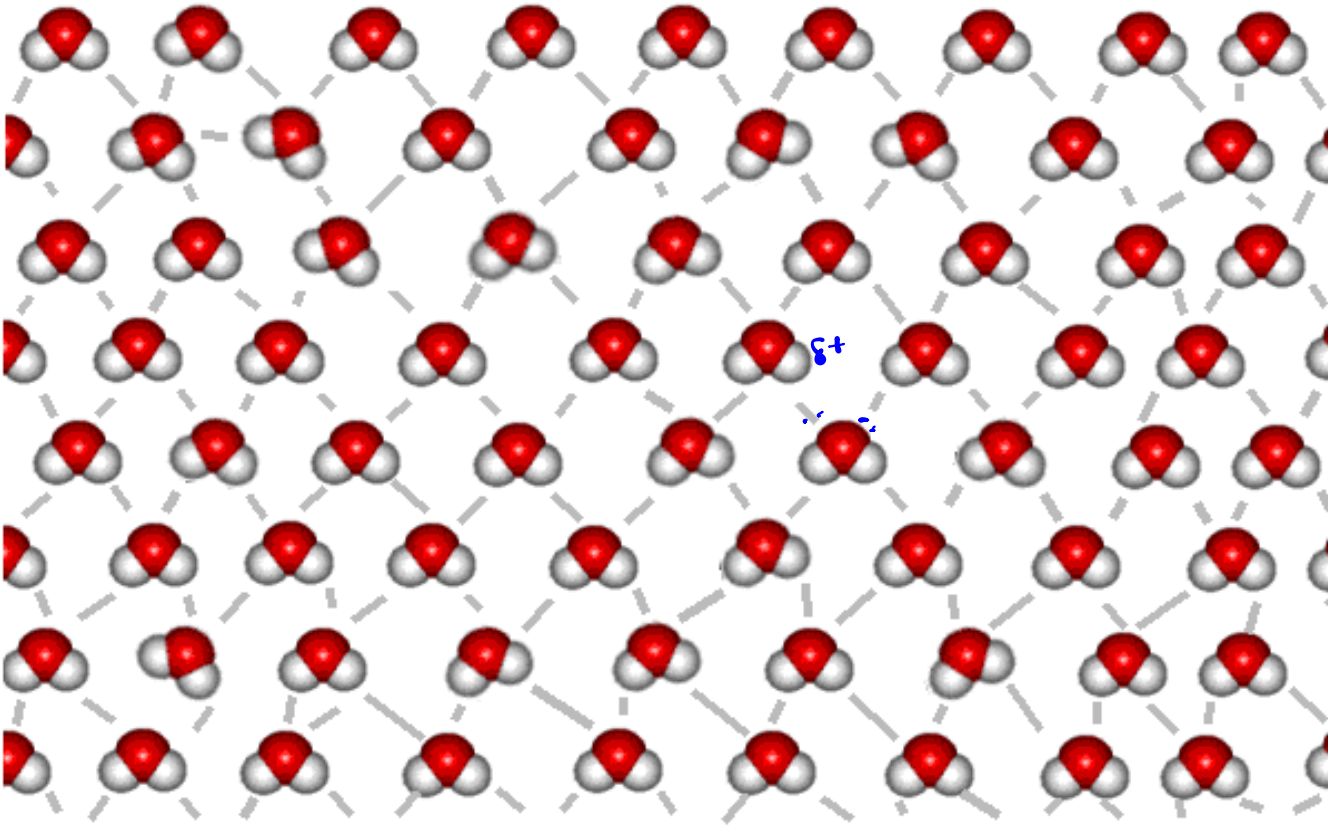


Hydrogen Bonds

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




δ+

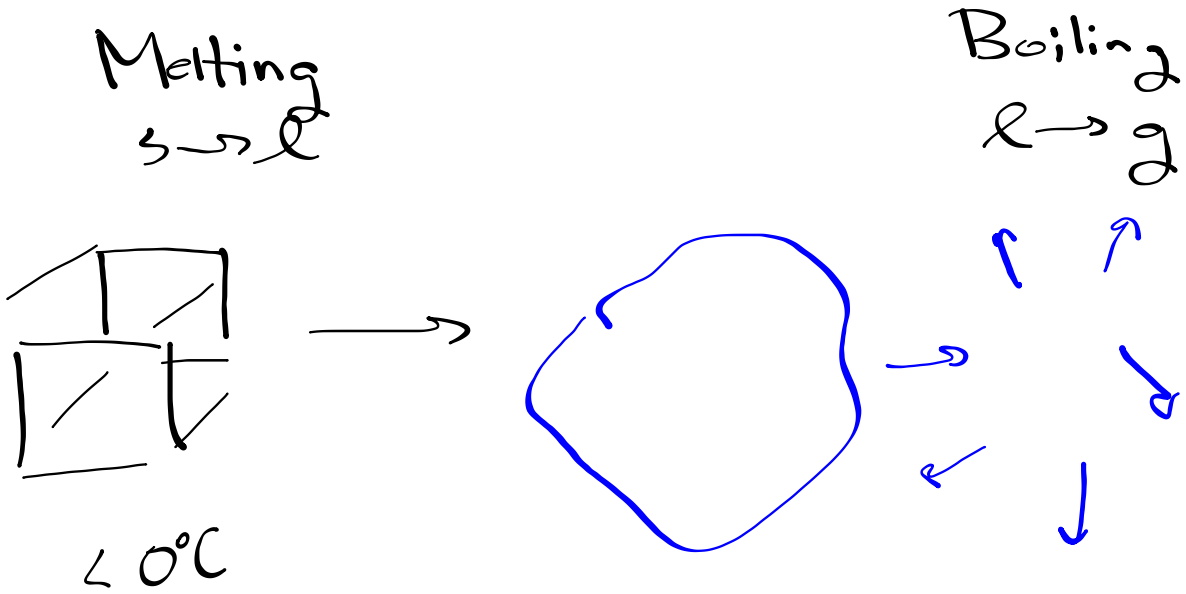
Network Solids

solids in which all of the atoms are covalently bonded to each other
- very stable substances with very high melting and boiling points
-melting requires breaking covalent bonds throughout the solid

Diamond

3550 °C

4700 °C


Melting
s → ℓ
Boiling
ℓ → g
< 0°C

Homework

p. 244 #32-38