Ionic forces are interactions between atoms or molecules, +vely charged ions such as Na^+, G^+ called Cations and -vely charged ions called anions. The attractive forces b/w oppositely charged ions is described by Coulomb's law in which the force increases with charge and decreases with distances b/w the ions is increased. The highly charged (polarized) nature of ionic molecules is reflected in their melting points (NaCl has mpt of 801°C) as well as their high water solubility (for alkali metal salts).

$Na^{\oplus}Cl^{\ominus}$ $K^{\oplus}\underline{I}^{\ominus}$

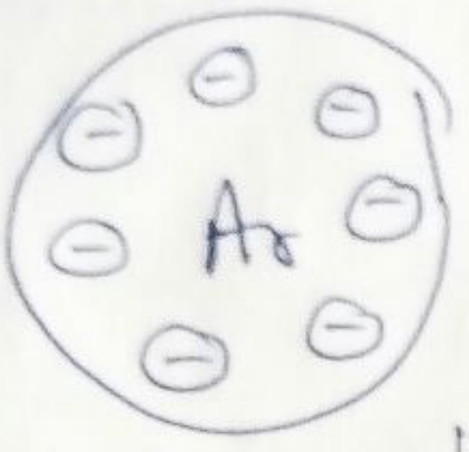
Dipole dipole interactions :-

- Dipoles are created by differences in electronegativity
- Interaction b/w dipoles is attractive.

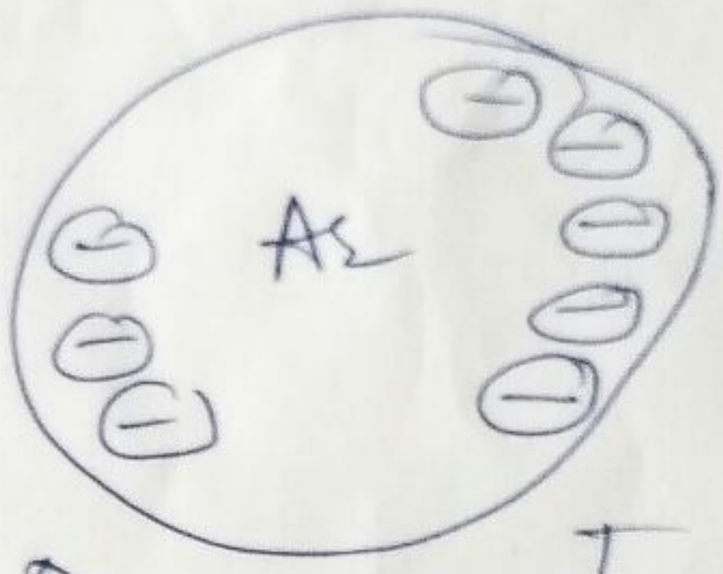
These dipoles can ~~atto~~ interact with each other in attractive ~~fashion~~ which will also increase the boiling point. However since the electronegativity diff b/w ~~Cation~~ Carbon ~~and~~ (en = 2.5) and electronegative atom (such as Oxygen and Nitrogen) is not as large as it for hydrogen (en = 2.2) The polar interaction is not as ~~s~~strong. ~~as~~ So ~~the~~ on the average these forces tends to be weaker than H bonding.

4 Vander Waal (Dispersion forces/London forces)
The weakest inter molecular forces of all are called dispersion or London forces. These represent the attraction b/w instantaneous dipole in a molecule. Think about an atom Argon. it's an inert gas. But if we cool it to -186°C, we can actually condense it to liquid Ar. The fact that it forms liquid

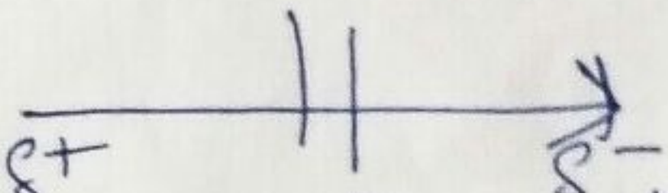
indicates that something is holding it together. That represents the attraction between instantaneous dipoles in a molecule. ie dispersion forces. But at any given instant there is mismatch b/w how many electrons are on one side and how many are on the other, which can lead to an instantaneous difference in charge.



If valance e' are perfectly distributed A_2 has no dipole.



Or an instantaneous basis, there can be an imbalance of charges



This creates a temporary dipole.

(There temporary dipoles attra

& This tendency to create " " is calle
polarizability. which increases with atomic size.
Its a little like Basketball. On av. every player
is covered one-on-one. for an even distribution
of players. But at any moment, you may have
double team situation where the distribution
is lumpy in valance shell and this lumpiness
creates dipoles and it is these dipoles which are
responsible for forces. forces are really the
only attractive forces between the molecules.
Since the dipoles are weak and transient,
they depend on contact b/w the molecules -
which means the forces increases with the
surface area. A small molecule like CH_4
has very weak intermolecular forces and
has low boiling point. However as the mass

increases, the boiling point goes up that's because surface ~~area~~ over which these forces operate increases. Therefore dispersion forces increases with increasing molecular weight

Individually, each interaction isn't worth much but if collectively, these forces can be extremely significant.

So

1. Intermolecular forces ~~be~~ with ~~ing~~ polarization of bonds.
2. Strength of forces is ionic > H bonding > dipole dipole > dispersion.
3. Bpt increase with mwt and with surface area.