What holds molecules together?

- Why are some compounds easier to turn from a liquid to a gas ?
- ***Intermolecular*** attractions are attractions between one molecule and a neighbouring molecule. The forces of attraction which hold an individual molecule together (for example, the covalent bonds) are known as ***intramolecular*** attractions. These two words are so confusingly

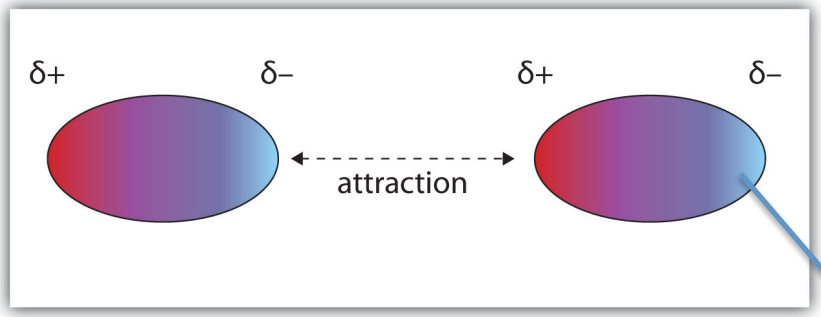
Intermolecular forces

Van der Waals forces
dipole-dipole forces
hydrogen bonding

Van der Waals forces

- Extremely weak forces that create temporary dipoles.
- Van der Waals forces are the only forces that exist between non-polar molecules.
- Since non-polar gases can be liquefied, this gives evidence for the presence of Van der Waals forces.
- As the type of molecule gets bigger in size Van der Waals forces increase in strength. Why?
- Why does hydrogen(-252^0C) have a lower boiling point than oxygen(-183^0C)?

Van der Waals

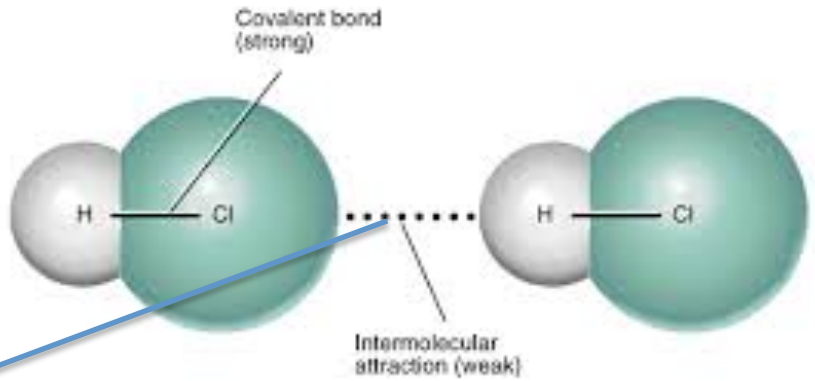


- At any given time the electron density can change in the atom making one end of the molecule more negative. This is a temporary dipole.

Electron density is constantly changing

Permanent dipole-dipole forces

- Weak forces that attract *polar molecules* together.
- Generally low boiling points.

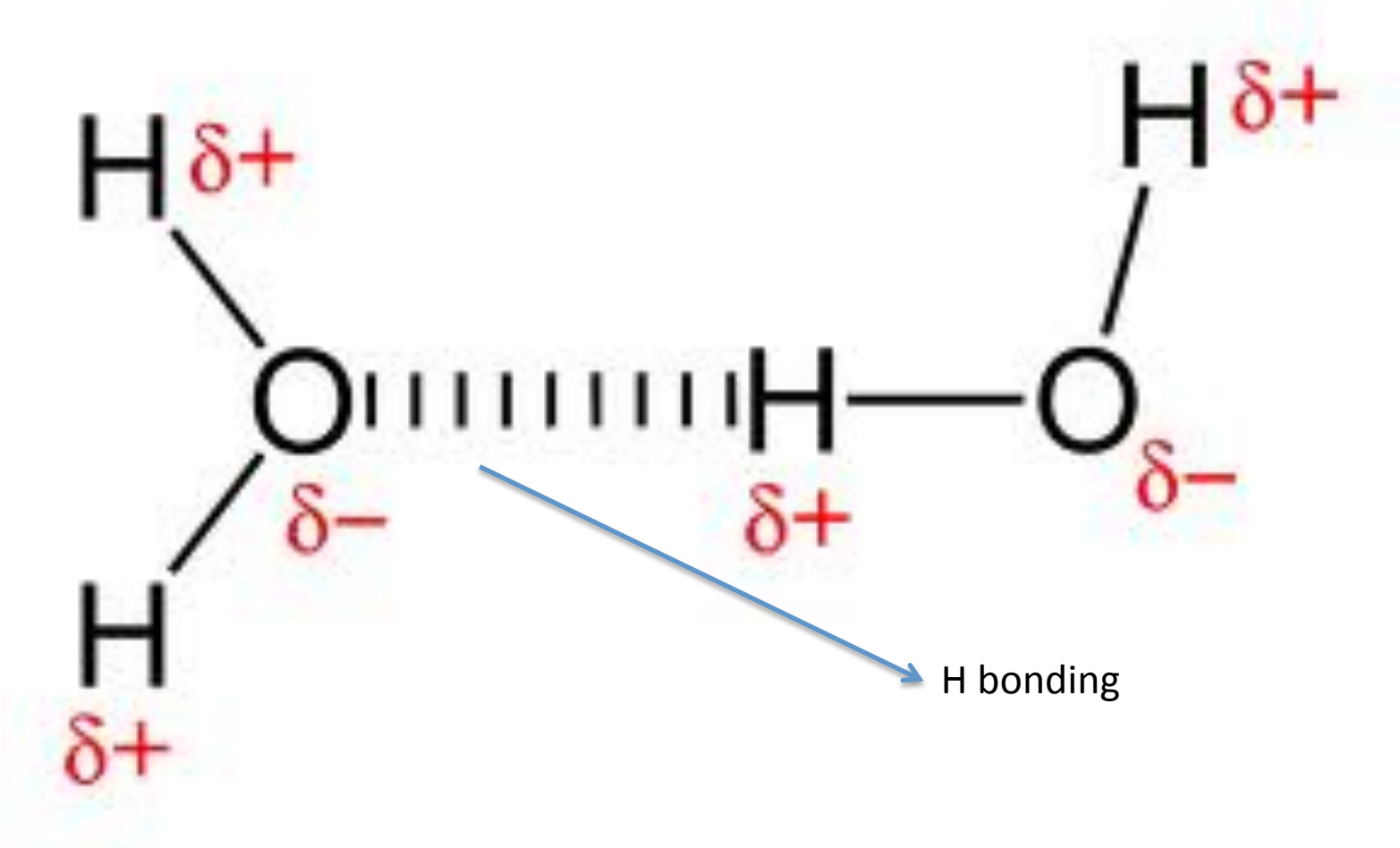


Weak intermolecular bond

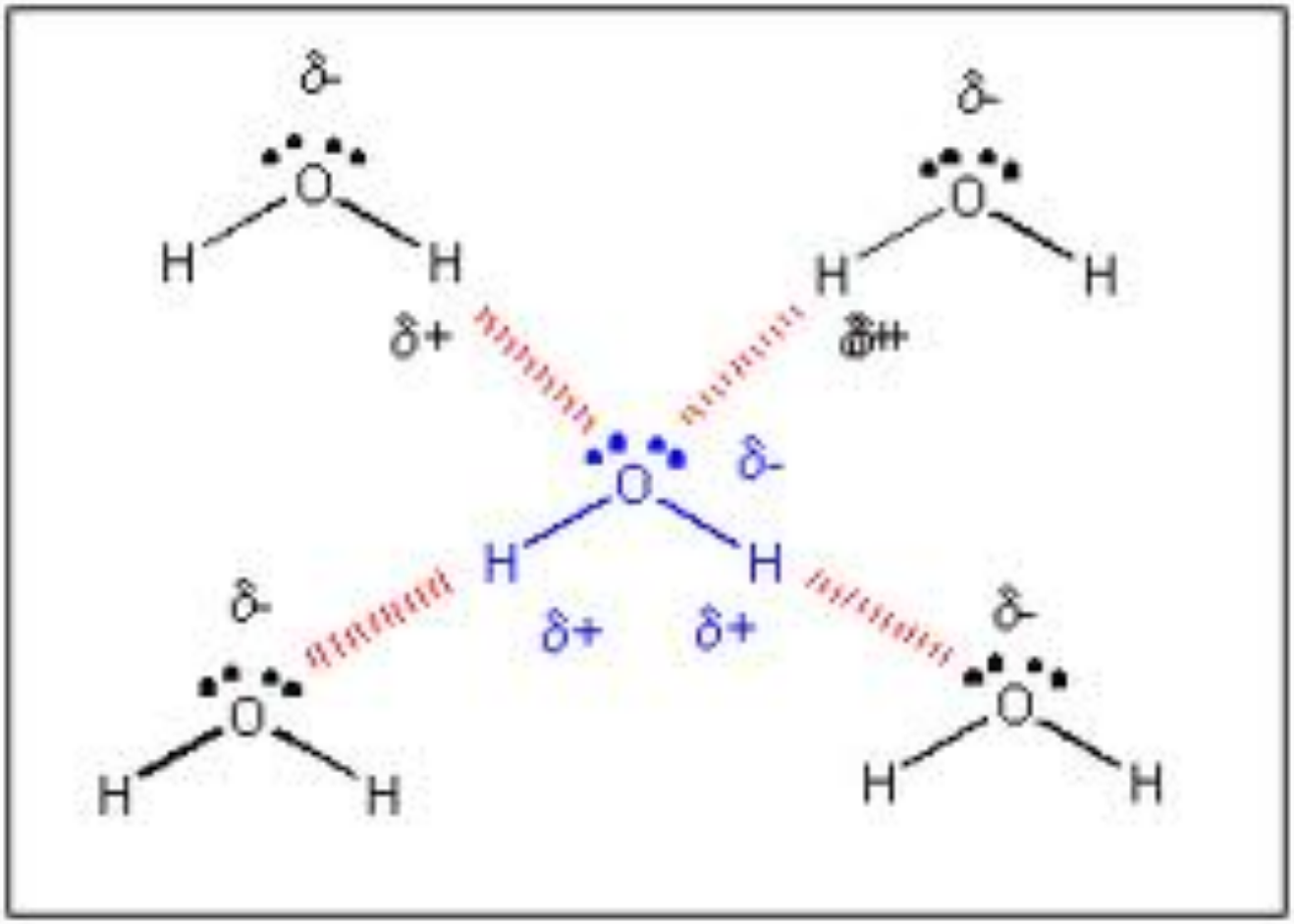
Hydrogen Bonding

- Hydrogen bonding is the attractive force which exists between a hydrogen and Oxygen, Fluorine or nitrogen in a covalent bond.
- The hydrogen bonds between water molecules exert a large influence on the physical and chemical properties of the molecules which form them.
- Water has an unusually high melting and boiling point for such a small molecule due to hydrogen bonding.
- Examples
- HF(breaking bad)
- NH_3(use in making fertilisers and bombs)
- H_20

Hydrogen bonding



Hydrogen bonding (H_20)



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