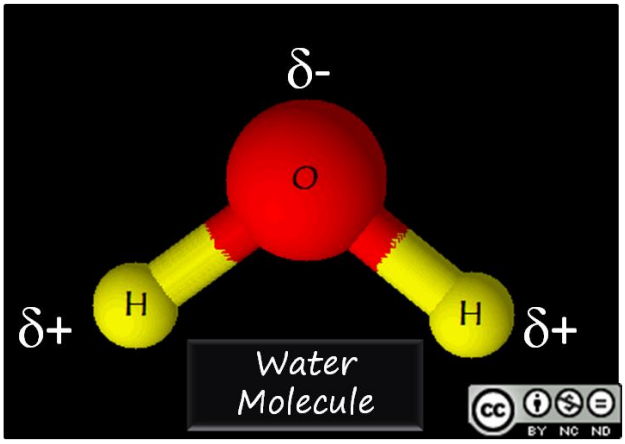
HYDROGEN BOND

Hydrogen bond is not a real bond, actually it is a type of electrostatic attraction. It plays very important role in the case of water. So let's learn more about it with the example of water molecule. You have studied bonding and hybridization of H_2O molecule.



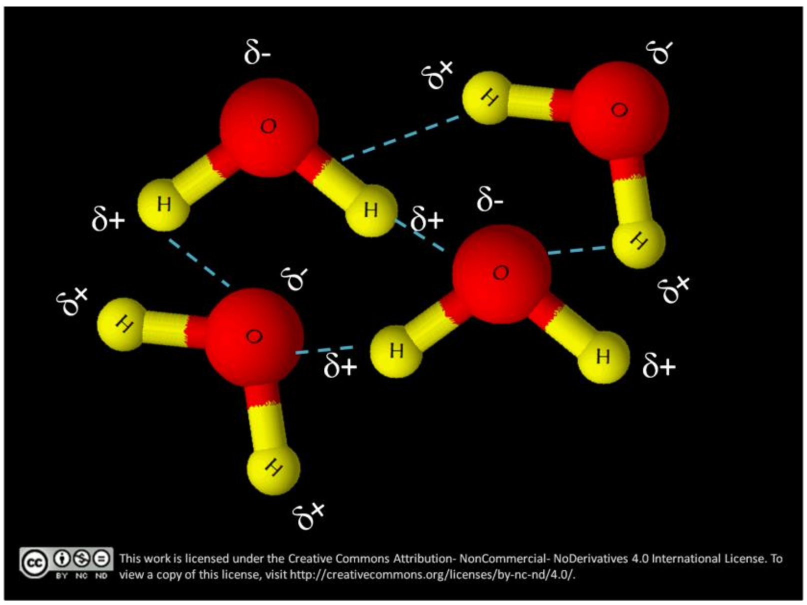
H_2O is a bent shaped molecule. There is a considerable electronegativity difference between H and O atoms which makes the H-O bond polar. More electronegative O pulls bonding pair of electrons and acquires a partial negative charge while Hydrogen develops a partial positive charge.

When two molecules of water come closer, the electrostatic force comes in action. Partially negative charged Oxygen of one molecule attracts partially positive charged Hydrogen of another molecule by electrostatic attraction. Electron rich Oxygen shares its lone pair of electron with electron deficient Hydrogen atom and forms an invisible bond of attraction which is called Hydrogen bond. This electrostatic attraction isn't sufficiently strong to form an ionic bond and the electrons are not shared enough to

make it a coordinate covalent bond, but this attraction is somehow capable of keeping the molecules together. Hydrogen bond is represented by a dotted line.

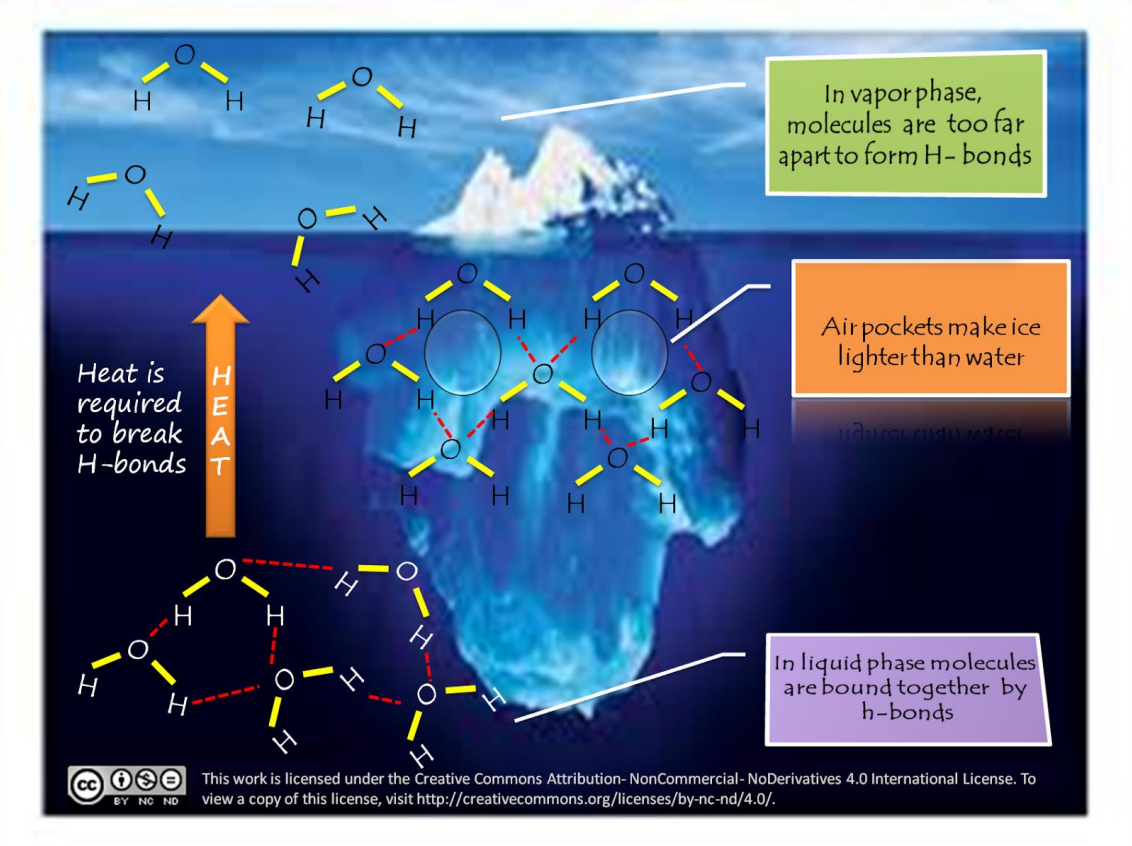
It is weaker than ionic and covalent bond. But it is solely responsible for the amazing nature of water. Let's see how it makes water so wonderful.

Hydrogen bonds make a network of water molecules which is responsible for the liquid state of water. When we try to evaporate water into vapours, we need to break a large number of hydrogen bonds to let water molecule free from the network. And it requires a large amount of heat to break multiple Hydrogen bonds that's why water remains liquid in large range of temperature and boils at higher temperature (100°C).



Do you know why sweating lowers your body temperature? Sweat is also formed by water and for evaporation it uses your body heat to break Hydrogen bonds. Now you can guess why temperature is lowered near the water bodies. Definitely because water molecules utilise heat present in the atmosphere which results in lowering of temperature.

Why ice floats in water? Have you ever thought about it? You will be surprised if I say Hydrogen bond is the culprit again. Water molecules are bent shaped and when hydrogen bond is formed between these molecules it forms a network. When we freeze water into ice, this network hinders the close packing of molecules and air gets trapped in the vacant space which lowers the density of ice. That's why ice floats in water.



Hydrogen bonding is not exclusive only for water molecules but it isn't present in every other molecule. In the next post we will learn about the molecules which possess Hydrogen bonds and try to find why they are chosen for hydrogen bonding.

Source : http://chemistrynotmystery.blogspot.in/2014/09/hydrogen-bond.html