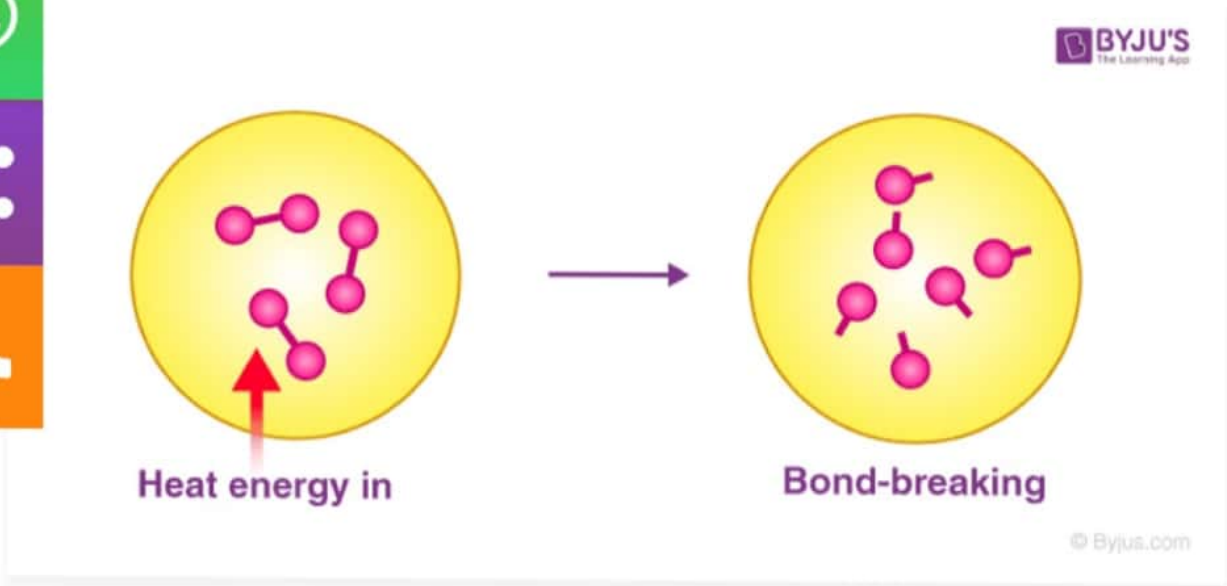
Bond Angle

Bond angle can be defined as the angle formed between two covalent bonds that originate from the same atom. An illustration detailing the bond angle in a water molecule (104.5°C) is provided below.

The geometric angle between any two adjacent covalent bonds is called a bond angle. This bond parameter provides insight into the molecular geometry of a compound.

Bond Energy or Bond Enthalpy

Bond energy is a measure of the strength of a chemical bond. It can be defined as the energy required to break all covalent bonds of a specific type in one mole of a chemical compound (which is in its gaseous state).



It is important to note that bond energy is not the same as bond dissociation energy. The latter is the change in enthalpy associated with the homolytic cleavage of a bond whereas the former is the average of the bond dissociation enthalpies of all bonds (of a specific type) in a molecule.

Factors Affecting Bond Energy

The strength of a chemical bond is directly proportional to the amount of energy required to break it. Therefore, bond energy is:

- Inversely proportional to the bond length, i.e. longer bonds have lower bond energies.
- Directly proportional to the bond order, i.e. multiple bonds have high bond energies.
- Inversely proportional to the atomic radii of the atoms participating in the bond (since the atomic radius is directly proportional to bond length).

Note: the difference in the electronegativities of the atoms participating in the chemical bond also contributes to the bond energy.