Water :
First Element Hydrogen

Fundamentals of Chemistry

Water

1. A colourless, tasteless, odourless liquid : 70% of human body and 70% of surface of Earth.H2O is the formula and chemical name is Di-hydrogen oxide , molecular mass is 18 amu. It can exist in all the three states of matter as water, water vapour, and ice.

2. It is a homogeneous chemical compound. Its elements can be separated only by chemical methods, such as electrolysis of acidified water. Heat is evolved when Hydrogen combines with Oxygen to form water. Water is a universal solvent.

3. The density of water is 0.997 gcm^{-3} at 4 degree centigrade. An unusual quality of water is that , when cooled, it first contracts in volume, but at 4 degree C, it starts to expand and continues to expand till it reaches zero degrees.

Its boiling point at sea level , with an atmospheric pressure of 760mm Hg is 100 degree C. Increase in atmospheric pressure raises the boiling point and decrease in atmospheric pressure lowers it.

4. Vegetables and fruits and vegetation matter contains 60 to 70 % water

It is present as water of crystallisation in many salts , such as CuSO4, .5H2O, MgCl2, .6H2O, ZnSO4, .7H2O,

5. The pleasant taste of water is due to dissolved matter, like air, carbon dioxide, minerals. Distilled water has no taste, and Pure Water does not conduct electricity. It is a good conductor only due to the presence of dissolved minerals.

It is a stable compound and does not decompose on heating

Solubility of gases in water decreases with increase in temperature.

(1) Pure water is neutral to litmus paper. (2) Stability of water as a compound does not allow it to decompose during normal heating. At very high temperatures of 2000 to 3500 degree C, it decomposes very slightly to form hydrogen and oxygen.

- (3) Catalytic nature of water, brings about many chemical reactions. Only when moisture is present, hydrogen and oxygen combine when sparked; yellow phosphorous burns in air.

4. Carbon from dissolved carbon dioxide is used by aquatic plants to prepare carbohydrates through photosynthesis

- Gases dissolved in water enable aquatic plants and organisms to respire.

5. Calcium is needed for strengthening the shells of snails and crabs. CO2 reacts with limestone in rocks to form soluble calcium bicarbonate. This is absorbed by marine life.

Reaction of water with metals

1. Precious metals : gold, silver, platinum, are inactive

2. Metals such as copper, tin, aluminium, show no action with water at ordinary temperatures

3. Sodium, potassium, calcium react with cold water, forming their hydroxides and giving off hydrogen.

4. Potassium reacts violently to cold water, it catches fire and burns. Hydrogen is released and a colourless, soapy , alkaline solution is formed

5. The density of water is 0.997 gcm^{-3} . Sodium, potassium float on water as density is less than that of water. Carbon being heavier , sinks in water