SCI – PARTICULATE NATURE OF MATTER

Matter is made up of discrete particles, the main ones being atoms, molecules and ions.

Atoms

The ancient Greeks were the first to use the word "atom" which means indivisible, to describe the smallest particle of any substance. Its actual existence was not established until the nineteenth century when John Dalton, an English chemist, put forward a theory to describe the nature of the atom. The atom is now considered to be the basic unit of simple substances or elements.

Definition: an atom is the smallest particle of an element which can take part in a chemical reaction. Or, it is the smallest part of an element that can ever exist and still possess the chemical properties of that element.

Molecules

Most atoms cannot exist alone. They generally bond with other atoms to form molecules. Molecules may be made up of atoms of the same element or of different elements.

Note: the smallest form of matter that cannot be split into simpler units by an ordinary chemical process is called element.

The number of atoms in each molecule of an element is called the atomicity of that element. This number is usually small. Most gaseous element like oxygen and chlorine are diatomic, i.e. the molecule consists of two atoms. Others like phosphorus and sulphur exist a polyatomic molecules. The molecules of helium are monoatomic i.e. they can exist independently as single atoms.

Compounds exist as molecules that is it is the smallest particle possessing the chemical properties of a given compound.

Definition: a molecule is the smallest particle of a substance that can normally exist alone and still retain the chemical properties of that substance, be it an element or a compound.

Ions

Some substances are not built up of atoms or molecules, but are made up of charged particles called ions. There are two types of ions: the positively charged ions or cations and the negatively charged ions or anions. An ionic substance has the same number of positive and negative ions, so that it is electrically neutral.

Definition: an ion is any atom or group of atoms which possesses an electric charge.