

## Introduction

Atom is the smallest particle of the element which cannot reside in the Free State but that take part in chemical reaction. Various theories were given to explain the structure of atom. Initially Dalton defined atom as the indivisible particle of the element but now it has been well established that atom consists of elementary particle like electron, proton and neutron. In this chapter we will study various theories that were given to explain the structure of the atom.

When two objects are rubbed together they get electrically charged. The origin of this charge can be explained, if it is assumed that the constituent particles of matter, the "atoms" are divisible and consist of charged particles.

**Sub atomic particles:** Atom is defined as the smallest particle of the element that can exist independently and retain all its chemical properties.

According modern atomic theory atoms are composed of particles. The three main sub-atomic particles are proton, neutron and electron.

**Cathode rays- Discovery of electrons:** In 1878 William Crooks carried out discharge tube experiments and discovered new radiations and called them cathode rays. Since these rays travel from the cathode towards anode. Later J.J Thomson studied on characteristics of cathode rays and concluded that cathode rays are negatively charged particles, now called electrons. The name electron was given by Johnson Stony.

## Discharge tube experiment

**Canal rays Or Anode rays:** In 1886, E. Goldstein carried out discharge tube experiments and discovered new radiations and called them canal rays. These rays were made up of positively charged particles and led to the discovery of proton.

## Properties of electron, proton and neutron:

Parameters	Electron	Proton	Neutron
Position	Present outside the nucleus and revolves in the orbits	Present inside the nucleus	Present inside the nucleus
Mass	$9.108 \times 10^{-28}$ g	$1.67 \times 10^{-24}$ g	$1.67 \times 10^{-24}$ g
Charge	$-1.602 \times 10^{-19}$ coulombs	$1.602 \times 10^{-19}$ coulombs	Zero
Representation	$e^{-}$	$p^{+}$	n

**Atomic models:** Atomic models proposed by scientists show the arrangement of the various sub-atomic particles in an atom.