The Electron

The electron is a very light particle. It has a mass of 9.11 x 10-31 kg. Scientists believe that the electron can be treated as a point particle or elementary particle meaning that it can't be broken down into anything smaller. The electron also carries one unit of negative electric charge which is the same as 1.6 x 10–19 C (Coulombs).

The Proton

Each proton carries one unit of positive electric charge. Since we know that atoms are electrically neutral, i.e. do not carry any extra charge, then the number of protons in an atom has to be the same as the number of electrons to balance out the positive and negative charge to zero. The total positive charge of a nucleus is equal to the number of protons in the nucleus. The proton is much heavier than the electron (10 000 times heavier!) and has a mass of 11/26 x Notesale.co. 10-27 kg.

The Neutron

The neutron is electrically neutral, as it corries no charge at Al. Ake the proton, it is much heavier than the electron and its mass is 1.6749 100 kg (slightly heavier than the proton). Kind of particle must be present in the nucleus along Ruther to dp Silved (in 1920) 18 9 with the proton. He predicted this because if there were only positively charged protons in the nucleus, then it should break into bits because of the repulsive forces between the like-charged protons! Also, if protons were the only particles in the nucleus, then a helium nucleus (atomic number 2) would have two protons and therefore only twice the mass of hydrogen. However, it is actually, four times heavier than hydrogen. This suggested that there must be something else inside the nucleus as well as the protons. To make sure that the atom stays electrically neutral, this particle would have to be neutral itself. In 1932 James Chadwick discovered the neutron and measured its mass.

Unlike the electron which is thought to be a point particle and unable to be broken up into smaller pieces, the proton and neutron can be divided. Protons and neutrons are built up of smaller particles called quarks. The proton and neutron are made up of 3 quarks each.

Properties of Subatomic Particles

NameLocationCharge(c)Unit ofMass (amu)Mass(g)

X = Chemical Symbol

For example, the iron nucleus which has 26 protons and 30 neutrons, is denoted as

⁵⁶₂₆Fe

where the total nuclear charge is Z = 26 and the mass number A = 56. The number of neutrons is simply the difference N = A - Z.

Chemical Symbols, Valencies and Chemical Formulae

A chemical symbol is an abbreviation that we use to indicate an element or an atom of an

element. For example, the

symbol for.

Some common Elements and their symbols



Valency

The number of electrons in an atom which are used to form a bond. It is the combining power or capacity of an element or radical. Valencies are whole numbers representing the numbers of hydrogen atoms required to combine with an atom for it to attain the stable electronic configuration.

Elements having a single valency are said to be monovalent, while those with two valencies are said to be divalent. Elements with more than two valencies are said to be multivalent. Copper, for example, is a divalent element with valencies of 1 and 2.