Atomic structure and isotopes

Isotopes are atoms of the same element with different numbers of neutrons and different masses.

Different isotopes of the same element react in the same way because they have the same electron configuration. The outer electrons are involved in chemical reactions. Neutrons make no difference to chemical reactivity.

Physical properties depend on the mass of an atom. Isotopes have different masses, so can have different physical properties.

Sub-atomic particle	Relative mass	Relative charge	Position within the atom
Proton	1	+1	Nucleus
Neutron	1	0	Nucleus
Electron	1/2000	-1	Shell

Atomic number is the number of protons in the nucleus of an atom.

Mass (nucleon) number $\rightarrow A$ X Element Symbol Atomic (proton) number $\rightarrow Z$

Mass number is the number of protons and neutrons in the nucleus of an atom.

All atoms of a specific element have the same number of protons and electrons giving them a neutral charge overall.

lons have the same number of protons and different numbers of electrons.

Relative mass

Carbon-12 is used as the standard measurement of relative masses.

Relative isotopic mass is the mass compared with 1/12th of the mass of carbon-12.

The relative isotopic mass neglects the tiny contribution the electrons make to the mass of an atom and have taken the masses of both a proton and a neutron as 1.0u. It is the same as the mass number.

Relative atomic mass is the weighted mean mass of an atom compared with 1/12th of the mass of clinic 142.

The relative atomic mass depends on the percentage abundance of the isotope on the relative mass of the isotope.

The relative atomic mass tells us the relative proportions of the relative softhe element in the sample.

Mass spectrometry is used in determining the matrix setopic masses and relative abundances of the isotope.

Relative molecular mass (M) is the weighted mean mass of a molecule compared with 1/12th of the mass of an atom of carbon-12.

Relative molecular mass is used in terms of simple molecules.

Relative molecular mass is found by adding the relative atomic masses of each atom making up the molecule.

Relative formula mass is the weighted mean mass of a formula unit compared with 1/12th of the mass of an atom of carbon-12.

Relative formula mass is used in terms of compounds with giant structures.