Isotopes

Atoms can commonly have more than one ratio of protons and neutrons that are stable. The equations below will help calculate the number of each subatomic particle in an isotope of an element

Atomic Number = # Protons (p^+) [*Type of Atom*]

 # Protons (p^+) = # Electrons (e^-) [*Atoms Neutral*]

Mass Number = # Protons + # Neutrons [*Isotope Mass*]

 # Neutrons (n^o) = Mass Number - Atomic Number

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Atomic Isotope Notation

Writing atomic isotopes

B ← Mass #
Protons + Neutrons

X

A ← Atomic #
Protons

Element – B
Atomic # Mass #

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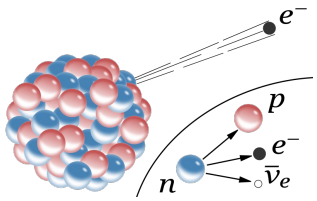
Atomic Mass

The mass of an atom is based on the mass of protons and neutrons



A neutron (n^o) breaks down into a proton (p^+) [*mass*] and an electron (e^-) [*low mass*]

Mass of Subatomic Particles

Proton: 1.67×10^{-27}g: 1 amu
Neutron: 1.67×10^{-27}g: 1 amu
Electron: 1.91×10^{-31}g: 0.001 amu

The electron is 1/10000 mass of the proton and neutron

The **atomic mass** of an isotope is the mass of the $p^+ + n^o$ in atomic mass units (*amu*)

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Compare Mass Number and Atomic Mass

Mass Number

The number of subatomic particles that make up the mass of an atom ($p^+ + n^o$, count)

Example
Sodium – 23 ($11p^+ + 12n^o$)
Mass Number = 11 + 12 = 23

Atomic Mass

The mass of the subatomic particles that contribute mass to an atom ($p^+ + n^o$, amu)

Example
Sodium – 23 ($11p^+ + 12n^o$)
Atomic Mass = 11amu + 12amu
= 23amu

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