

ELEMENTS

mass number → ^{12}C
atomic number → 6

- *atomic number* = Z = number of protons = p
- *mass number* = number of nucleons = $p + n$
- *atomic mass* = experimental measurement of the mass of the element

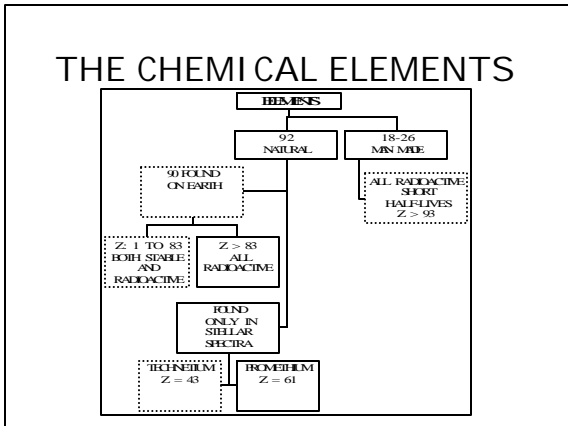
ISOTOPES

- same element with different masses
- change number of neutrons
- stable and radioactive

^1_1H ^2_1H ^3_1H

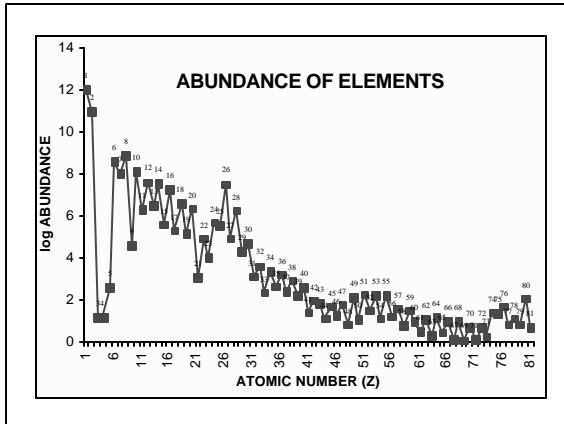
RADIOACTIVITY

- The simultaneous decay of one element usually into another element with the emission of energy and usually a decay particle.
- The decay particle and energy are released from the nucleus.
- The decay particle is a very high energy particle (emitted at high velocity and can cause great damage).



THE STABLE ISOTOPES

protons-neutrons	number of isotopes
even-even	157
even-odd	52
odd-even	50
odd-odd	5

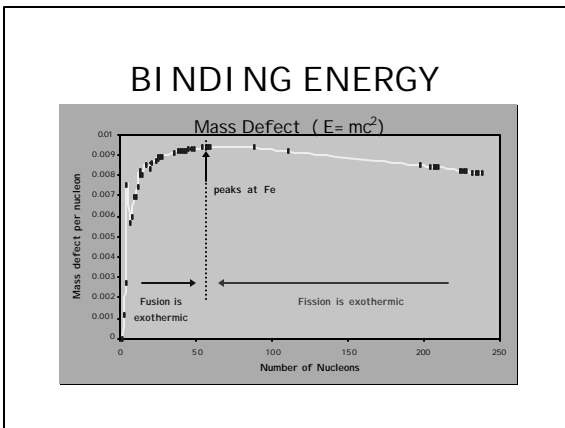


COSMIC ABUNDANCE OF THE ELEMENTS

- extreme abundance of hydrogen and helium from the big bang
- general decrease in abundance with increasing atomic number (Z)
- some low abundance (Li, Be, B) and some high (Fe, Ni, Pb)
- greater abundance of even Z than odd Z elements

IMPORTANT EXOTHERMIC NUCLEAR PROCESSES

Fission	Fusion
<ul style="list-style-type: none"> ➢ splitting of the atom ➢ heavy elements ➢ examples- U, Pu ➢ U.S. commercial nuclear reactors 	<ul style="list-style-type: none"> ➢ joint two atoms ➢ light elements ➢ examples- H, He, Li ➢ Sun's energy source



IRON

- High cosmic abundance
- Highest binding energy per nucleon
- A very stable nuclide in the solar system

This concludes your journey through CHM 102.

Hope you had fun!