Mini-Lesson

(only take notes if you need to, on a piece of binder paper)

How many atoms in a compound?

H_2O

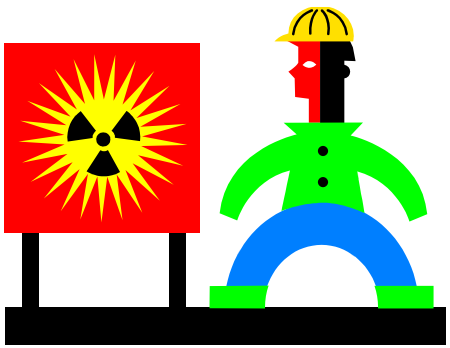
Al_2S_3

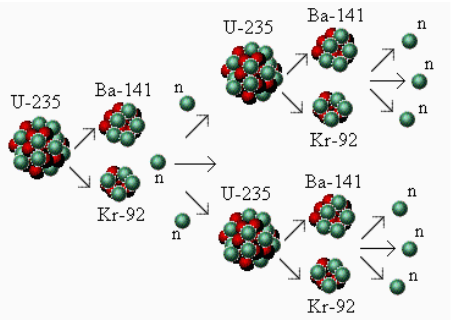
$Mg_2(SO_4)_2$

Nuclear Chemistry!

Nuclear Fission

- Carbon-14 Dating
- Atomic Fission (the bomb, nuclear power)
- Radon
- Chain Reactions

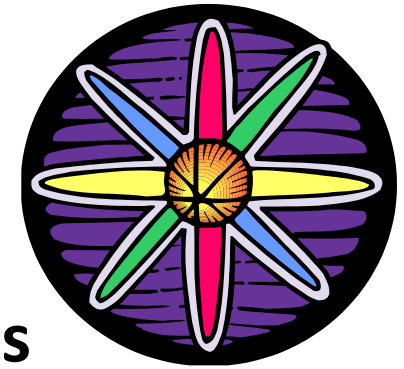




Subatomic Particles

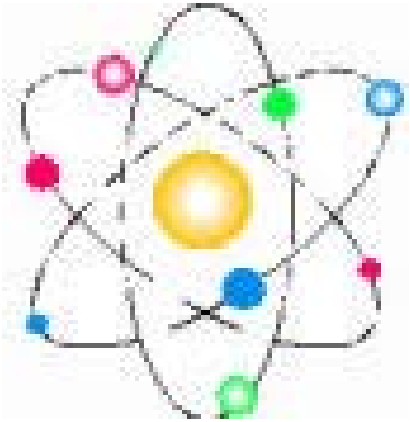
- **Protons- positive charge**
- **Neutrons- neutral**

In the nucleus



- **Electrons - negative charge**

Outside the nucleus



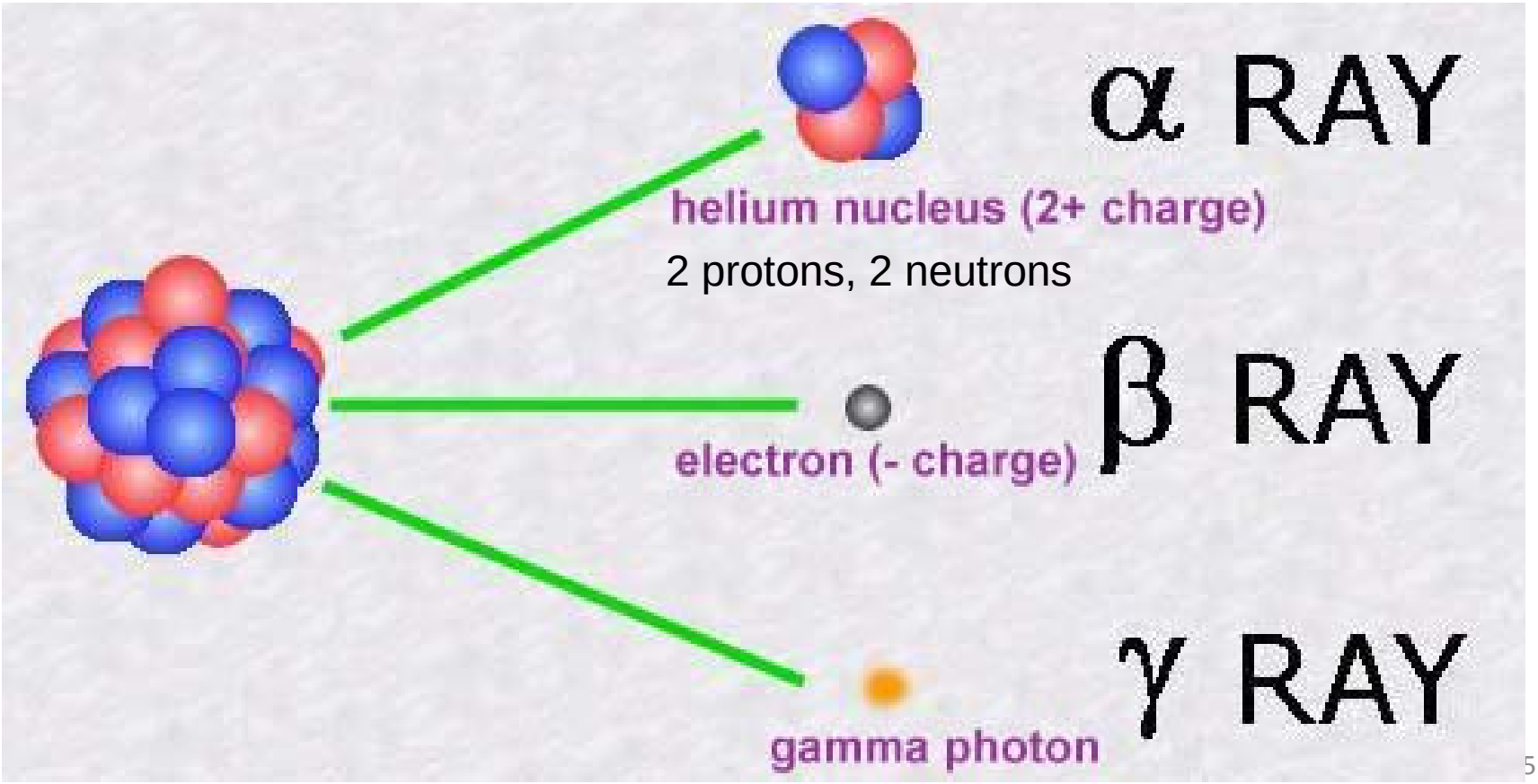
Strong Force

- Normally particles with similar forces (both + or both -) would repel each other
  - So why doesn't the nucleus totally fly apart from protons repelling each other?!
    - Strong Force

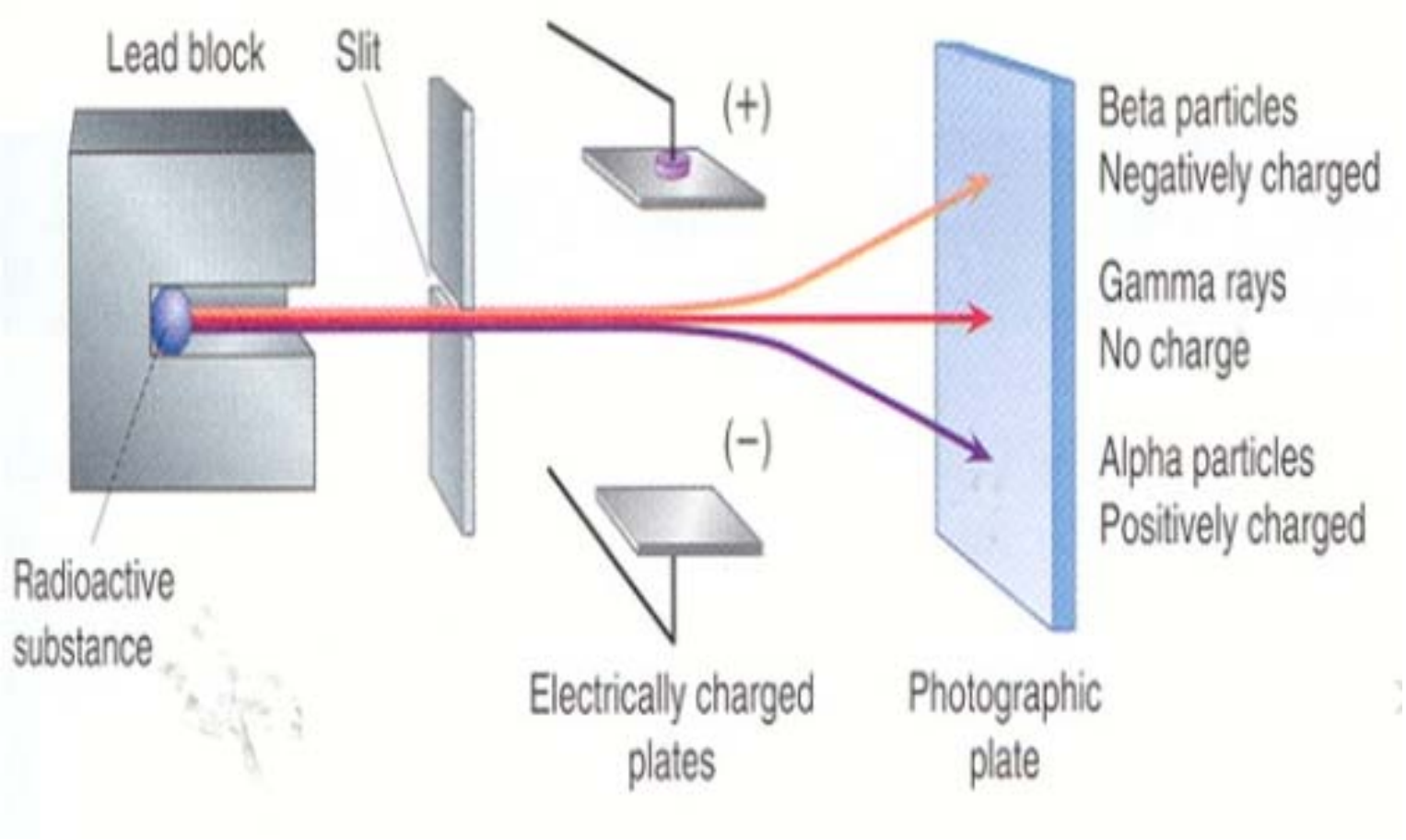
- Sometimes there are too many neutrons, and it makes the atom unstable

Radiation

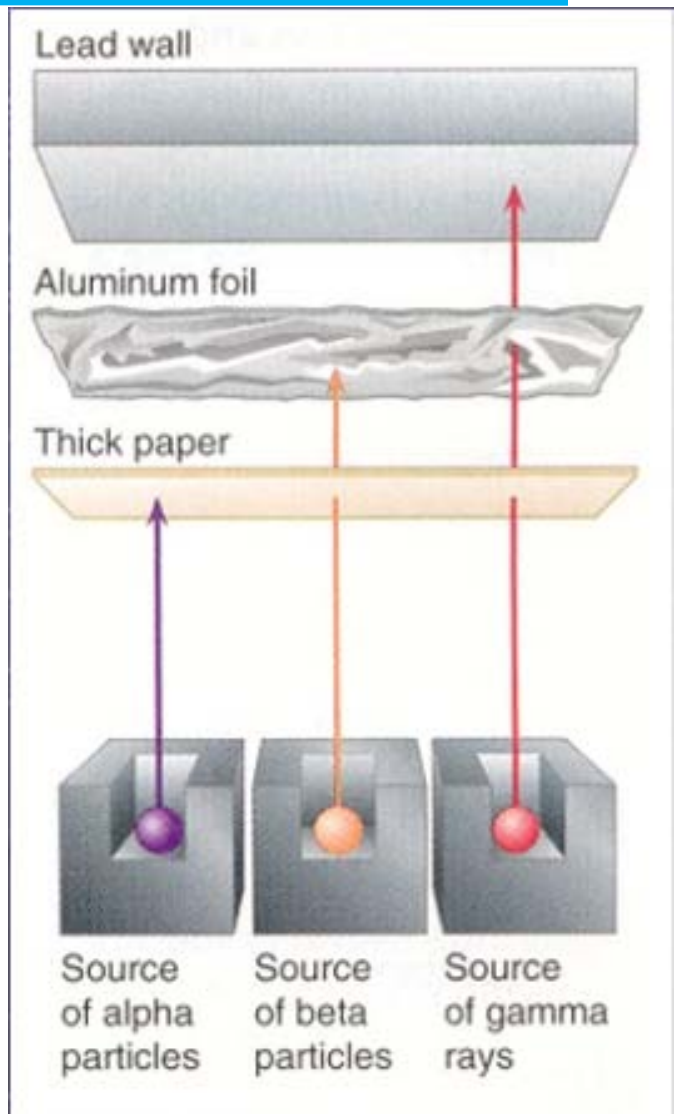
- **Radiation comes from the nucleus of an atom.**
- **Unstable nucleus emits (spits out) a particle or energy**

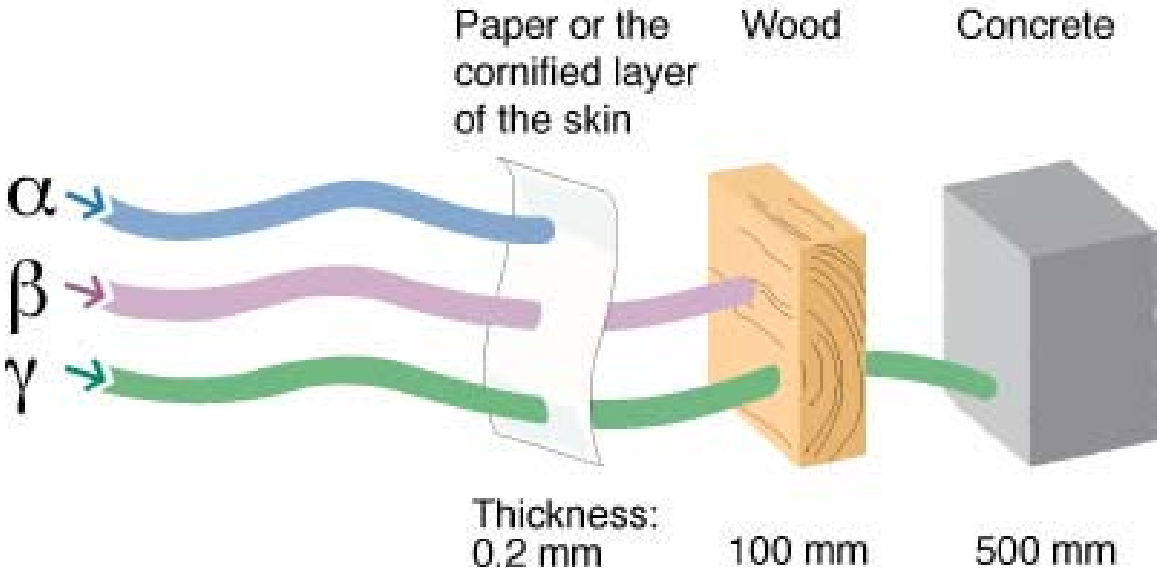


Charge of Nuclear Particles



Penetrating Power of Radiation

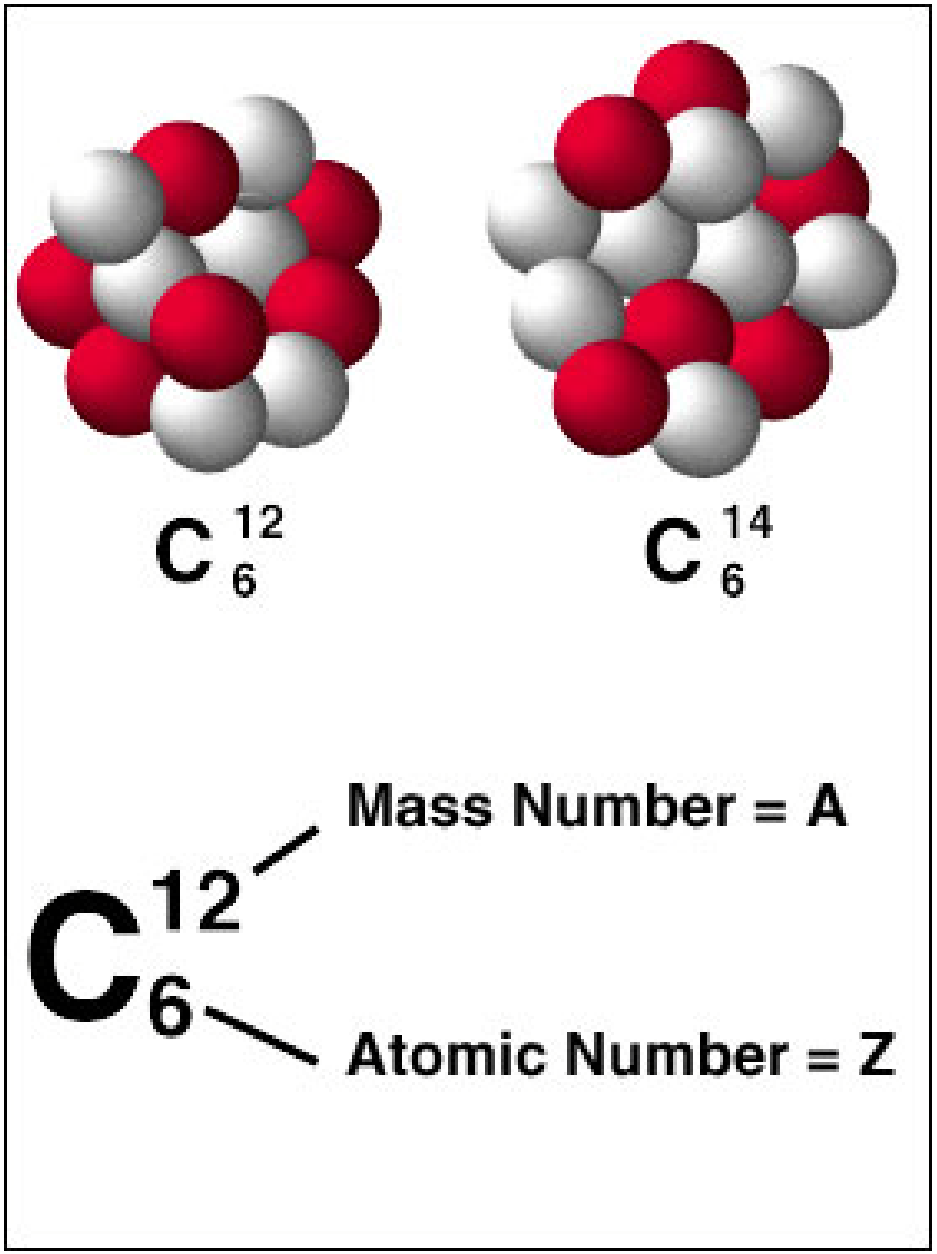




Copy the symbols down

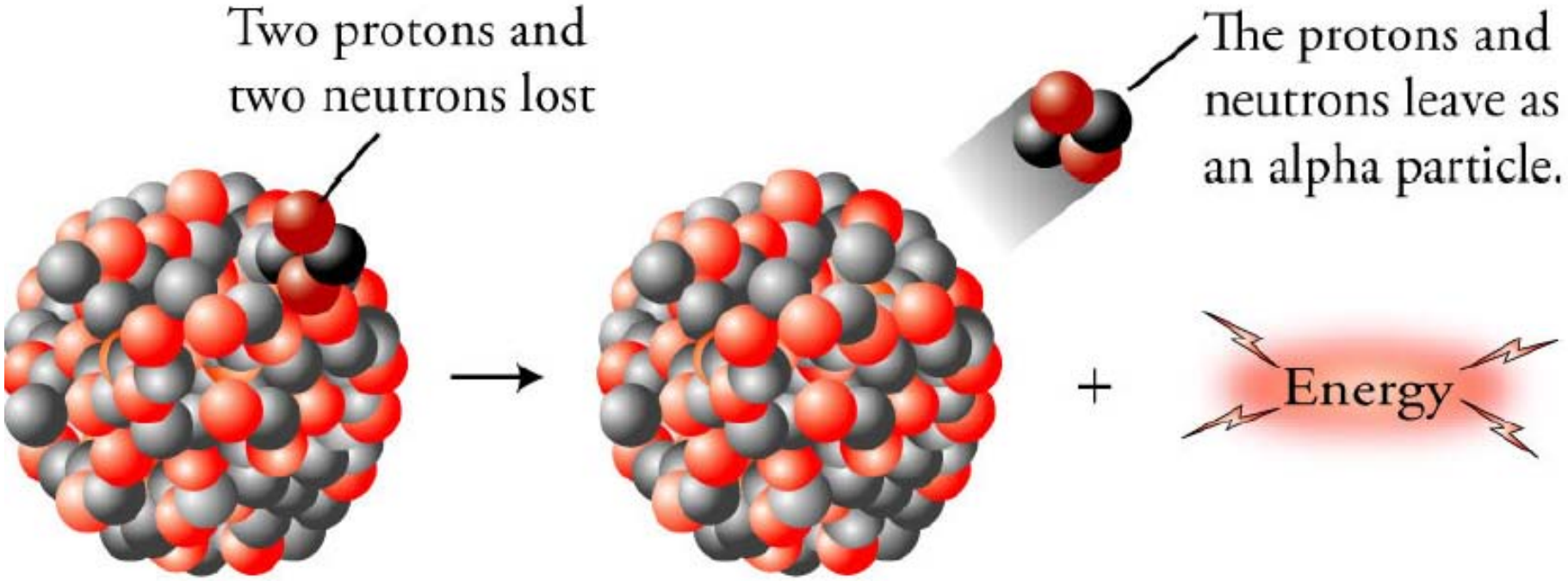
Type	What is it?	Symbol	Charge	What Stops It
Alpha Particle	2 protons 2 neutrons	$^{4}_{2}\mathrm{He}$ $^{4}_{2}\alpha$	2+	Paper
Beta Particle	An electron	$^{0}_{-1}\beta$ $^{0}_{-1}\mathrm{e}^{-}$	1-	Aluminum, wood, clothes
Gamma Ray	High speed energy waves	γ $^{0}_{0}\gamma$	0	Thick lead or concrete

How to write isotopes when doing nuclear chemistry

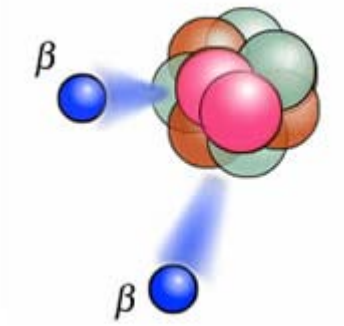


Alpha Decay

$$^{238}_{92}\mathrm{U} \longrightarrow {}^{234}_{90}\mathrm{Th} + {}^{4}_{2}\mathrm{He}$$



Beta Emission:



A beta particle is just like an e-.

When beta decay happens, the nucleus chang
a neutron into a proton and an e-, and emits
the e-

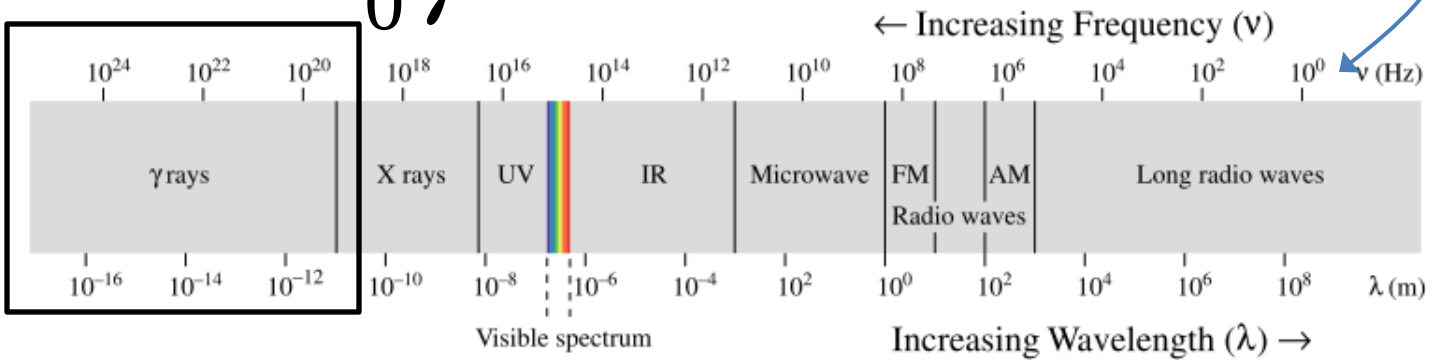
$$^{1}_{0}\mathbf{n} \rightarrow {}^{0}_{-1}\beta + {}^{1}_{1}\mathbf{p}$$

$$^{234}_{90}\mathrm{Th} \rightarrow {}^{0}_{-1}\beta + {}^{234}_{91}\mathrm{Pa}$$

Gamma rays:

These are dangerous EMR waves with no significant mass that are usually emitted with other types of radiation. They penetrate very deeply.

The Symbol: ${}^{0}_{0}\gamma$



Gamma Radiation:

No change in atomic or mass number

$$^{11}_{5}B^{*} \rightarrow {}^{11}_{5}B + {}^{0}_{0}\gamma$$

boron atom in a high-energy state