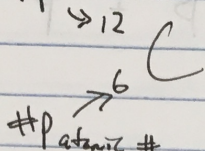


Isotopes

- Isotopes have the same # of protons (atomic #) but different #s of neutrons (atomic mass)

$$\#p + \#n = \text{mass \#}$$



#p atomic #

Carbon-12



Carbon-13



Carbon-14

↗ radioactive

Types of radiation

- 3 (main) types:

Gamma rays 1) γ -rays: not detected $\rightarrow$ no charge

Beta particles 2) β -particles: deflected toward + $\rightarrow$ negative charge

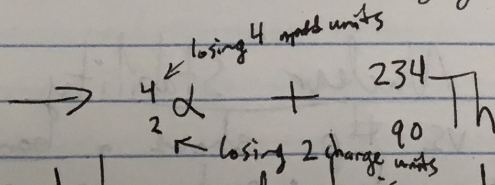
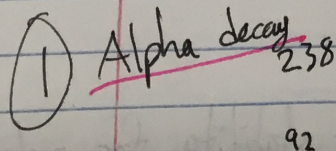
Alpha particles 3) α -particles: deflected toward - $\rightarrow$ positive charge, heavier than β -particles

- Suggests existence of sub-atomic particles
- As particles undergo decay, they lose mass

Table 21.1

Property	α	β	γ
Charge	2+	1-	0
Mass	$6.64 \times 10^{-24} \text{ g}$	$9.11 \times 10^{-28} \text{ g}$	0
Relative penetrating power	1	100	10,000
Nature of radiation	${}^4_2\text{He}$ nuclei	Electrons	High-energy photons

- emitted from nucleus of decaying material



- can predict which new element is made