

## Showing Radioactive decay

### Review

- ♦ atomic number- number of protons (if this changes the element changes)
- ♦ mass number- number of protons + neutrons (isotopes change the # of neutrons)
- ♦ You can get the atomic number from the periodic table.
- ♦ You can NOT get the mass number (the mass numbers on the periodic table are the averages of all isotopes found)

### Representing isotopes

♦ Carbon-14 and Carbon-12

Mass number

The atomic number of Carbon is 6

$${}_{6}^{14}\text{C}$$

$${}_{6}^{12}\text{C}$$

\*mass # on top, atomic # on bottom

### Showing Alpha Decay

- ♦ ~expulsion of 2 p<sup>+</sup> and 2 n<sup>0</sup>
- ♦ Show the alpha decay of Radon-222.

$${}_{86}^{222}\text{Rn} \xrightarrow{\alpha \text{ decay}} {}_{84}^{218}\text{Po} + \alpha$$

lose 2 p<sup>+</sup> so the atomic number is now 84  
lose 2 p<sup>+</sup> and 2 n<sup>0</sup> so the mass number is now 218  
element # 84 is Polonium  
The particle is also released  
alpha particle can also be written as  ${}_{2}^{4}\text{He}$

### Show the alpha decay of...

Plutonium-244

Polonium-210

Technetium-98

### Show the alpha decay of...

Plutonium-244

$${}_{94}^{244}\text{Pu} \xrightarrow{\alpha \text{ decay}} {}_{92}^{240}\text{U} + \alpha$$

Polonium-210

$${}_{84}^{210}\text{Po} \xrightarrow{\alpha \text{ decay}} {}_{82}^{206}\text{Pb} + \alpha$$

Technetium-98

$${}_{43}^{98}\text{Tc} \xrightarrow{\alpha \text{ decay}} {}_{41}^{94}\text{Nb} + \alpha$$

### Showing Beta Decay

- ♦ ~conversion of a neutron to a proton and an electron, and expulsion of the electron.
- ♦ The beta decay of Lead-214

$${}_{82}^{214}\text{Pb} \xrightarrow{\beta \text{ decay}} {}_{83}^{214}\text{Bi} + \beta$$

gain 1 p<sup>+</sup> so the atomic number is now 83  
lose 1 n<sup>0</sup> and gain 1 p<sup>+</sup> so the mass number is the same  
element # 83 is Bismuth  
The particle is also released  
beta particle can also be written as  ${}_{-1}^0\text{e}$

### Show the beta decay of...

Potassium-40

Carbon-14

Thorium-234

### Show the beta decay of...

Potassium-40

$${}_{19}^{40}\text{K} \xrightarrow{\beta \text{ decay}} {}_{20}^{40}\text{Ca} + \beta$$

Carbon-14

$${}_{6}^{14}\text{C} \xrightarrow{\beta \text{ decay}} {}_{7}^{14}\text{N} + \beta$$

Thorium-234

$${}_{90}^{234}\text{Th} \xrightarrow{\beta \text{ decay}} {}_{91}^{234}\text{Pa} + \beta$$

