

α alpha ${}^4_2\text{He}^{2+}$ slowest moving

β^- beta negative ${}^0_{-1}e$

β^+ beta positive ${}^0_{+1}e$

γ gamma rays ${}^0_0\gamma$ fastest moving

α things that provide
protection

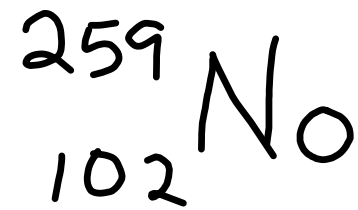
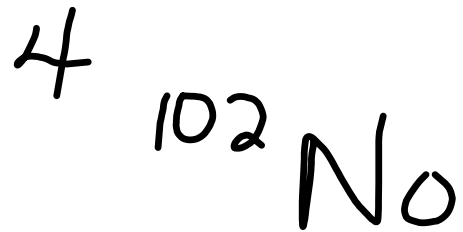
heavy clothing

B^-
 B^+

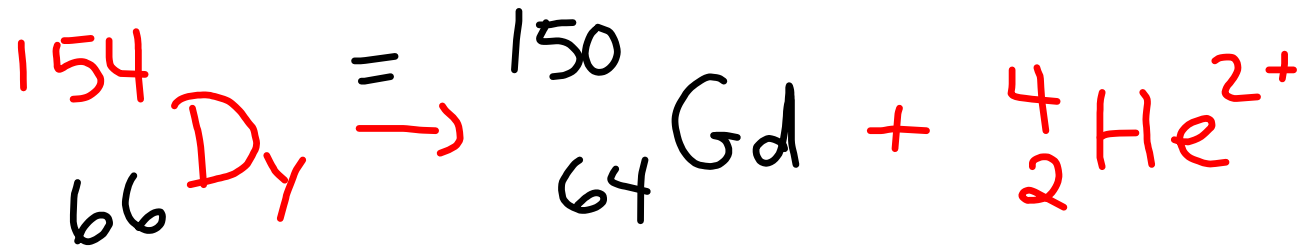
heavy plastic

γ

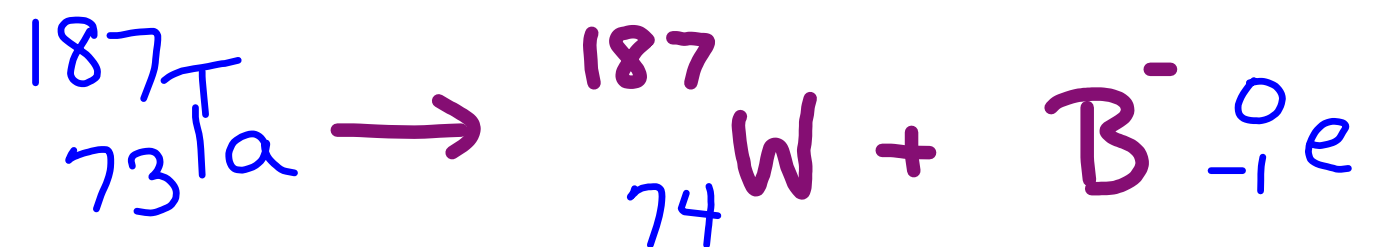
lead



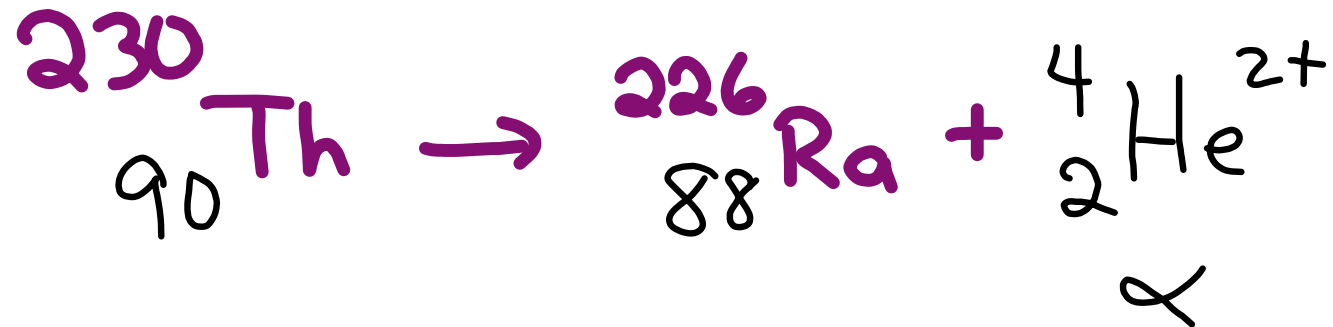
2.



5.



10.



Natural Decay b/c
there is only one reactant.

20.



Artificial Transmutation
b/c more than one reactant
The rxn above occurs in
the sun.

Fusion rxn- combines two
to creat one.

half-life - time it takes
for a substance to
decrease by half of its
original amount.

$$\frac{\text{total time}}{\text{half-life time}} = \# \text{ of half-lives}$$

21.

10.0g

$$\frac{10,000,000 \text{ yr}}{2.5 \times 10^6 \text{ yr}} = 4$$

10.0 $\rightarrow$ 5 $\rightarrow$ 2.5 $\rightarrow$ 1.25 $\rightarrow$ 0.625g

25

$$\frac{x}{4.5 \times 10^9 \text{ yrs}} = \frac{6}{1}$$

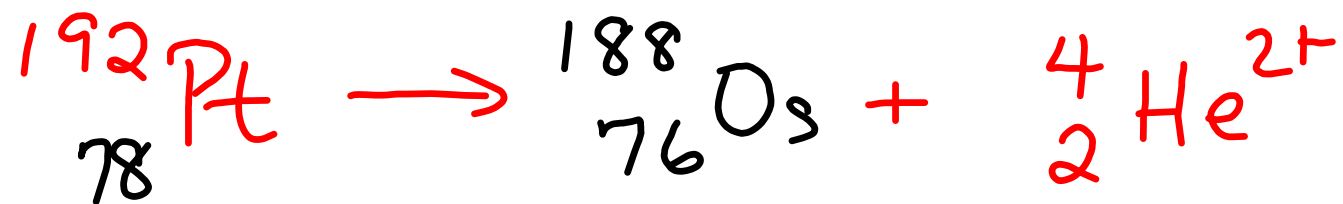
12435^① → 6217^② → 3108^③ → 1554

194^⑥ ← 388 ←^⑤ 777^④

$$x = (4.5 \times 10^9)(6)$$

$$x = 2.7 \times 10^{10} \text{ yrs}$$

26.



$$27. \frac{207.6 \text{ hrs}}{41.5 \text{ hrs}} = 5$$

$$8.65 \times 24 = 207.6 \text{ hrs}$$

$$3.44 \rightarrow 1.72 \rightarrow 0.86 \rightarrow 0.43$$



$$\textcircled{0.108 \text{ mg}}$$

$$0.1075 \text{ mg} \leftarrow 0.215$$

$$.0108 \text{ cg}$$

$$\frac{0.108 \text{ mg} \times 1 \text{ g} \times 100 \text{ cg}}{1000 \text{ mg} \times 1 \text{ g}} = 0.0108 \text{ cg}$$

28.

$$\frac{x}{4.5 \times 10^9 \text{ yrs}} = \frac{4}{1}$$

$$1 \rightarrow \frac{1}{2} \rightarrow \frac{1}{4} \rightarrow \frac{1}{8} \rightarrow \frac{1}{16}$$

$$x = (4.5 \times 10^9 \text{ yrs})(4)$$

$$x = 1.8 \times 10^{10} \text{ yrs}$$

