

radioactive

unstable nucleus (breaks down), throws off particles  
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ratio of prot. to neutrons

smaller, more stable atoms - ratio of 1:1  
 larger, less stable not ratio of 1:1

Particles created by radioactive decay

beta ( $\beta$ ) particle  $\rightarrow \begin{matrix} 0 \\ -1 \end{matrix} e$

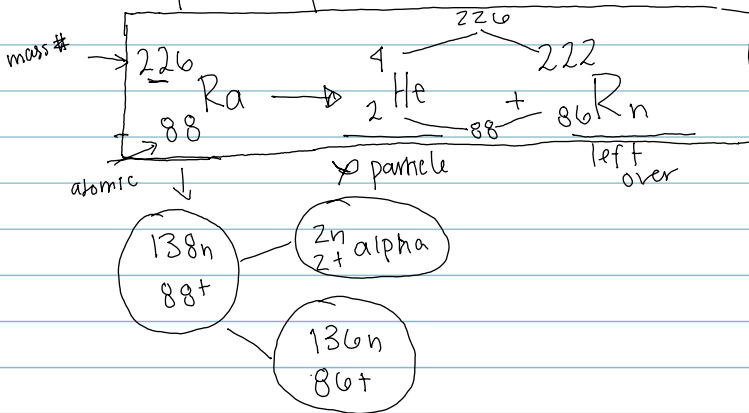
positron  $\rightarrow \begin{matrix} 0 \\ 1 \end{matrix} e$

electron capture  $\begin{matrix} 0 \\ -1 \end{matrix} e \rightarrow$

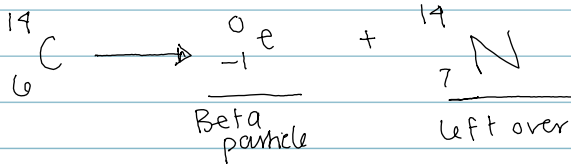
alpha particle  $\rightarrow \begin{matrix} 4 \\ 2 \end{matrix} He$

gamma-ray  $\gamma$

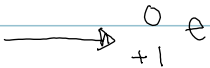
ex. alpha particle production



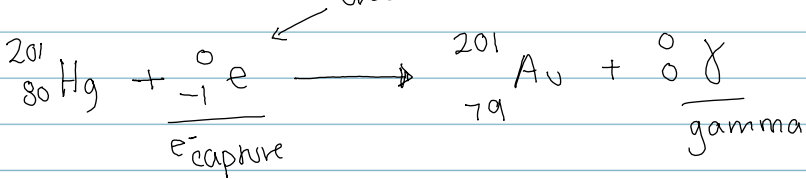
ex.  $\beta$  particle production



◦ positron:

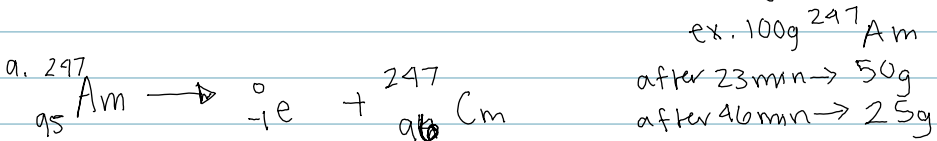


ex. electron capture



**Half-Life**

\* time it takes for 1/2 of sample to decay



b. How many half-lives for 75% of a ~~350~~<sup>350</sup> gram sample?

1 cycle 50%  
 2 cycle 25% > 2 cycles

c. half-life:  $\frac{92 \text{ min}}{23 \text{ min}} = 4 \text{ cycles}$

$\frac{1000 \text{ g}}{\text{sample}} \times \left(\frac{1}{2}\right)^{\text{④}} \rightarrow \text{# of cycles}$