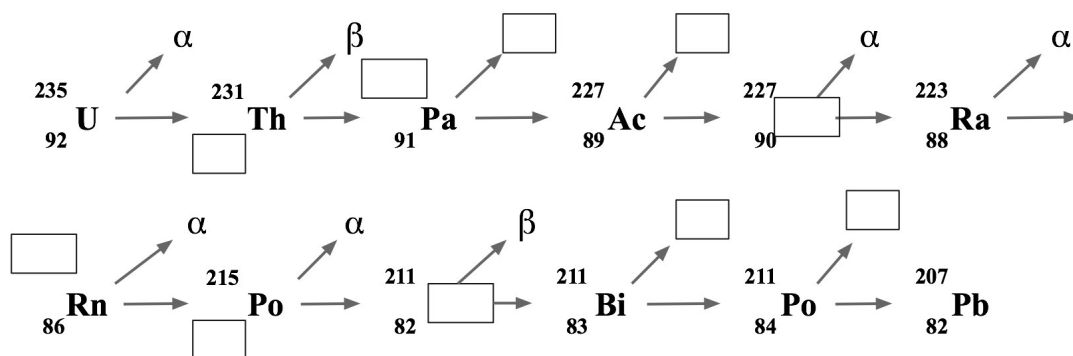


1. Complete the following radioactive decay series:

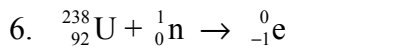
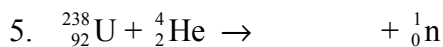
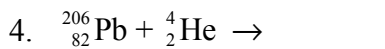


2. What kind of nucleus does every radioactive decay series end with?

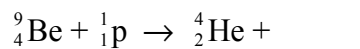
Induced Transmutation

3. Describe the process of induced transmutation. What is the large machine used to achieve these reactions called and how does it work?

Fill in the blanks to complete the following equations. Use a periodic table to identify elements by atomic number.



7. Complete the equation for the proton (${}^1_1\text{p}$) bombardment of Be-9:



8. Write the balanced nuclear equation for the induced transmutation of aluminum-27 into a new nucleus by neutron bombardment. An alpha particle is released in the reaction along with another nucleus, which you must determine.

9. Rutherford discovered the proton by observing that H-1, which he realized was a proton, was a product in the alpha-particle bombardment of many gases. Write the complete equation for the alpha-bombardment of N-14, producing H-1 (a proton) and one other nucleus (which you must determine).
10. Write the equation for the bombardment of Am-241 with Be-9 that creates 3 neutrons and another nucleus, which you need to find:
11. Write the complete equation for the bombardment of Cf-249 with N-15 that produces another transuranium element and 4 neutrons:
12. Write the balanced nuclear equation for the alpha particle bombardment of ${}_{94}^{239}\text{Pu}$. One of the reaction products is a neutron [you will need to determine the other].