alpha can't get thru cells

Name: Key

Nuclear Chemistry Worksheet

Directions: Identify the following as alpha, beta, gamma, or neutron.

1. $^{1}_{0}n$ neutron
2. $^{0}_{-1}e$ beta
3. $^{4}_{2}He$ alpha
4. $^{0}_{0}\gamma$ gamma

5. Nuclear decay with no mass and no charge — gamma
6. An electron — beta
7. Least penetrating nuclear decay — alpha
8. Most damaging nuclear decay to the human body — gamma
9. Nuclear decay that can be stopped by skin or paper. — alpha
10. Nuclear decay that can be stopped by aluminum. — beta

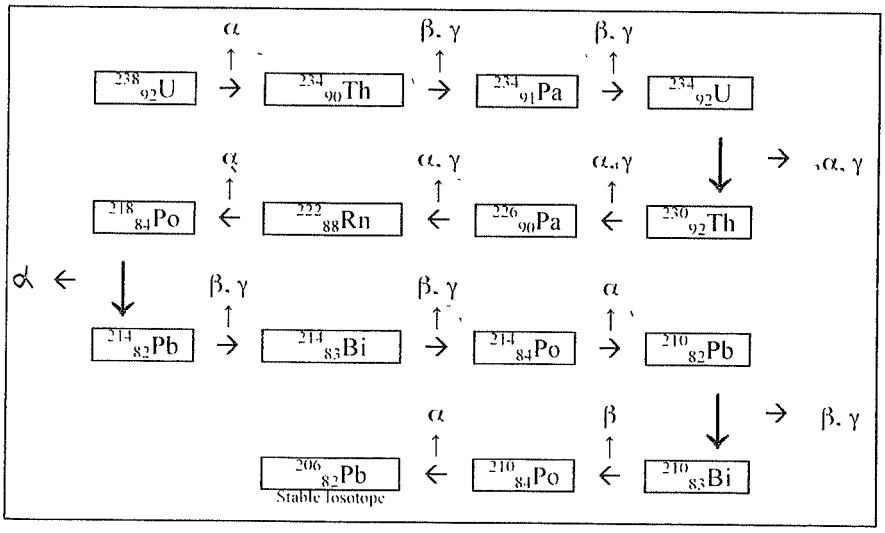
Complete the following nuclear equations.

11. $^{42}_{19}K \rightarrow {}^{0}_{-1}e + {}^{42}_{20}Ca$
12. $^{239}_{94}Pu \rightarrow {}^{4}_{2}He + {}^{235}_{92}U$
13. $^{9}_{4}Be \rightarrow {}^{9}_{4}Be + {}^{0}_{0}\gamma$
14. $^{235}_{92}U \rightarrow {}^{4}_{2}He + {}^{231}_{90}Th$
15. $^{6}_{3}Li \rightarrow {}^{4}_{2}He + {}^{2}_{1}H$
16. $^{236}_{92}Sm \rightarrow {}^{142}_{56}Ba + {}^{91}_{36}Kr + 3\,{}^{1}_{0}n$

56 + 36 = 92

142 + 91 + 3 = 236

Nuclear Decay Series



The figure to the left maps the radioactive decay of uranium-238 to lead-206. Use the figure to answer the following questions.

17. How many alpha particles are produced as one atom of uranium-238 decays to an atom of lead-206?

8

18. How many beta particles?

6

19. Explain why lead-206 is a stable isotope. Correct ratio of neutrons to protons

20. When protactinium-229 goes through two alpha decays, francium-221 is formed. Write the reactions below.

$^{229}_{91}Pa \rightarrow {}^{4}_{2}He + {}^{225}_{89}Ac$

$^{225}_{89}Ac \rightarrow {}^{4}_{2}He + {}^{221}_{87}Fr$

21. Write the nuclear equation for the decay of Po-210 if it undergoes 2 consecutive alpha decay followed by a beta decay followed by another alpha decay.

$^{210}_{84}Po \rightarrow {}^{4}_{2}He + {}^{206}_{82}Pb$

$^{206}_{82}Pb \rightarrow {}^{4}_{2}He + {}^{202}_{80}Hg$

$^{202}_{80}Hg \rightarrow {}^{0}_{-1}e + {}^{202}_{81}Tl$

$^{202}_{81}Tl \rightarrow {}^{4}_{2}He + {}^{198}_{79}Au$

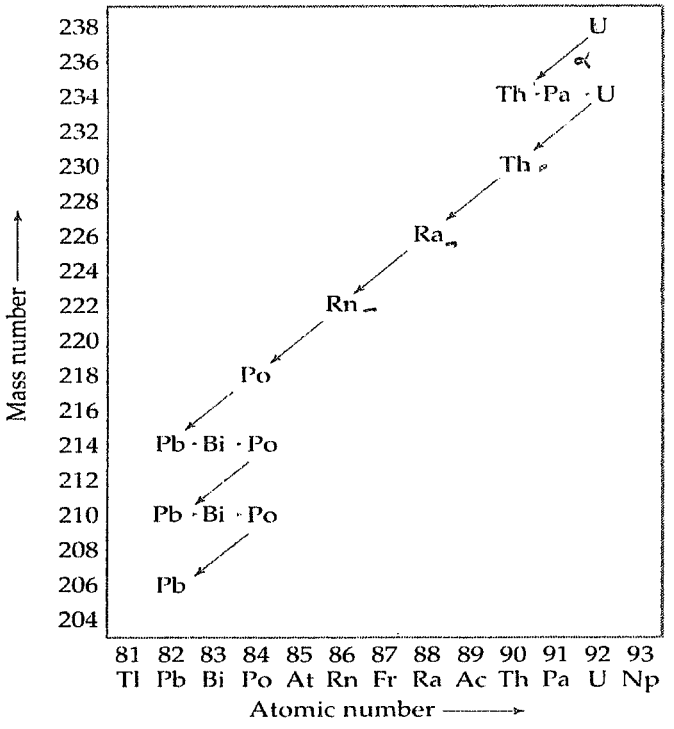
22. The decay chain (or series) of uranium-238 is shown in the following figure. What is the ***final product*** in this decay series?

^{206}Pb

23. Using the figure to the right, list each type of decay that uranium-238 goes through to become lead-206.

$\alpha, \beta, \beta, \alpha, \alpha, \alpha, \alpha, \alpha, \beta, \beta, \alpha,$

β, β, α



24. Thorium-232 undergoes radioactive decay until a stable isotope is reached. Write the reactions for the decay of Th-238. There are eleven steps beginning with Alpha decay with each product becoming the reactant of the next decay. Circle the final Stable isotope.

alpha: _____

beta: _____

beta: _____

alpha: _____

alpha: _____

alpha: _____

alpha: _____

beta: _____

beta: _____

alpha: _____

beta: _____