

Name: _____

Broughton High School

Radioactivity



Toxic



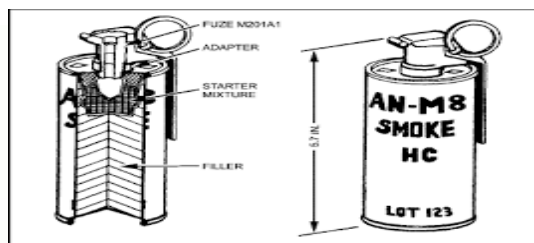
RADIOACTIVE



Chapter 18

Chapter 18– Radioactivity and Nuclear Reactions Vocabulary Words

1. Alpha Particle	
2. Beta Particle	
3. Bubble Chamber	
4. Chain Reaction	
5. Cloud Chamber	
6. Critical Mass	
7. Gamma Ray	
8. Geiger Counter	
9. Half-Life	
10. Nuclear Fission	
11. Nuclear Fission	
12. Radioactivity	
13. Strong Force	
14. Tracer	
15. Transmutation	



Radioactive Decay

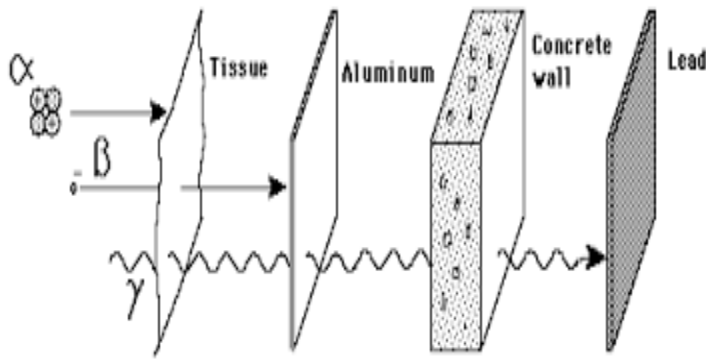
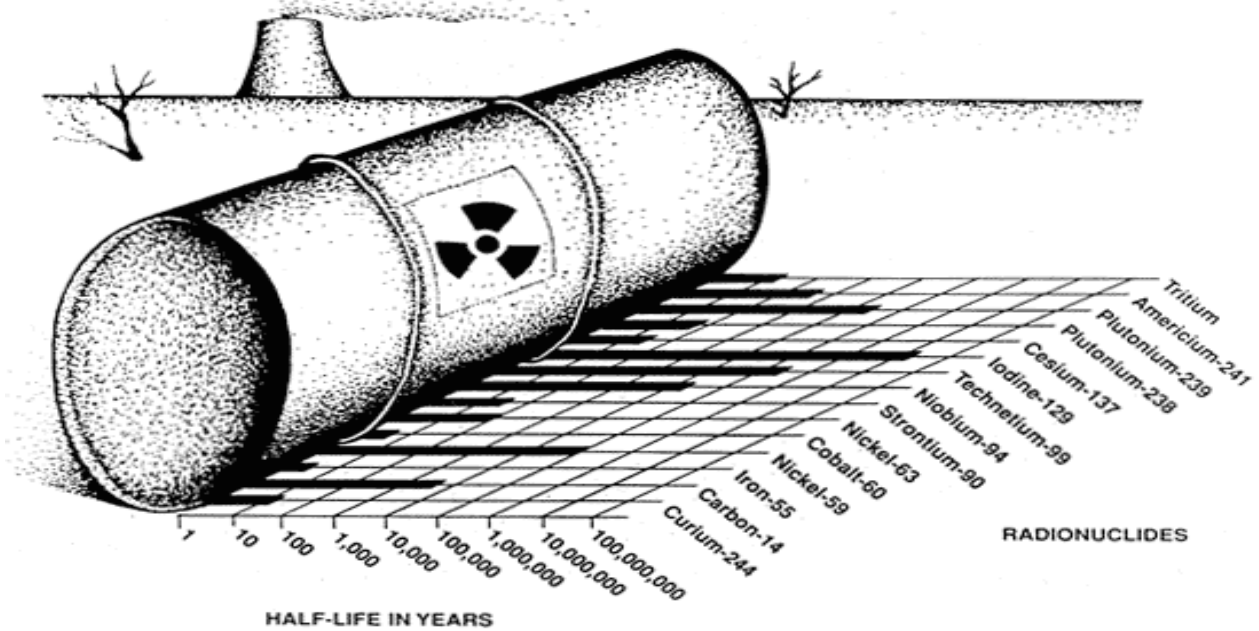


Fig. 2 – Half-Lives of Radionuclides in “Low-Level” Radioactive Waste



Note: The hazardous life of a radionuclide is 10 to 20 times its half-life.

Source: Update of Part 61, Impacts Analysis Methodology, NUREG/CR-4370, January 1986, U.S. Nuclear Regulatory Commission, Washington, DC.



Nuclear Chemistry Practice Sheet

Directions: Use your knowledge of nuclear chemistry and write the equations for the following processes

1. Define Alpha particle decay:
2. Define Beta particle decay:
3. Define Gamma ray:
4. The Alpha (α) decay of iridium-174
5. The Beta (β) decay of platinum-199
6. The Alpha (α) decay of sulfur-31
7. Krypton-76 undergoes beta decay

Nuclear Chemistry Practice Sheet

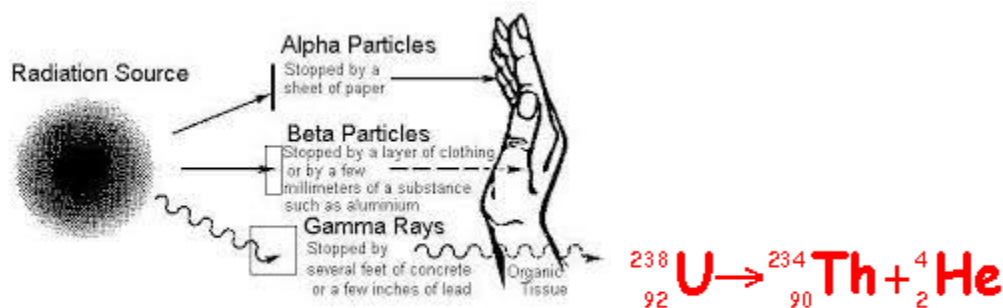
8. Write the symbols for an alpha particle, beta particle, and a gamma ray.

9. If the half-life for the radioactive decay of zirconium-84 is 26 minutes and I start with a 175 gram sample, how much will be left over after 104 minutes?

10. Distinguish the difference between fusion & fission reaction?

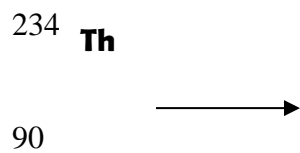
11. Why is it difficult to make a fusion reaction occur?

12. Alpha Decay

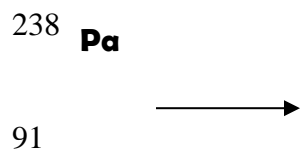


Nuclear Chemistry Practice Sheet

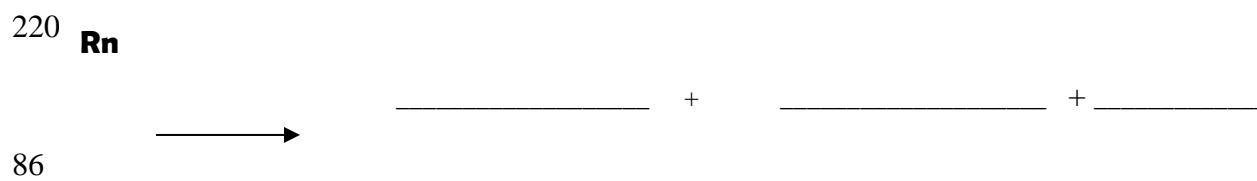
13. Beta Decay



14. Alpha Decay



15. Gamma Decay



Nuclear Chemistry Practice Sheet

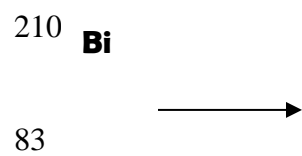
16. Beta Decay



17. Alpha Decay



18. Beta Decay



Nuclear Chemistry Crossword Puzzle

R K Y D L
 S C A H P J B E
 I N I D P M E A
 J O O R I A O C D
 G E M I C U U M Q E
 N I D T U M L N E U B D V U
 N O I T A L L I T N I C S U N E R E T Y
 G R E T T A M I T N A E L E C T R O N I C
 K O E V C I T E H T N Y S C A A L U E S O D
 V O T I L C O V A A D O I Y A V H E M L B E
 S T U T G X R Q C Y M U I N A R U P A G R A
 P R E I N E Y T R A C E R S I M B R L R N Z
 U Z D S E T R H E L I U M S S A M O Z A Y
 W O L J I R I N
 P B F B

ABSORBED
 ALPHA
 ANTIMATTER
 BECQUEREL
 BRAIN
 CARBON
 CIRCULATORY
 DECAY
 DEUTERON
 DOSE

ELECTRONIC
 EXCITATIONS
 FISSION
 GEIGER
 HELIUM
 LEAD
 MASS
 MOMENTUM
 NEON
 NUCLEAR

PAULI
 POSITIVE
 RAD
 RADIUM
 SCINTILLATION
 SYNTHETIC
 TRACERS
 URANIUM

Broughton High School
Radioactivity Study Guide



Section 1: True/ False Indicate whether the statement or statement is true or false.

1. *Half–Life* is the amount of time it takes half of the nuclei in a radioactive sample to increase.
2. *Gamma rays* are electromagnetic waves with high –frequency energy.
3. A *chain reaction* is an ongoing series of fission reactions.
4. The process of changing one element to another through nuclear decay is called *Transmutation*.
5. *Alpha particles* are composed of one proton and two neutrons.
6. The combining of two smaller nuclei to make a large nucleus is called *nuclear fusion*.
7. A *tracer* is a radioactive isotope used to find or track molecules in an organism.
8. A device that produces an electric current when radiation is present is called a *Geiger Counter*.

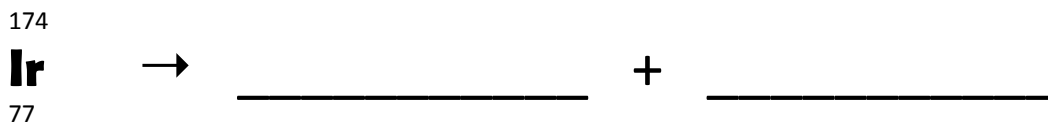
Section 2: Fill-In: Match the word from the box with the correct sentence or phrase.

Atomic Number	Radioactivity	Strong Force	Cloud Chamber
Nuclear Radiation	Curie	Gamma Rays	Alpha Particle
Atomic Mass	Beta Particle	Fission	Geiger Counter

9. Nuclear _____ is a process of splitting a nucleus into two nuclei with smaller mass.
10. A _____ measures radioactivity by producing an electric current when radiation is present.
11. A _____ chamber detects alpha or beta particles by means of a trail of condensed vapor.
12. _____ particles and energy are released from a decaying nucleus.
13. _____ particle decay occurs when 2 protons and 2 neutrons are released from the nucleus of the atom.
14. _____ is nuclear decay which happens when the strong forces is not large enough to hold the nucleus together.
15. The _____ causes protons and neutrons to be attracted to each other in the nucleus.
16. _____ particle decay occurs when a proton is gained and a electron is released.
17. _____ are penetrating electromagnetic waves that carry high energy photons.
18. _____ the number of protons in the nucleus of an atom.
19. Marie and Pierre _____ discovered the radioactive elements of polonium and radium in 1898.
20. The _____ is the number of protons and neutrons in the nucleus of the atom.

Section 3: Complete the following Nuclear Chemistry Problems. Show all your work to receive complete credit.

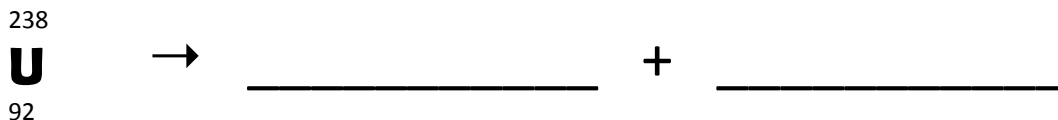
21. Show the Alpha (α) decay of Iridium – 174.



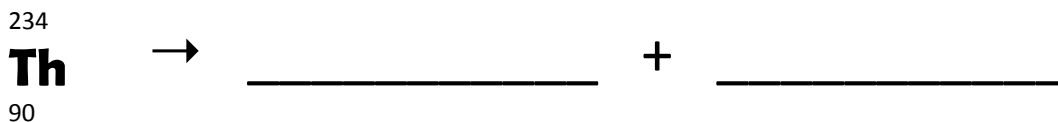
22. Show the Beta (β) decay of Platinum – 199.



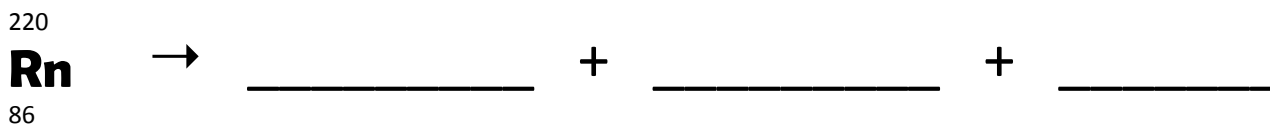
23. Show the Alpha (α) decay of:



24. Show the Beta (β) decay of:



25. Gamma (γ) Decay of:



26. The half-life of cesium-137 is 30.2 years. If the initial mass of a sample of cesium-137 is 1000g, How much will remain after 151 years?

27. What is the half-life of polonium-214 if, after 820 seconds, a 1000 mg sample decays to 31.25 mg?