

EXTRA

NAME

Class Work

4/29/14

10.1 Introduction to Nuclear Chemistry

SPARK (take out your test corrections)

1. What particles are in the nucleus of an atom?
2. What is an isotope of an element?
3. What do you already know about radioactivity?

Objective

SWBAT: Describe what nuclear reactions are and how they differ from chemical reactions, explain what radioactivity is and why radioactive material can be harmful to humans and define nuclear fission and nuclear fusion.

Brain Pop Video

1. What is radioactivity?
2. What are some types of radiation? Which one is the most harmful to humans?
3. What does it mean to have an unstable nucleus?
4. What can radiation do to human cells?

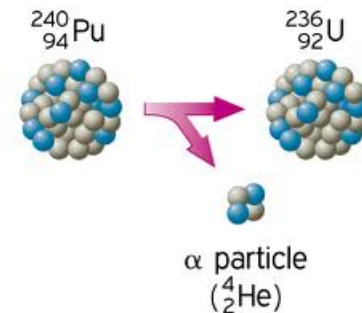
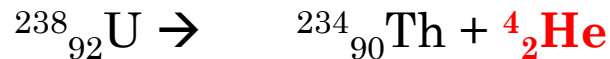
Objective: SWBAT describe nuclear reactions

Radioactivity

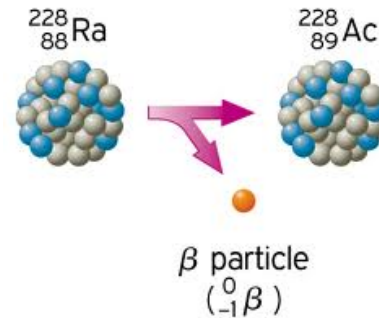
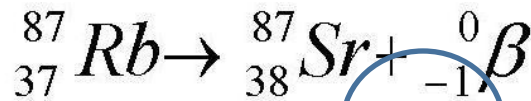
- Radioactive atoms undergo radioactive decay.

– Atoms emit radiation:

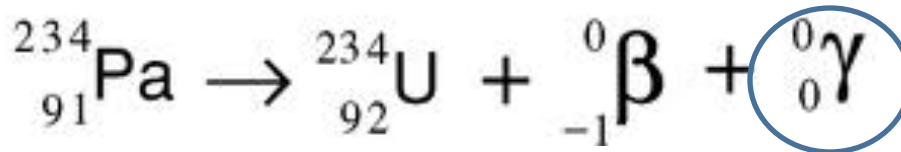
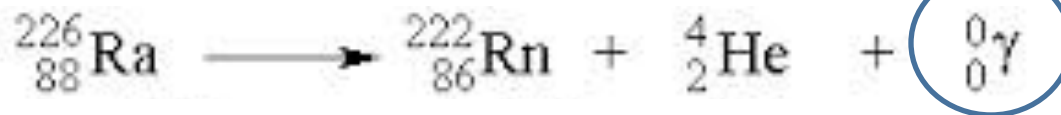
- Alpha Particles ${}^4_2\alpha$ or ${}^4_2\text{He}$



- Beta Particles ${}^0_{-1}\text{e}$ or ${}^0_{-1}\beta$



- Gamma Rays



Objective: SWBAT describe nuclear reactions

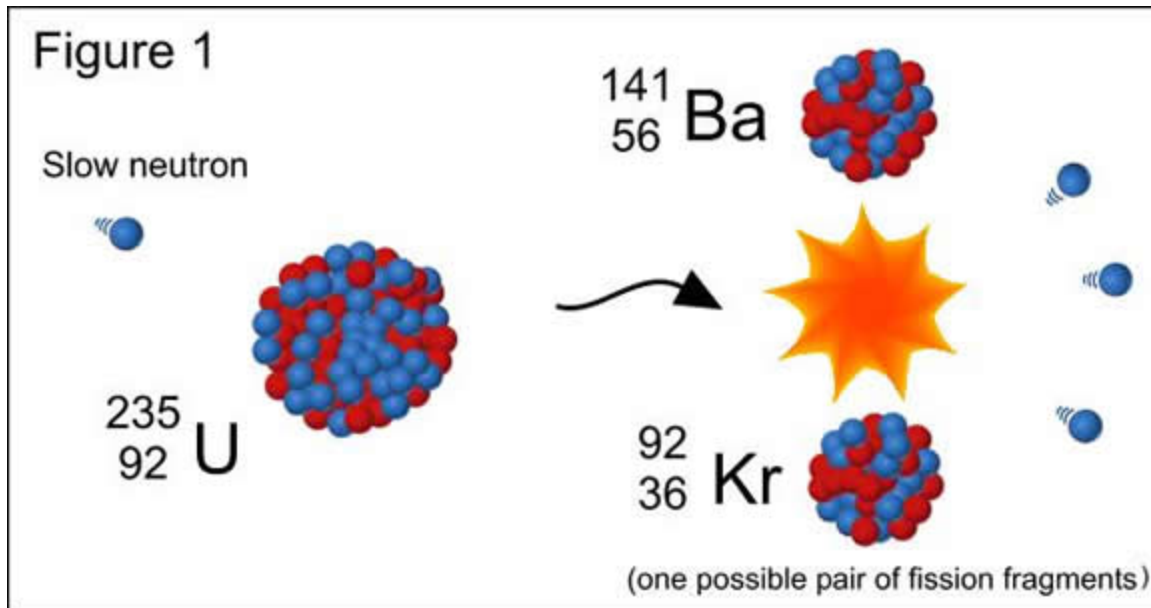
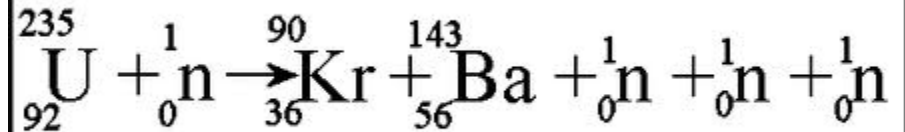
Table O
Symbols Used in Nuclear Chemistry

Name	Notation	Symbol
alpha particle	${}^4_2\text{He}$ or ${}^4_2\alpha$	α
beta particle	${}^0_{-1}\text{e}$ or ${}^0_{-1}\beta$	β^-
gamma radiation	${}^0_0\gamma$	γ
neutron	${}^1_0\text{n}$	n
proton	${}^1_1\text{H}$ or ${}^1_1\text{p}$	p
positron	${}^0_{+1}\text{e}$ or ${}^0_{+1}\beta$	β^+

Objective: SWBAT describe nuclear reactions

Fission

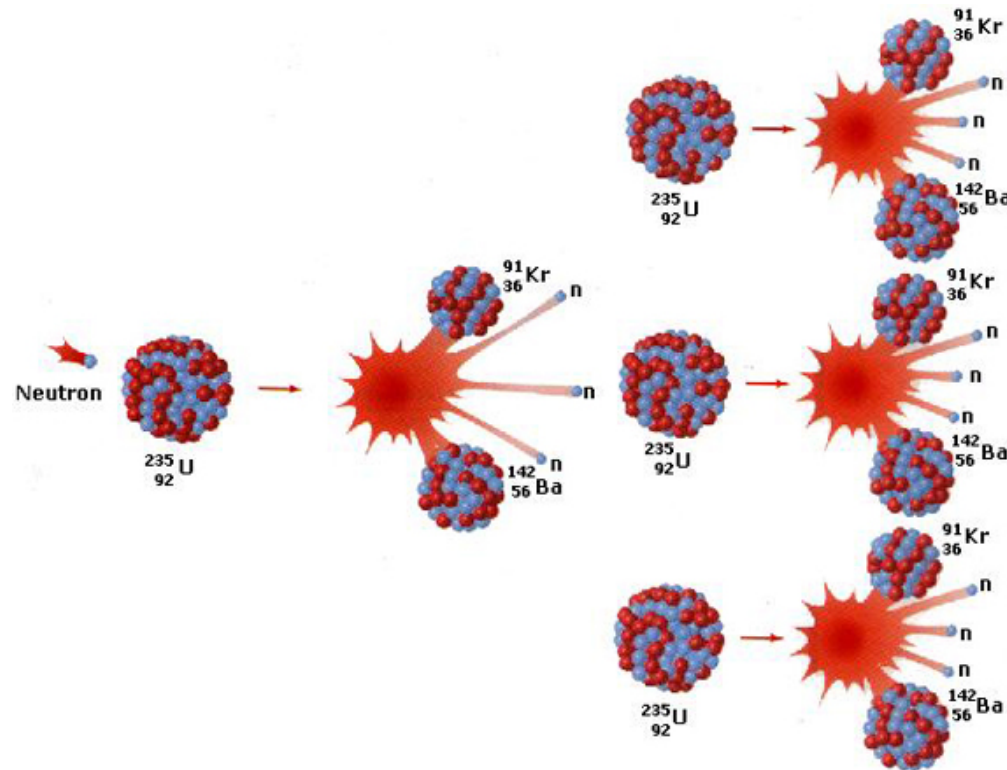
- Neutron splits a heavy atom into 2 smaller atoms



Objective: SWBAT describe nuclear reactions

FISSION

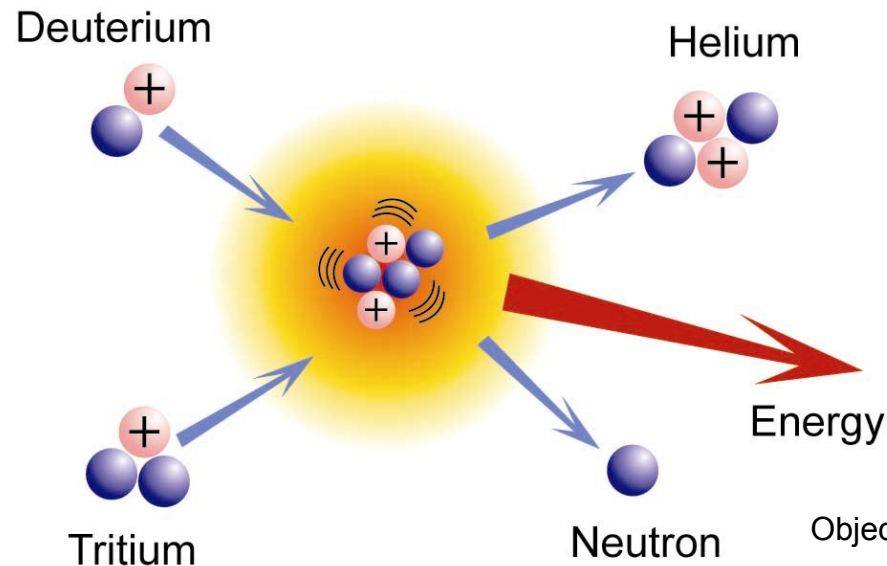
- Fission reaction starts a **chain reaction**
- Small amounts of **MASS** converted to **ENERGY**
- **LOTS OF ENERGY PRODUCED**



Objective: SWBAT describe nuclear reactions

9 F 19.00	92 U 238.0	14 Si 28.9	8 O 16.00	7 N 14.01
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- 2 smaller atoms FUSE together into one larger atom



Transmutations

- Elements are considered radioactive when their nuclei (nucleus) are unstable.
- **Transmutation** – atomic nucleus of an **element is changed** into a nucleus of a **different element**
- **Natural Transmutation** – occur naturally
 - Radioactive decay
- **Artificial Transmutation** – occurs in a lab
 - Scientists bombard the nucleus with particles

Objective: SWBAT describe nuclear reactions

Stop and Jot

- How are nuclear reactions different from a typical, chemical reaction bonding of two elements?

Practice

- Complete the practice at the bottom of your sheet!

HOMEWORK

Complete 10.1 HW

Objective: SWBAT edit their drafts for Paper #5