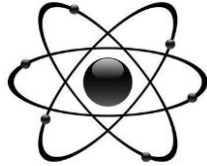


Chapter 18: Radioactivity & Nuclear Reactions

- Radioactivity
- Types of Radiation
- Nuclear Reactions
- Half Life



Radioactivity

- The word _____ was first used in the 1890s by _____



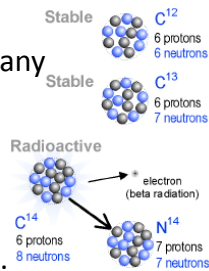
- She used the word radioactivity to describe the property of certain substances to give off **invisible** " _____ " that could be detected by films.

Radioactivity

- We now know that radioactivity comes from the _____ of the atom.

- If the nucleus has too many _____,

or is unstable for any other reason, the atom undergoes _____.



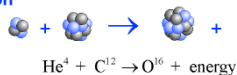
Radioactivity

- Unstable atoms will continue to undergo radioactive decay until they form _____ atoms.
- (Change into atoms of another element.)

Radioactivity

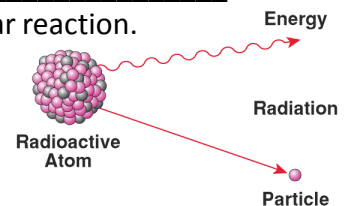
- The word _____ means to "break down."
- Radioactive decay gives off _____.

A nuclear reaction



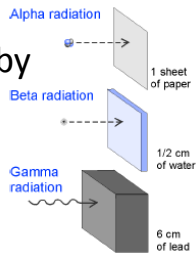
Nuclear Reactions and Energy

- A _____ is any process that changes the _____ of an atom.
- _____ is one form of nuclear reaction.



Types of Radiation

- Scientists quickly learned that there were _____ different kinds of radiation given off by radioactive materials.



- Which one has more penetrating power?

Types of Radiation

- The scientists called them "_____ " because the radiation carried _____ and moved in straight lines, like _____ .

Types of Radiation

- In _____ **decay**, the nucleus ejects two protons and two neutrons.
- _____ **decay** occurs when a neutron in the nucleus splits into a proton and an electron.
- _____ **decay** is not truly a decay reaction in the sense that the nucleus becomes something different.

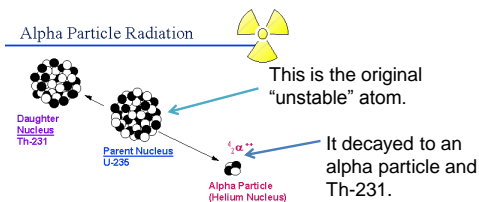
Types of Radiation

Protons			
Neutrons			

Alpha Radiation

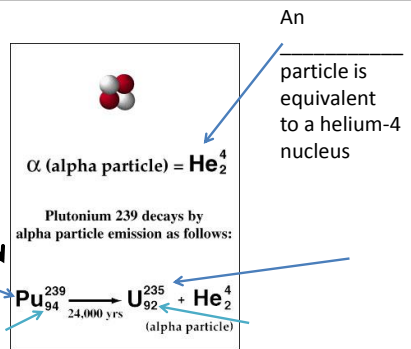
- An alpha particle is equivalent to a helium-4 nucleus and represented by

$$\begin{matrix} 4 \\ 2 \end{matrix} \quad \text{or}$$

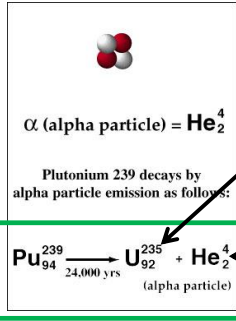


Alpha Radiation

This is an example of a nuclear equation.



Alpha Radiation



This is called the _____ nucleus.

This is the _____ particle that emits energy.

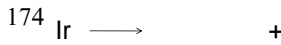
Alpha Decay Equation Practice



What would be the daughter nucleus?

Alpha Decay Equation Practice

Write the equation to show the alpha decay of iridium-174.

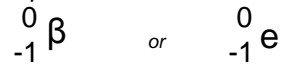


What would be the daughter nucleus?

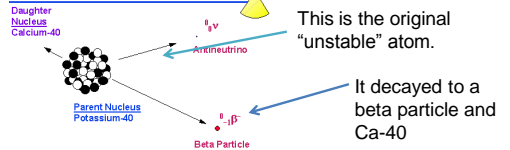
Alpha Particle

Beta Radiation

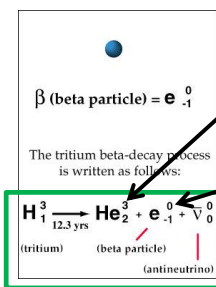
- A beta particle is a fast-moving electron with a -1 charge and represented by



Beta Particle Radiation



Beta Radiation



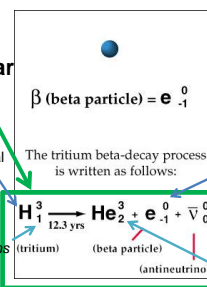
This is called the _____ nucleus.

This is the _____ particle that emits energy.

Beta Radiation

This is an example of a nuclear equation.

This is the original "unstable" atom.



This is the beta particle.

Number of Protons

Number of Protons (Notice it has gained a proton!)

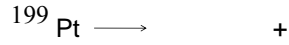
Beta Decay Equation Practice



What would be the daughter nucleus?

Beta Decay Equation Practice

Write the equation to show the beta decay of platinum-199.



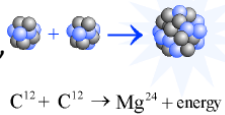
What would be the daughter nucleus?

Beta Particle

Fusion Reactions

- A fusion reaction is a nuclear reaction that combines, **or** _____, two _____ into a _____.

Energy release by a fusion reaction

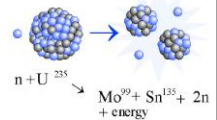


- It is difficult to make fusion reactions occur because positively charged nuclei repel each other.

Fission Reactions

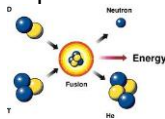
- A fission reaction _____ up a _____ into _____ pieces.
- A fission reaction typically happens when a neutron hits a nucleus with enough energy to make the nucleus unstable.

Energy release by a fission reaction



Examples of fusion and fission.

Fusion is the process that takes place in stars like our Sun. Whenever we feel the warmth of the Sun and see by its light, we are observing the products of fusion.



Examples of fusion and fission.

Fission is used to produce energy for nuclear bombs, but we also use fission peacefully everyday to produce energy in nuclear power plants

