

RADIOACTIVE DECAY

- Radioactivity → release of _____ as a result of changes in the _____ of an atom
- Scientists discovered that when radioactive energy was given off, the atoms of one type of element were changed into the atoms of _____ type of element
- Isotopes that are unstable become stable by losing _____ by emitting _____
 - This process of giving off radiation is called _____
 - When an the atom of an element _____, it usually turns into a _____ type of atom

Types of Radiation

- While working at McGill University in Montreal, Ernest Rutherford discovered that there are three common types of radiation
1. Alpha Radiation
 - A stream of _____ → called _____
 - Alpha particle is the same as the nucleus of a _____ atom (_____ or _____)
 - Because there are only 2 protons and 2 neutrons present, an alpha particle has a charge of _____
 - Largest and most massive type of radiation
 - Relatively _____ moving
 - Does not _____ through other objects → can be stopped by a _____
 - Since 2 protons are given off, a different type of _____ is formed with an atomic _____ 2 less than the parent atom
 - Example:

Activity Practice Problems #2-5 (BC Science 10 pg. 295)

- a. ${}^{208}_{84}\text{Po} \rightarrow \underline{\hspace{2cm}} + {}^4_2\alpha$
- b. ${}^{231}_{91}\text{Pa} \rightarrow \underline{\hspace{2cm}} + {}^4_2\text{He}$
- c. $\underline{\hspace{2cm}} \rightarrow {}^{221}_{87}\text{Fr} + {}^4_2\alpha$
- d. $\underline{\hspace{2cm}} \rightarrow {}^{192}_{77}\text{Ir} + {}^4_2\alpha$
- e. $\underline{\hspace{2cm}} \rightarrow {}^{207}_{85}\text{At} + {}^4_2\text{He}$

2. Beta Radiation

- A beta particle is equal to a high energy $\rightarrow$ called
- Written as or
- Has a charge of
- Lightweight and moving
 - can penetrate more than an alpha particle
 - can be stopped by a sheet of
- The electron comes from the breakdown of a $\rightarrow$ forms an
 and a $\rightarrow$ the atomic number by
- Example:

Activity Practice Problems #1b-f (BC Science 10 pg 296)

- a. ${}^{14}_6\text{C} \rightarrow \underline{\hspace{2cm}} + {}^0_{-1}\beta$
- b. ${}^6_2\text{He} \rightarrow \underline{\hspace{2cm}} + {}^0_{-1}\beta$
- c. ${}^{24}_{11}\text{Na} \rightarrow \underline{\hspace{2cm}} + {}^0_{-1}e$
- d. $\underline{\hspace{2cm}} \rightarrow {}^{201}_{80}\text{Hg} + {}^0_{-1}\beta$
- e. $\underline{\hspace{2cm}} \rightarrow {}^{52}_{27}\text{Co} + {}^0_{-1}\beta$
- f. $\underline{\hspace{2cm}} \rightarrow {}^{42}_{20}\text{Ca} + {}^0_{-1}e$

3. Gamma Radiation

- A ray of high-energy, _____ wavelength _____ → called _____

- Results when the nucleus of an atom has too much _____
- Written as _____
- Has almost no mass and no charge
 - has great _____ power
 - need thick blocks of _____ material (lead or concrete) to stop it
- Does not result in the formation of a new atom
- Example: _____ the * means _____ energy
- Gamma decay can result when other types of radioactive decay result in a new atom with too much energy in the nucleus
- Example:

Homework Alpha, Beta & Gamma Radiation Worksheet (BC Sc. 10 SWB pg. 125)
Radioactive Decay & Nuclear Equations (BC Sc. 10 SWB pg. 126)