

TO SUMMARIZE:

- Beta particles are electrons emitted from nuclei when a neutron changes into a proton
- Beta particles have the symbol β or e
- Beta particles have lower ionizing power than alpha particles
- Beta particles have greater penetrating power than alpha particles

3. Gamma Emission

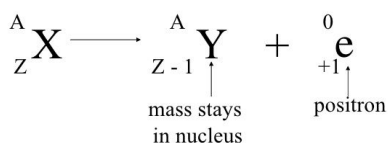
- Because photons have no mass and no charge, the emission of gamma rays does not change the atomic number or mass number of a nucleus

TO SUMMARIZE:

- Gamma rays are electromagnetic radiation—high-energy, short-wavelength photons
- Gamma rays have the symbol γ
- Gamma rays have low ionizing power
- Gamma rays have high penetrating powers

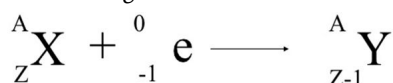
4. Positron Emission

- a radioactive decay process that involves the emission of a **positron** from a nucleus
 - positron** - a particle with the same mass as an electron but carries a positive charge
 - symbol for positron:** ${}^0_{+1}e$ or ${}^0_1\beta$
- a proton in the nucleus is converted into a neutron and a positron, and then the positron is emitted
- When an atom emits a positron, its **atomic number** decreases by 1 because it has one less proton



5. Electron Capture

- occurs when the nucleus of an atom draws in a surrounding electron, usually one from the lowest energy level
 - This captured electron combines with a proton to form a neutron
- As a consequence of electron capture, the **atomic number** of the nucleus decreases by 1
- The formation of the neutron also results in an X-ray photon being emitted



Radioactive Decay	Particle Emitted	Change in Mass #	Change in Atomic #
Alpha Decay	Helium Nuclei	decreases by 4	decreases by 2
Beta Decay	Beta particle	no change	increases by 1
Positron Emission	Positron	no change	decreases by 1
Electron Capture	X-ray photon	no change	decreases by 1
Gamma Emission	Energy	no change	no change

RADIOACTIVE SERIES:

- a series of nuclear reactions that begins with an unstable nucleus and results in the formation of a stable nucleus
- decay reactions continue until a stable nucleus is formed

