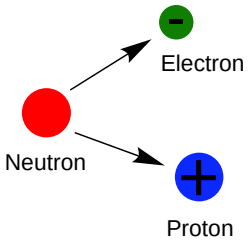
**CONCEPT:** BETA DECAY

- **Beta Decay** occurs when an unstable nucleus emits a _____ *particle*.
  - □ **Beta particle**: high energy and speed _____; symbolized as: $^{0}_{-1}$___ or $^{0}_{-1}$___
  - □ Usually occurs in nuclei with excess number of _____.
    - ____ # of neutrons, ____ # of protons
    - Neutron splits into a _____ and an electron; electron is ejected from the nucleus.




$^{81}_{34}Se \longrightarrow$ ____ + $^{0}_{-1}e$

(parent nuclide) (daughter nuclide)

**EXAMPLE**: Write a balanced nuclear reaction for beta decay of I-129.

**Characteristics of Beta Particles**

- Beta particles are much _____ than alpha particles, have _____ ionizing power but _____ penetrating power.

**Types of Radioactivity**

| Type | Particle | Example | Size | Ionizing Power | Penetrating Power | Shield |
|---|---|---|---|---|---|---|
| Alpha Decay | $^{4}_{2}\alpha$ | $^{171}_{78}Pt \longrightarrow {}^{167}_{76}Os + {}^{4}_{2}\alpha$ | Largest | Highest | Lowest | Clothing, skin, paper, air |
| Beta Decay | ____ | $^{81}_{34}Se \longrightarrow {}^{81}_{35}Br + {}^{0}_{-1}\beta$ | _____ | _____ | _____ | _____ _____ |

**EXAMPLE**: Which are **not** the characteristics of beta decay?

a) Beta particles are smaller in size but have higher ionizing power due to their speed.

b) A high-energy, high-speed electron is ejected from a nucleus of an unstable atom.

c) Due to higher penetrating power, beta particles can not be blocked by your skin.

d) Beta particle carries a mass number of zero.