

RADIOACTIVITY

Types of Decay

Alpha - ${}^4_2\alpha^{+2}$ (Helium-4 ion with a charge of +2) comes out of the atom which drops the atomic number (Z) by 2 and the atomic mass (A) by 4.

2 protons and 2 neutrons are released, No Electrons.

Example: ${}^{230}_{90}\text{Th} \rightarrow {}^{226}_{88}\text{Ra} + {}^4_2\alpha^{+2}$

Beta - ${}^0_{-1}\beta^{-1}$ (high energy electron) comes out of the atom which raises the atomic number (Z) by 1 and the atomic mass (A) stays the same.

A neutron changes into a proton.

Example: ${}^{211}_{82}\text{Pb} \rightarrow {}^{211}_{83}\text{Bi} + {}^0_{-1}\beta^{-1}$

Gamma - ${}^0_0\gamma$ (high energy photon) is released in rays. The atomic number (Z) and the atomic mass (A) stay the same.

Positron emission - ${}^0_{+1}\beta^{+1}$ (high energy positive electron) comes out of the atom which drops the atomic number (Z) by 1 and the atomic mass (A) stays the same. ("Antimatter", opposite of beta decay)

Example: ${}^{50}_{25}\text{Mn} \rightarrow {}^{50}_{24}\text{Cr} + {}^0_{+1}\beta^{+1}$

(Electron capture has same effect.)

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