Nuclear Reaction: Change in nucleus.

When an isotope is unstable, they decay (fall apart) emitting (gives off) radiation. (radioactive particles and energy)

Radioactive Decay Types:

1. Alpha decay: loss of helium atom

300 4 296

Ra 🡪 He **+** Rn

88 2 86

300 296

Example:

214 4

210

Pb

82

Po He +

84 2

238 4

234

Th

90

U He +

92 2

Example:

214 4 210

1. Po → He + Pb

84 2 82

238 4 234

1. U → He + Th

92 2 90

MOVE 2 SPACES TO THE LEFT.

230 4 226

1. Th → He + Ra

90 2 88

1. β (beta) decay: loss of e¯ (electron)

1p+, 1n° 1p+ 1p+, le¯

47 o 47

Ca e + Sc

20 ¯1 21

o

20p+ 27n° e¯ + 21p+ , 26n°

¯1

1p+, 1e¯

20p+

26n°

Practice Problem:

1. 35 o 35

Si e¯ + P

14 ¯1 15

1. 140 o 140

Ba e¯ + La

56 ¯1 57

1. 40 40

K β¯ + Ca

19 20

1. Gamma Decay: No particle lost but high energy produced

Effects of nuclear (decay) radiation.

Alpha

Beta

Gamma

Human skin Al (foil) Lead (several inches)

Nuclear Reaction (Start with this):

* Nuclear Fusion: combining of the nuclei

1p+ + 1p+ 2p

Stars 1n° 1n° 2n

H + H He

1p+ + 1p 2p+

* Nuclear Fission: Separation of nucleus

Nuclear Reactors He H + H

2p+ 1p+ 1p+

U-235 Ba-141

56p+ Nuclear

n 92p 85n° Chain

143n Energy n Reaction

n n

36p

56n Kr-92