3. $^{56}_{26}Fe$

p 26

n 30

$26(1.00728) \rightarrow 26.18928$

$30(1.00867) \rightarrow +30.2601$

56.44938

-55.9349

$0.51448 amu$

$(1.6605 \cdot 10^{-27})$

$E=mc^2$ $(8.5429 \cdot 10^{-28} kg)(9 \cdot 10^{16})$

$7.6887 \cdot 10^{-11}$

56

$55.9349 amu$

$1.3730 \cdot 10^{-12} J$

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4. $^{190}_{76}Os$

p 76

n 114

$76(1.00728) \rightarrow 76.55328$

$114(1.00867) \rightarrow +114.98838$

191.54166

-189.95863

$1.58303 amu$

$(1.6605 \cdot 10^{-27})$

$(9 \cdot 10^{16})(2.6286 \cdot 10^{-27} kg)$

$2.3658 \cdot 10^{-10} J$

$189.95863 amu$

$1.2451 \cdot 10^{-12} J$

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WWK

7. positron- particle with the same mass as an electron, but has a positive 1 (+1) charge

$_{+1}^{0}e$ or $_{+1}^{0}\beta$

8. electron capture- nucleus captures a stray electron, converting a proton to a neutron.

9. transmutation- conversion of an atom of one element into an atom of another element.

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Radioactive Decay TOC pg 69-70

♫ Ready to ROCK, Dude ♫ decay

* STABLE nuclei don't decay! *

RULES of STABILITY

1. To be stable neutrons must be greater than/equal to protons. * except $_{1}^{1}H$ & $_{2}^{3}He$ *
2. The closer the N:P ratio is to 1.5, the more stable the element.
3. Nuclei with even numbers of protons & neutrons are more stable.
4. Nuclei with the "magic number" of protons & neutrons are more stable. These #'s are: 2, 8, 20, 28, 50, 82, 126
5. Any atom higher than 83 (atomic #) or with a mass greater than 209 amu is NOT stable!

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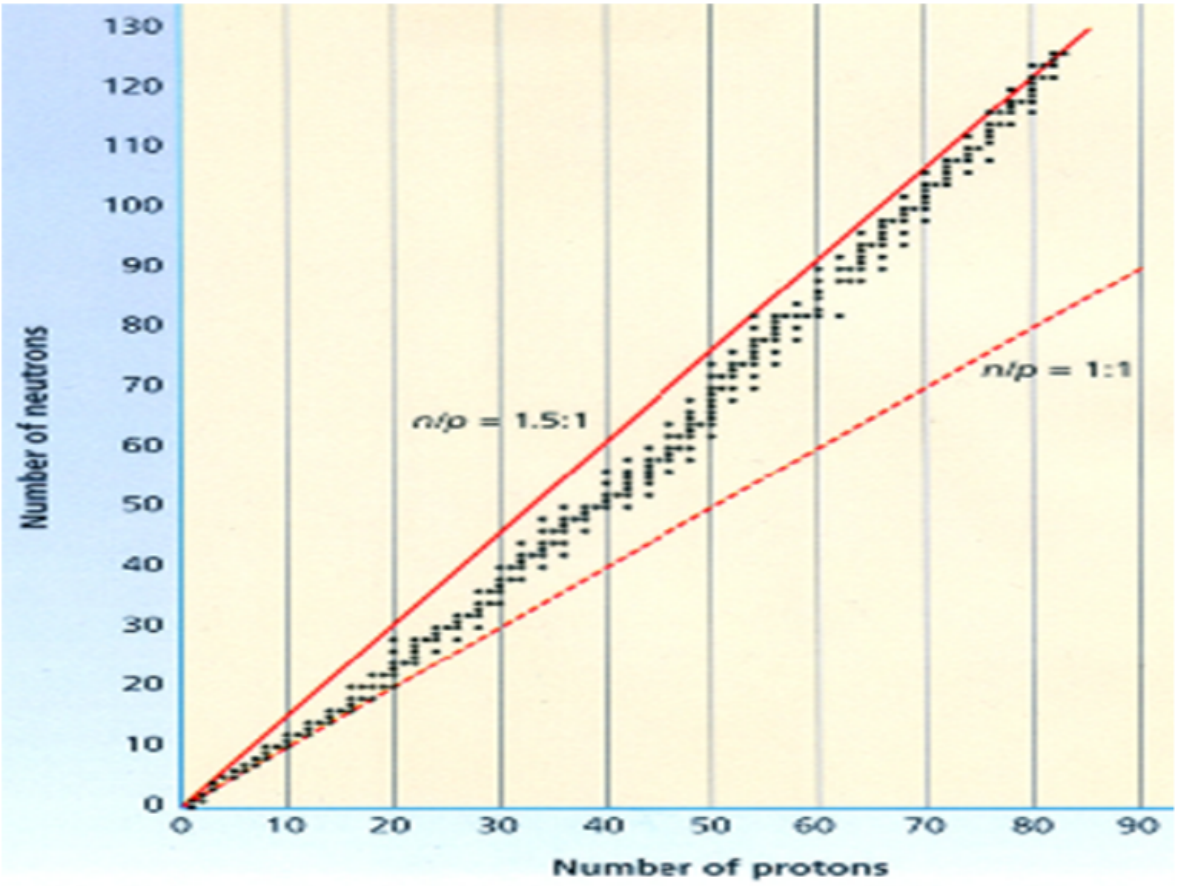

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Types of Decay

alpha α	beta β	gamma γ
• symbol $^{4}_{2}He$	• symbol $^{0}_{-1}e$ or $^{0}_{-1}\beta$	• symbol $^{0}_{0}\gamma$
• blocked by: paper	• blocked by: metal foil	• blocked by: partially by concrete & lead
* large - move slow - very little penetrate power	* move faster & have more penetrating power	* fastest & most penetrating power
Ex: $^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{4}_{2}He$	Ex: $^{90}_{38}Sr \rightarrow {}^{90}_{39}Y + {}^{0}_{-1}e$	Ex: $^{40}_{18}Ar \rightarrow {}^{40}_{18}Ar + {}^{0}_{0}\gamma$

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positron emission

- same as Beta decay, but particle is positively charged.

$${}^{1}_{1}p \rightarrow {}^{1}_{0}n + {}^{0}_{+1}e$$

Ex: $${}^{49}_{24}Cr \rightarrow {}^{49}_{23}V + {}^{0}_{+1}e$$

electron capture-

neutron emission

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Examples page 69

Ex 1: Predict the nuclear stability of the following isotopes.

a. ${}^{32}_{15}P$

b. ${}^{14}_{6}C$

c. ${}^{51}_{23}V$

d. ${}^{24}_{12}Mg$

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Examples page 69

Ex 2: BETA DECAY

$^{223}_{87}Fr$ --> +

Ex 3: Alpha Decay

$^{139}_{56}Ba$ --> +

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Examples page 69

Ex 4: POSITRON EMISSION

Write an equation for the positron emission of Zr-90.

$^{90}_{40}Zr$ -->

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Examples page 69

Ex 5:
What particle is formed when polonium-210 experiences alpha decay?

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Examples page 69

Ex 6:
Write the equation for the decay process of iodine-131 into xenon-131.

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Examples page 69

Ex 7: Write a balanced nuclear equation for the induced transmutation of aluminum-27 into phosphorus-30 by alpha particle bombardment. A neutron is emitted from the aluminum atom in the reaction.

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