

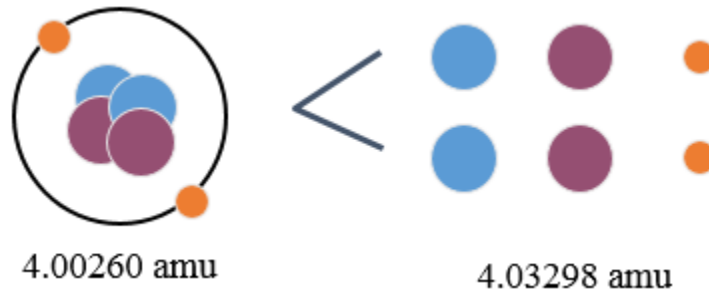
Unit 11 Nuclear Chemistry Note Packet

Important Vocab

Define nucleon:

Define nuclide:

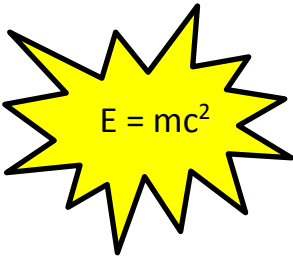
Mass defect: difference between the mass of an _____ and the mass of its _____.



Notice that the atom has _____ mass than the _____. Matter is converted to energy when the atom is formed!

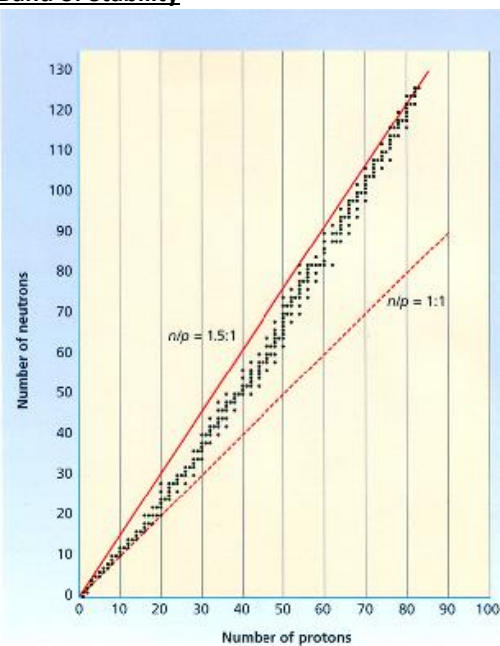
What is nuclear binding energy?

High binding energy = _____



E =
m =
c =

Band of Stability



Lighter nuclides:

Heavier nuclides:

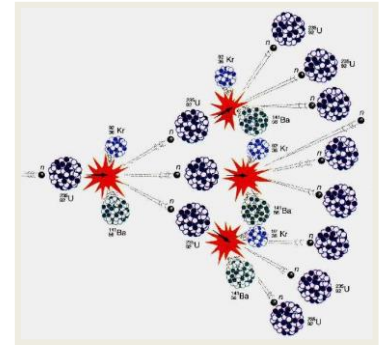
Fission vs. Fusion

Fission: _____

Define chain reaction:

Define critical mass:

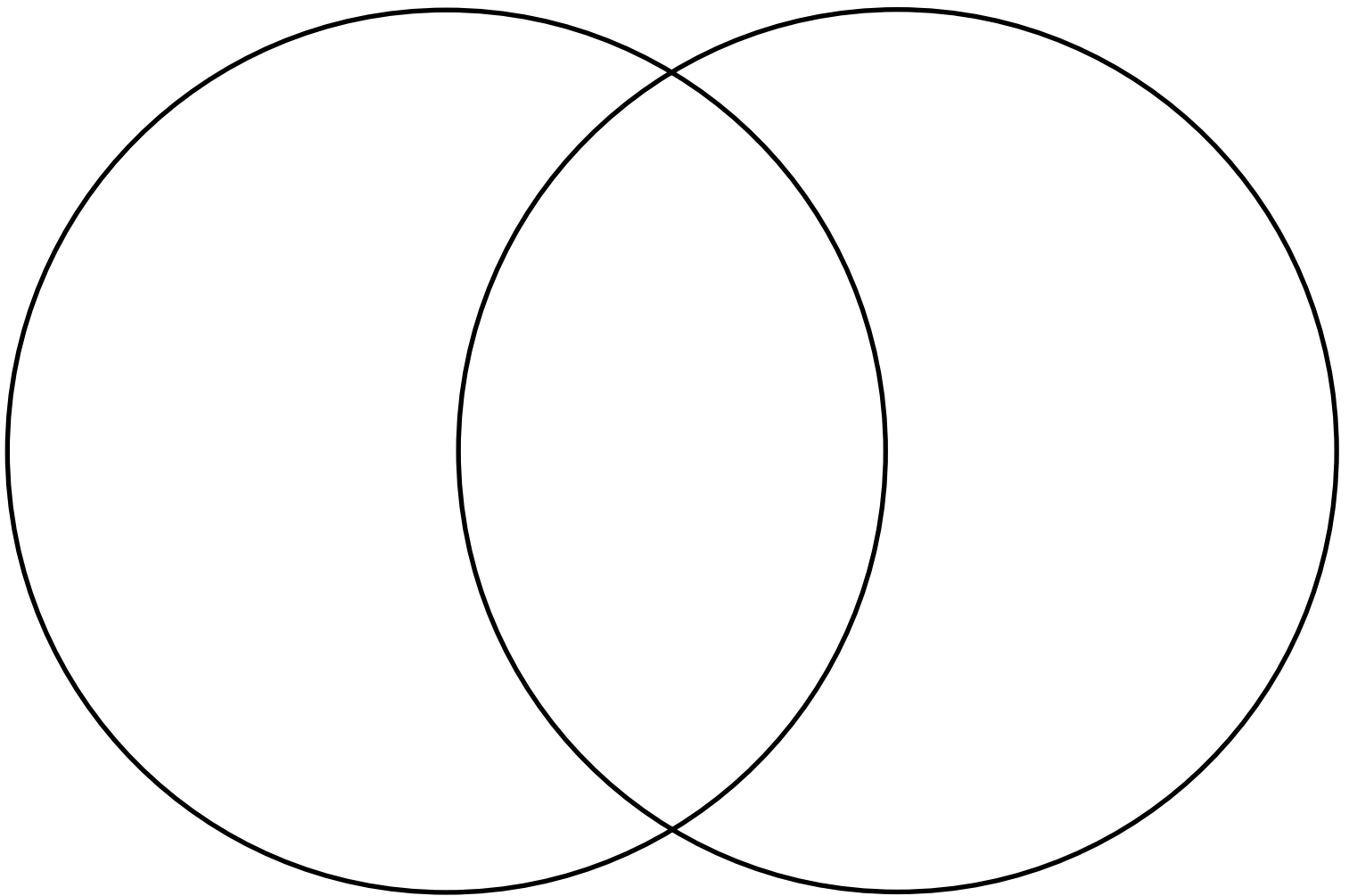
Nuclear power plants use _____.



Fusion: _____

Fusion is a thermonuclear reaction –

Fusion occurs naturally in _____.



More vocab

Radioactive decay:

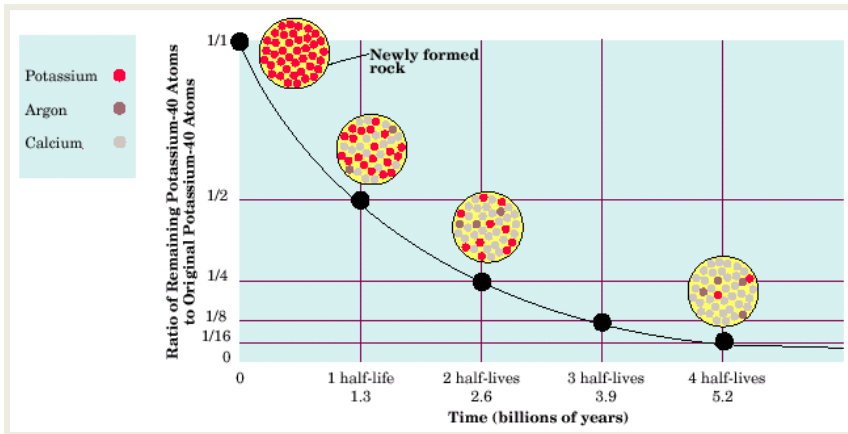
Radioactive nuclide:

Why do nuclides decay?

Half Life

Define half-life:

Shorter half-life = _____



Try it!

1. The half life of polonium-210 is 138.4 days. How many milligrams of polonium-210 remain after 415.2 days, if you start with 2.0 mg of the isotope?
2. Assuming a half-life of 1599 years, how many years will be needed for the decay of 15/16 of a given amount of radium-226?
3. The half-life of polonium-218 is 3.0 minutes. If you start with 16 mg, how long will it be before only 1.0 mg remains?
4. If it takes 63 hours for 20.g to decay to 2.5g, what is the half-life?

Radioactive Particles

| Type | Symbol | Charge | Blocked by | Mass |
|-----------------|--------|--------|------------|------|
| alpha, α | | | | |
| Beta, β | | | | |
| Gamma, γ | | | | |

Energy of the particles:

_____ has the least energy.

_____ has the most energy.

Alpha Emission:

Example Equation:

Beta Emission:

Example Equation:

Electron Capture:

Example Equation:

Alpha Bombardment:

Example Equation:

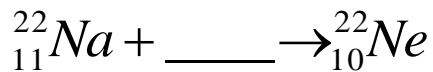
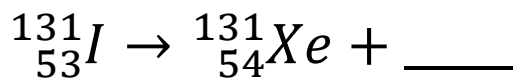
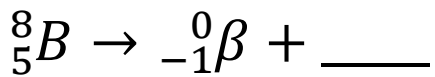
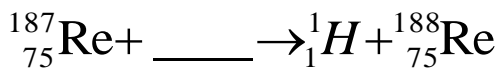
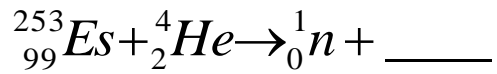
Positron Emission:

Example Equation:

Gamma Emission:

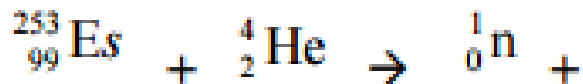
Example Equation:

Balancing and Classifying Nuclear Reactions



Write a balanced nuclear equation for the alpha decay of Thorium-230.

Try these!



More Vocab

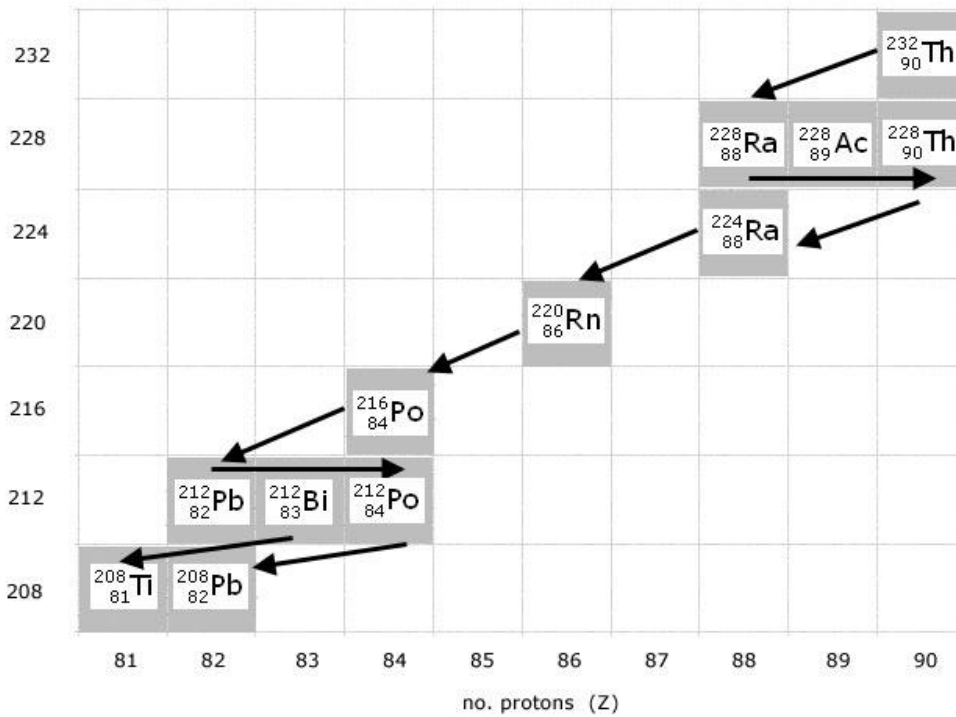
Transmutation:

Parent nuclide:

Daughter nuclide:

Decay Series

no. nucleons (A)



1. Write the decay for radon-220.

2. What type of decay are all the diagonal arrows?

3. Write the decay for bismuth-212.

4. What type of decay are all the right arrows?

Write the decay series from polonium-216 to thallium-208.