

basics and decay graph

isotope - same protons different neutrons

A - mass number (total particles)

Z - atomic number (total protons)

$N = A - Z$

on the decay graph:

- isotopes near the bottom tend to emit $\beta^+/-$

- isotopes near the top are alpha emitters

more neutrons = more unstable = more likely to decay

binding energy curve

****make sure to know the key points on this graph**

- iron is the most stable as it has the highest binding energy (at the top of the curve)

- if you're moving from lower binding energy to higher (--> on graph till iron) then energy is released from fusion

- if you're moving from lower binding energy to higher (<-- on the graph from uranium to iron) then energy is being released from fission

Reactors

composed of uranium-235 fuel rods with moderators on the inside, eg. water, graphite.

the moderators slow down the neutrons to thermal speeds to allow them to be absorbed by the fuel rods (otherwise they would reflect off the rods)

the control rods between the fuel rods (boron) absorb neutrons completely without causing anymore reactions (like an on/off switch)
coolant is CO₂ fluid that takes heat away from the rods and takes it to the boiler which heats the water and in turn turns it into steam to turn the turbine.

binding energy and reactions

binding energy = energy required to separate a nucleus into its constituents part

higher binding energy/higher binding energy per nucleon = more stable

a nucleus is lighter than its constituent parts.

>> this is due to energy in the form of mass being used to separate the particles

mass **defect** = change in mass from nucleus to constituent parts (*fusion*)

mass **difference** = mass difference between nucleus and fission fragments (*fission*)

$E = mc^2$

or

mass defect (in u) x 931.5MeV = Energy

Fission:

- occurs when a nucleus collides with neutrons

- forms a daughter nucleus as well as 2-3 more neutrons which therefore cause a chain reaction



By MostAncientDream

Not published yet.

Last updated 20th February, 2024.

Page 2 of 2.

Sponsored by **Readable.com**

Measure your website readability!

<https://readable.com>

