BINDING ENERGY

Contents

Binding Energy

Binding energy is the energy required to disassemble or break a whole system into separate parts.

Nuclear binding energy is the energy that would be required to disassemble or break the nucleus of an atom into its component parts. These component parts are neutrons and protons, which are collectively called nucleons.

Mass defect

The mass of an atomic nucleus is usually less than the sum of the individual masses of the constituent protons and neutrons (according to Einstein's equation $E=mc^2$) and this 'missing mass' is known as the mass defect, and represents the energy that was released when the nucleus was formed.

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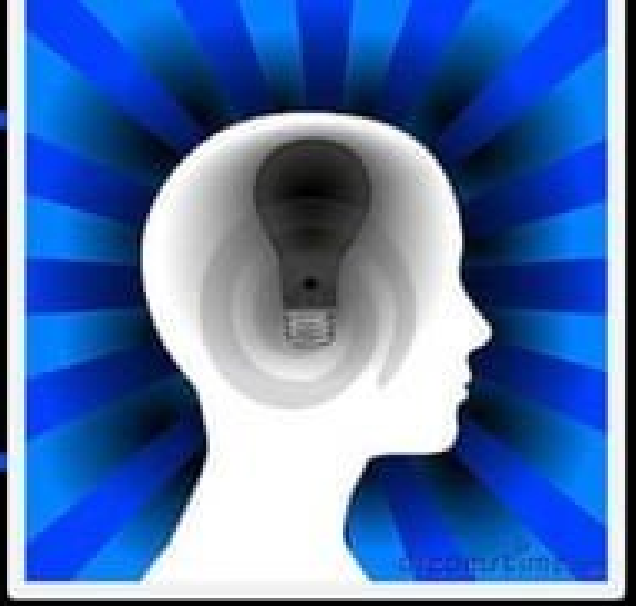
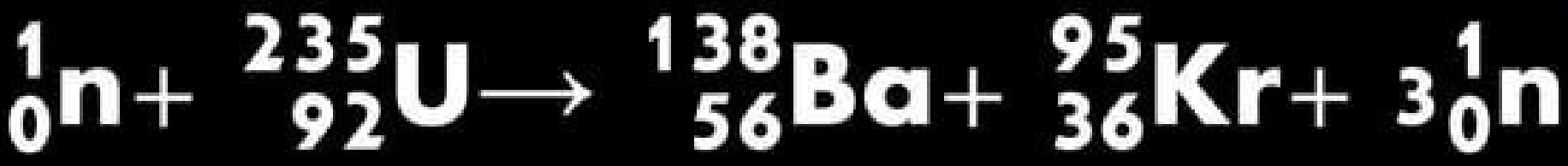


1 atomic mass unit	**= 1μ = 931 MeV**
m_p	= 1.0073μ
m_n	= 1.0087μ

STEP 1:



reactants

products

Mass reactant= 235.0439 amu + 1.0087 amu = **236.0526 amu**

Mass product= 137.905 + 94.900 + 3.026= **235.831 amu**

STEP 2:

Difference between mass of reactants and mass of products

ΔM= mass of reactants − mass of products

ΔM=236.0526 amu - 235.831 amu

ΔM= 0.222 amu

Mass defect

STEP 3:

Convert mass defect into energy

E= mass defect (c^2)

E=0.222 amu(931 MeV/ amu)

E=206 MeV

Binding Energy

Binding Energy: Compared

Alpha decay	Fission
5.4 MeV	**206 MeV**