BINDING ENERGY

BINDING ENERGY

- BINDING ENERGY = [Z*m('H) + N*mn - m(AX)] C^2

- Masses generally given in atomic mass units, it is convenient to include the unit conversion factor in c^2, thus: $c^2 = 931.50$ MeV/u

APPLICATIONS OF BINDING ENERGY EQN.

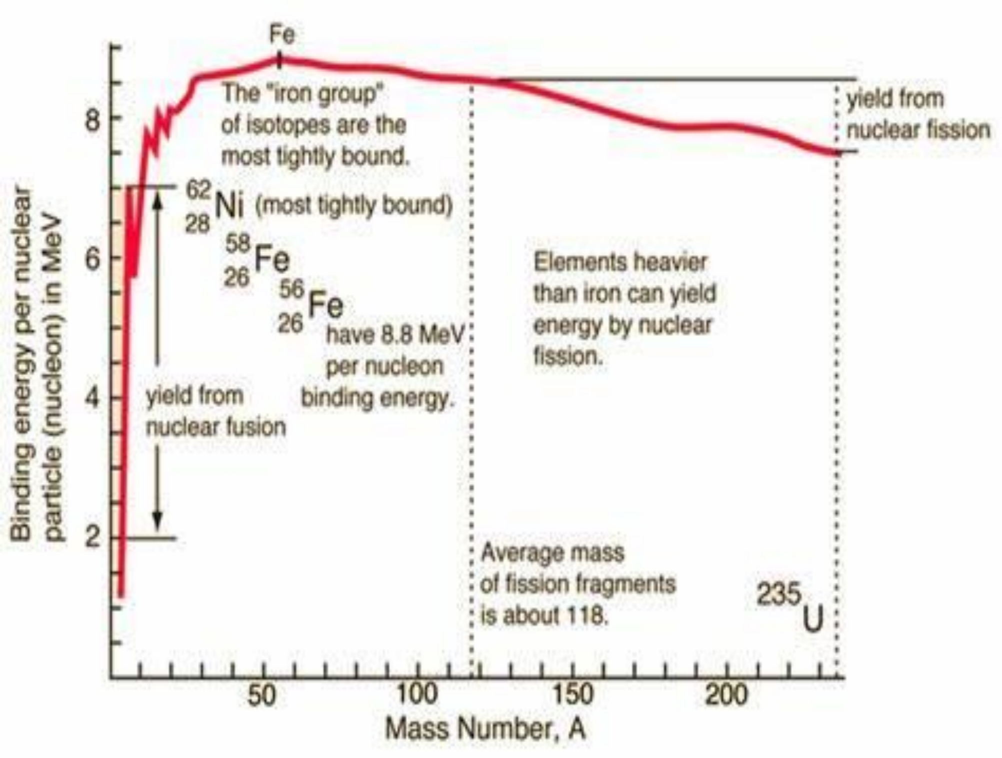
1. Neutron separation energy (Sn): is the amount of energy that is needed to remove a neutron from a nucleus

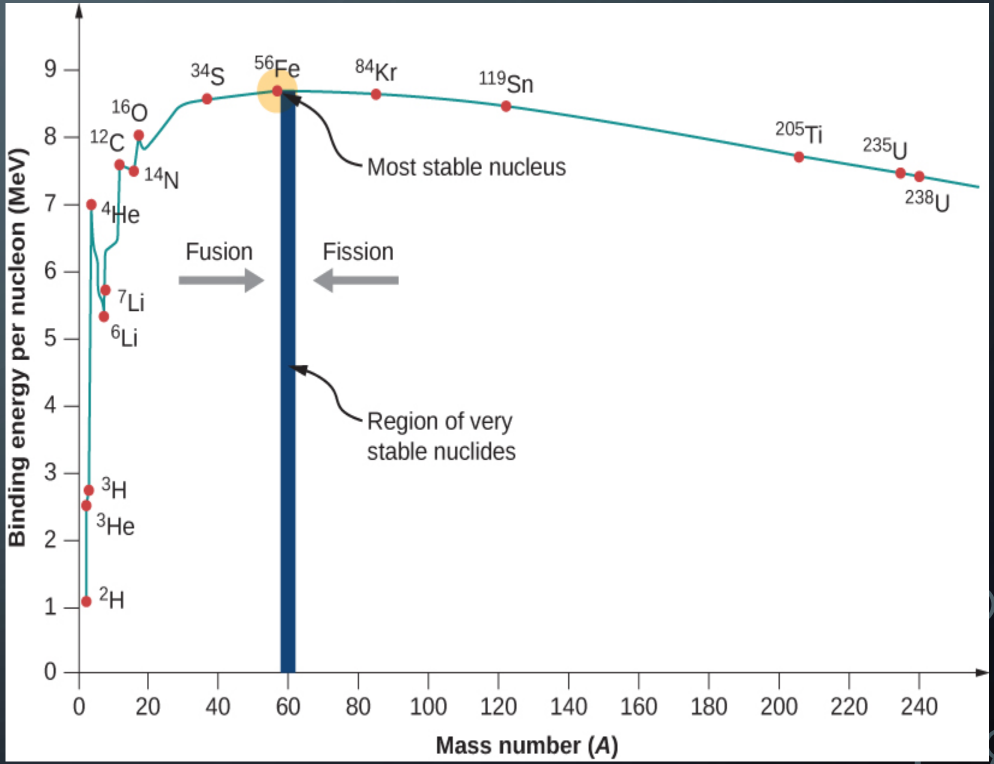
difference in binding energies between ${}^{A}_{Z}\mathrm{X}_{N}$ and ${}^{A-1}_{Z}\mathrm{X}_{N-1}$:

$$S_n = B({}^{A}_{Z}\mathrm{X}_{N}) - B({}^{A-1}_{Z}\mathrm{X}_{N-1})$$
$$= \left[m({}^{A-1}_{Z}\mathrm{X}_{N-1}) - m({}^{A}_{Z}\mathrm{X}_{N}) + m_n\right]c^2$$

2. Similarly find out the eqn. for proton separation energy

BINDING ENERGY CURVE





SALIENT FEATURES OF THE CURVE

- The intermediate nuclei have large value of binding energy per nucleon. So they are most stable (30<A>63).
- The binding energy per nucleon have low value for both heavy and lighter nuclei, so they are unstable nuclei.
- $\Delta E/A$ value is significantly higher for nuclei that have Z or N equal to 2,8,20,28,50,82,126 as compared to their neighboring nuclei.