BINDING ENERGY CURVE:

The graph between Binding energy per nucleon & mass number of different nuclei is known as Binding energy curve. The Binding energy curve is shown in figure below.

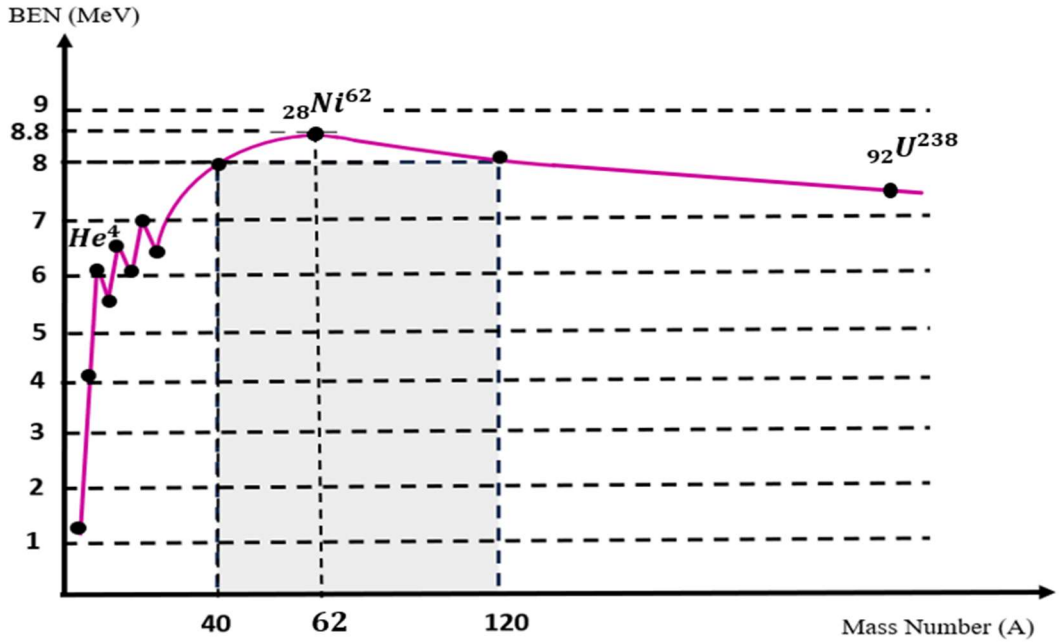

Figure: Binding Energy Curve

Nature of binding energy curve:

Initially, the curve increases very sharply for lighter nuclei (up to A=20), and then increases gradually, being maximum for Nickel nucleus ($A = 62$). Beyond Nickel nucleus the curve decreases gradually.

For the range $A = 40$ to $A = 120$, the BEN is relatively larger ($\geq 8MeV$). Hence, these nuclei are relatively more stable than others.

Conclusions drawn from the curve:

1. Binding energy per nucleon of lighter nuclei (like $_1H^1$, $_1H^2$ and $_1H^{3)}$ is small, which indicates that the lighter nuclei are relatively less stable.
2. The curve for the nuclei of range $A = 40$ to $A = 120$ (intermediate nuclei) is higher and flat (average binding energy per nucleon $= 8.5\ MeV$). This indicates that those nuclei are relatively more stable in nature.
3. The curve has peak value for $_{28}Ni^{62}$ (about 8.8 MeV). This shows that Nickel is the most stable element on the earth.
4. Binding energy per nucleon of heavier nuclei ($A > 120$) is small, which indicates that the heavier nuclei are also relatively less stable.
5. There are sharply defined peaks corresponding to $_2He^4$, $_6C^{12}$, $_8O^{16}$ which represents that these nuclei are relatively more stable than the other nuclei in their neighborhood.

NUCLEAR FORCE:

1. The nuclear force is a force that acts between the protons & neutrons of an atom.
2. It is the force that binds the neutrons & protons in a nucleus together.
3. The nuclear forces are the strongest force known to Physics.
4. They are short range forces. They only act in the range of 10^{-15}m.
5. They are non-conservative force (energy released is not recovered) & charge independent forces.
6. It is 100 times that of electrostatic force and 10^{38} times that of gravitational force.
