Nuclear Reactions – Nuclear reactions that lead to a decrease of mass are exoergic (They release energy), and those that lead to an increase of mass are endoergic (They require energy input).

Reaction notation:

**42He + 147N ---> 178O + 11H** Can be written as **147N(α, p)178O**

In general:

**Initial Nucleus(Bombarding particle, Emitted particle)Final Nucleus**

Common Particles:

n = 10n = 1.008665 u

p = 11H = 1.007825 u

d = 21H = 2.014102 u

t = 31H = 3.016049 u

α = 42He = 4.002602 u

**Example 1:** Find the missing item in: **???(n, p)146C**

**Example 2:** Finding the Q value of this reaction: **19779Au(α, d) 19980Hg**

**Hahn and Strassman’s Discovery:**

**n + 23592U ---> 14156Ba + 9236Kr + some neutrons How many Neutrons?**

n = 10n = 1.008665 u

U-235 = 235.043923 u

Ba-141 = 140.914406 u

Kr-92 = 91.926153 u

What is the Q value of this reaction?

What is the energy density in J/kg if this is the only reaction that occurs? (Many different fission reactions occur)

**How to build a nuclear bomb:**

**Nuclear Energy:**

**Advantages:**

**Disadvantages:**