Ch. 9

There are millions of carbon compounds because

-carbon has 4 valence electrons

-carbon atoms form bonds with other carbon atoms

-carbon atoms can form single, double, and triple bonds

Monomers and Polymers- monomers are single pieces, like legos, while polymers are all of those monomers combined to make larger, more complex molecules.

All Organic Compounds contain carbon and hydrogen.

Alkanes- contain only single bonds between carbon atoms, referred to as saturated because they all for valence electrons are hooked up to separate atoms. Very strong and stable bonds.

Alkenes- contain double bonds between some of the carbon atoms. Referred to as unsaturated. Medium strength and stability.

Alkynes- contain triple bonds between some of the carbon bonds. Referred to as unsaturated. Very low stability, highly reactive.

Ch. 10

Radioactivity- unstable atomic nucleus emits charged particles or energy, or both.

Alpha Decay- 2 protons and 2 neutrons (equivalent to a He nucleus). Low penetrating power. Positive Charge. Cannot penetrate skin. Paper will stop it. Large mass, and relatively slow.

Beta Decay- 1 electron. Medium penetrating power. Smaller mass and faster than Alpha Decay. Negative charge. Can pass through paper, but will be stopped by thin metal

Gamma Decay- no mass is lost, just very high energy. No mass or charge for Gamma Decay. Very fast(speed of light), High penetrating power. Can be stopped by thick lead

or thick concrete.

Transmutation- When an atom goes through Alpha or Beta Decay then the atoms changes into a new element.

How Alpha Decay works- The nucleus loses two protons and two neutrons, so the atomic number goes down by 2, and the mass number goes down by 4

examples-

How Beta Decay works- Pretend that neutrons are neutral because they are made up of a proton and an electron squished together. During Beta Decay an electron shoots off from one of these neutrons. That neutron now turns into a proton. So the mass number stays the same (because electrons are so light), and the atomic number of the element goes up by one.

examples

Nuclear Reactions- Fusion and Fission, turning mass into energy

$E=mc^2$

Energy =mass(speed of light)^2

Fusion- The combining or fusing together of atoms to make energy. This is how the sun works

example- $H + H \rightarrow He + energy$

Fission- The breaking apart of atoms to make energy
Fission is how nuclear power plants make energy. They break apart Uranium, which releases heat. The heat is used to boil water, create steam, then the steam makes turbines spin which produces energy

Background radiation- We are exposed to radiation every day from many natural sources, some can be dangerous.

Half-Life- Radioactive elements decay over time and turn into new elements. The time it takes for half of the original sample to decay is called the half-life.

Example if you had a rock made up of the fake element Zorpa, and it was 100 grams, and had a

half-life of 10 years then…

At time zero, you would have a 100 grams of Zorpa.
After 10 years only 50 grams of that rock would be make up of Zorpa.
After another 10 years (20 years total), the rock would be only 25 grams of Zorpa.
After another 10 years (30 years total), the rock would be only 12.5 grams of Zorpa.
After another 10 years (40 years total), the rock would be only 6.25 grams of Zorpa.
Etc.