

Read Ch. 3.1-3.2, pp 54-65 in your text then answer the following questions.

- Classify each of the following as a physical or chemical property.
  - Iron and oxygen form rust. **chemical**
  - Iron is more dense than aluminum. **physical**
  - Magnesium burns brightly when ignited. **chemical**
  - Oil and water do not mix. **physical**
  - Mercury melts at  $-39^{\circ}\text{C}$ . **physical**
- Classify each of the following as an *intensive* or an *extensive* property.
  - Copper has a density of  $8.96\text{ g/cm}^3$ . **intensive**
  - Nitrogen boils at  $-196^{\circ}\text{C}$ . **intensive**
  - A sample of water has a mass of 35.2 g. **extensive**
  - Gold has a metallic yellow color. **intensive**
  - A nail is 5.10 cm long. **extensive**
- Classify each of the following as a physical or chemical change.
  - Aluminum reacts with copper(II) chloride. **chemical**
  - Hydrogen gas is formed when zinc comes in contact with acid. **chemical**
  - Liquid water becomes water vapor. **physical**
  - Molten iron cools and solidifies. **physical**
  - Sodium metal and chlorine gas form when NaCl is electrolyzed. **chemical**
- From a laboratory process designed to separate water into hydrogen and oxygen gas, a student collected 10.0 g of hydrogen and 79.4 g of oxygen. What mass of water was originally involved in the process?  
**Mass of water =  $10.0\text{ g} + 79.4\text{ g} = 89.4\text{ g}$**
- In a flask, 10.3 g of aluminum reacted with 100.0 g of liquid bromine to form aluminum bromide. After the reaction, no aluminum remained, and 8.5 grams of bromine remained unreacted. How many grams of bromine reacted? How many grams of compound were formed?  
 **$100.0\text{ g} - 8.5\text{ g} = 91.5\text{ g}$  bromine reacted;  $91.5\text{ g} + 10.3\text{ g} = 101.8\text{ g}$  aluminum bromide formed.**
- Solve each of the following using the concept of conservation of mass.
  - In the complete reaction of 22.99 g of sodium with 35.45 g of chlorine, what mass of sodium chloride is formed?  
 **$22.99\text{ g Na} + 35.45\text{ g Cl} = 58.44\text{ g NaCl}$ ;**
  - A 12.2-g sample of X reacts with a sample of Y to form 78.9 g of XY what is the mass of Y that reacted?  
 **$78.9\text{ g XY} - 12.2\text{ g X} = 66.7\text{ g Y}$**

- Look at the following diagram. Determine whether a chemical or physical change is depicted. Explain your choice.

**This is a chemical change. The particles at the left ( $\text{H}_2$  and  $\text{Cl}_2$  molecules) change at the right ( $\text{HCl}$ ).**

**The overall reaction is:**

