

# Common Chemical Reactions

## Intro

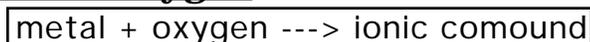
In this lab you will be performing several experiments. For each one you will be expected to write an equation and indicate the type of reaction (composition, decomposition, single replacement, or double replacement).

## Acid/Base Neutralization:



- 1) Many reactions are observed not by dramatic changes in color or gaseous production, but through evidence of bond restructuring with associated energy changes.
- 2) Combine 5 ml of 6M HCl with 5 ml of 6M NaOH.
- 3) Feel the test tube. The energy being released is called the heat of neutralization.
- 4) Write the chemical equation for the above reaction. Water is one of the products. Pour the contents of the test tube down the sink. What is the type of reaction?

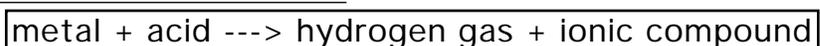
## Reaction of Metals, with oxygen:



### Procedure 1

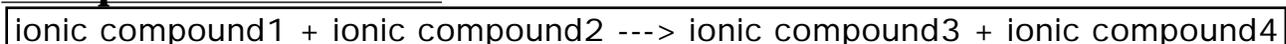
- 1) Take a small piece of magnesium ribbon. (about 3 cm long)
- 2) Get an evaporating dish from the lab bench, and light your Bunsen burner.
- 3) **Caution: Do not look directly at burning magnesium ribbon. You will damage your eyesight.** Holding the Mg ribbon at one end with tongs, place the other end in the flame. Once ignited, hold the burning ribbon over the evaporating dish.
- 4) Throw away the remainder of the Mg ribbon and clean out the evaporating dish.
- 5) Write a balanced equation for this reaction. What type of reaction is this?

## Reaction of Metals with Acids:



- 1) From the lab bench, get a small test tube, and place about 5 small pieces of Magnesium in it.
  - 2) Mix three mL of water with 3 ml of 6M HCl in a separate test tube.
  - 3) While the acid test tube sits in your test tube rack, pick up the test tube containing the Magnesium with your test tube holder. Then invert the magnesium test tube over the acid test tube, dumping the magnesium into the acid, while holding the empty test tube over the top of the acid test tube.
  - 4) While the reaction occurs, light a splint. When the reaction slows down, remove uncover the acid test tube and insert a flaming splint.
  - 5) What gas do you think was produced?
  - 6) Let the reaction sit until all the Mg is gone. Pour the contents down the sink.
- Equations and calculations:
- 1) Write a balanced equation for this reaction. Hint: It was a single replacement reaction.
  - 2) Write an equation for what happened when you brought the flaming splint to the mouth of the test tube. (Reaction of hydrogen and oxygen.)  
What type of reaction is this?

## **Precipitation reactions:**



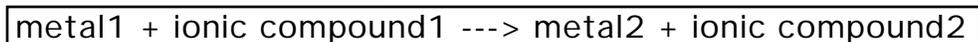
- 1) Place about 5 ml of 6M HCl in a test tube.
- 2) Squeeze a few drops of AgNO<sub>3</sub> solution into the test tube.
- 3) The solid formed is called a precipitate. This reaction follows the same pattern as the lab where you combined two ionic substances. The positive and negative ions switch places.
- 4) Save this test tube for the next procedure. Write an equation for this reaction. What type of reaction is it?

## **Acids with Carbonates:**



- 1) Place a scoop of baking soda (sodium bicarbonate) NaHCO<sub>3</sub> into a test tube.
- 2) The test tube in which you dropped some AgNO<sub>3</sub> still contains most of the unreacted HCl. Pour some of the HCl into the test tube with the baking soda.
- 3) Put a flaming splint near the opening of the test tube. Notice that CO<sub>2</sub> is produced. How do you know?
- 4) Write the equation for this reaction. Other products include water and an ionic salt.
- 5) Pour the test tube with the baking soda into the sink and pour what is left of the HCl test tube into the waste beaker.
- 6) Write an equation for this reaction. What type of reaction is it?

## **Metals With Ionic Solutions:**

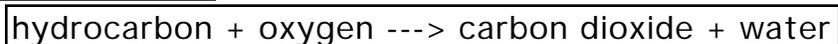


- 1) Get a piece of copper sheet.
- 2) Using steel wool, "sandpaper" a small portion of the copper to its shiny color.
- 3) Place a drop of silver nitrate on the shiny copper.

What evidence did you see of a chemical reaction?

Your two reactants were silver nitrate and copper metal. Your two products were tiny gray pieces of silver metal and copper nitrate solution. Write the chemical equation for this reaction. What type of reaction is it?

## **Combustion Reactions:**



- 1) Get a candle from the lab bench.
- 2) Light it.
- 3) Stare at it for as long as you want.
- 4) Write the reaction for this combustion reaction. Wax is somewhat of a mixture but the formula can be approximated as C<sub>26</sub>H<sub>54</sub>.