**Lab: Oxides of Metals and Non-Metals**

**Introduction**: When elements are burned in oxygen, they form compounds called oxides. In this experiment you will burn several metals and non-metals in oxygen and observe the oxides produced. The oxides of a number of elements dissolve in water to form acidic or basic solutions. You can determine if a particular solution is acidic or basic by testing with an acid-base indicator. Do the oxides of metals behave differently in water than those of non-metals? In this activity you will be looking for a relationship between the type of element (metal or non-metal) burned and the type of solution (acidic or basic) formed by the oxide.

**Problem**: Do solutions of oxides of metals differ from those of the oxides of non-metals?

**Materials**:

O2 (in tank) deflagrating spoon gas jar glass lid deionized water   
S, Mg, C, Fe (solids) Bunsen burner pH strips flint sparker crucible tongs

**Concluding Questions**:

1. Each of the elements reacted with oxygen to produce an oxide. Some elements produce two different oxides, depending upon the concentration of oxygen during combustion. The names of the oxides formed in this experiment are carbon dioxide, iron (III) oxide, sulfur trioxide, and magnesium oxide. Write a balanced chemical equation for each reaction.
2. Recall that litmus paper turned red in acids and blue in bases. Bromothymol blue solution turns yellow in acids, blue in bases, and is green in neutral solutions. Which oxides produced acidic solutions? Which oxides produced basic solutions?
3. Does iron (III) oxide appear to be soluble in water? Relate this observation with the acid/base test.
4. What type of elements form oxides that produce acidic solutions? What type of elements form oxides that produce basic properties?
5. Calcium oxide dissolves in water. Would you expect a solution of calcium oxide to be acidic or basic?
6. How does high sulfur content coal contribute to acid rain?