I. PURPOSE
To observe properties and trends in properties of the alkaline earth metals.

II. MATERIALS
1. Balance
2. Test tube rack
3. Test tubes
4. Utility clamp
5. 10 mL Grad. cylinder
6. Mg ribbon
7. Ca turnings
8. MgSO\(_4\)
9. CaSO\(_4\)
10. 0.1 M SrCl\(_2\)
11. 0.1 M MgCl\(_2\)
12. 0.1 M CaCl\(_2\)
13. 0.1 Na\(_2\)CO\(_3\)
14. Sat. Mg(OH)\(_2\)
15. Sat. Ca (OH)\(_2\)
16. pH paper
17. Wood splints
18. Phenolphthalein

III. PROCEDURE
Part A
1. Place a calcium turning in a test tube containing 5 mL of distilled water. Place another test tube over the first and collect the gas. The second test tube should be held firmly with the utility clamp.
2. Keeping the second test tube inverted, insert a burning wood splint into the second test tube to test for hydrogen.
3. To the test tube with the Ca turning add 2 drops of phenolphthalein and observe.
4. Repeat Steps #1 - #3 with a piece of magnesium ribbon. Before starting, sand the magnesium ribbon until it shines.

Part B
1. Place a drop of the saturated calcium hydroxide on a piece of pH paper. Record the pH of the solution.
2. Repeat Step #1 with the saturated magnesium hydroxide.

Part C
1. Weigh out a 0.50 gram sample of magnesium sulfate and place it in a test tube containing 5.0 mL of distilled water. Mix well and place in your test tube rack.
2. Repeat Step #1 with the calcium sulfate.
3. With both test tubes in the rack, compare the solubility of the compounds.

Part D
1. Place 1 mL (20 drops) of 0.1 M MgCl\(_2\) in a clean test tube and place in the test tube rack.
2. Repeat step #1 with CaCl\(_2\) and SrCl\(_2\).
3. With all 3 test tubes in the rack, add 10 drops of Na\(_2\)CO\(_3\) solution to each test tube and observe.

IV. PRE-LAB QUESTIONS
1. Why are the test tubes inverted for collecting the gas in Part A?
2. What is the purpose of sanding the magnesium ribbon in Part A, Step #4?
3. Why is the volume of water in Part C listed as ‘5.0 mL’, but the volume of water in Part D listed as ‘1 mL’?
4. Why do the formulas for all of the substances in Part D end in ‘– Cl\(_2\)’?

V. DATA & CALCULATIONS
A. DATA
   For each Part of the lab create a list of observations.

B. CALCULATIONS
   1. Write an electron configuration for each of the alkaline earth metals through barium.
   2. Draw a Bohr model for each of the alkaline earth metals through barium.

VI. QUESTIONS & DISCUSSION OF ERROR
A. QUESTIONS
   1. Correlate the reactivity of the alkaline earth metals with their period number on the periodic table.
   2. Compare the reactivity of an alkali metal with an alkaline earth metal in the same period.
   3. How many valence electrons do the alkaline earth metals have?
   4. Explain in detail how alkaline-earth metals become more stable through bonding.

B. DISCUSSION OF ERROR

VII. CONCLUSION