



Periodic Trends Lab

Name

Period

Seat #

Purpose: To compare and contrast the properties of magnesium and calcium as they react with water and hydrochloric acid.

Background: The periodic table gives clues to the properties of elements in each chemical family, or group (the vertical columns in the table). For example, for column 1A, Li to Cs, we talked about that the reactivity of these metallic elements with air and water increases with increasing atomic number.

Complete prior to lab

Define: Group:

Name the different groups of the periodic table:

Hypothesis: [Answer the purpose – how do you think the reactions will be different/same]

Materials:

2 pieces of Mg ribbon (2-3 cm)
Phenolphthalein indicator
1.0M HCl
Forceps

2 small chunks of Ca
Distilled or Deionized H₂O
4 beakers

Procedure:

1. Put on your safety goggles
2. Place 1 cm of distilled water in two of the beakers
3. Put 1-2 drops of phenolphthalein indicator into each beaker.
(Phenolphthalein turns pink in the presences of a base) **CAUTION:** *Phenolphthalein solution is poisonous and flammable. Do not get it in your mouth; do not swallow any. Be sure there are no flames in the lab when you are using it.*
4. Using forceps, put one piece of the Mg ribbon into one of the beakers with water.
5. Using forceps put a small chunk of Ca and put it into the other beaker with water
CAUTION: *Do not touch the Ca with your hands.*
6. Observe the reactions for several minutes and record the observations in your data table.
7. Have the instructor put a small amount of 1.0 M HCl in the two remaining beakers.
8. Place the second piece of Mg in one of the beakers with HCl and the second Ca chunk in the other beaker of HCl.
10. Observe and record your findings, include how fast the reaction occurred.

Observations		
	Reaction with H ₂ O	Reactions with HCl
Mg		
Ca		

Question Set:

ANSWER THE FOLLOWING QUESTIONS INTO THE GOOGLE FORM:

<http://tinyurl.com/PeriodicTableLabQuestions>

- 1) Which metal reacted faster with water?
- 2) Which metal reacted faster with acid?
- 3) Consult a text or other references and find out if beryllium reacts the same way as Mg and Ca with water and acid. Explain.
- 4) Make a statement about the trends in reactivity as you move down the column of alkaline earth metals.
- 5) Predict the reactivity of strontium and barium, based on your activity in this lab.
- 6) How are strontium and barium metals stored in the chemical storage room based on the reactivity? Explain your answer.
- 7) If sufficient radium could be gathered for a test, predict its reactivity with water and hydrochloric acid. Explain.
- 8) Why would it be dangerous to handle even a small amount of radium? Your answer should be related to this lab and the concept of reactivity NOT radioactivity.
- 9) Group VIIA (The halogens – nonmetallic elements) reactivity *decreases* as the atomic number *increases*. Why do you think this group of elements is opposite Group IA? Explain. (HINT – think about atomic structure, valence electrons, electronegativity)
- 10) What should you have learned from this experiment regarding trends of reactivity on the periodic table?
- 11) What might have been a source of error during your lab? “HUMAN ERROR” is not an answer!
- 12) How would your answer to #11 have effected your results?
- 13) Was this a *quantitative* or *qualitative* lab? Why?
- 14) Brainstorm a way that you could add a quantitative aspect to this lab.
- 15) Any issues/concerns with your lab group and how you worked together? If not, explain what worked well in your group and how people functioned cooperatively.