Name: _____ Group: _____ Date: _____

LAB 21 EXPERIMENT

THE ELECTROLYSIS OF WATER

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Goal

Determine the relationship between volumes of gases obtained during the electrolysis of water.

1. What is the independent variable in this lab?

_____

_____

2. What is the dependent variable in this lab?

_____

Hypothesis

I think _____

because _____.

Materials

- wash bottle of distilled water
- 600-mL beaker
- balance (accurate to 0.01 g)
- weighing pan
- spatula
- container of sodium carbonate (Na_2CO_3)
- glass stirring rod
- marker
- test-tube rack
- 2 test tubes (16 mm × 150 mm) and stoppers (No. 1)
- 2 electrolysis electrodes (platinum or stainless steel) and stand
- 2 conductor wires and clamps
- source of electric current (battery or other)
- 30-cm ruler
- wood splints
- matches *or* lighter

Procedure

1. Measure into the beaker about 450 mL of distilled water.

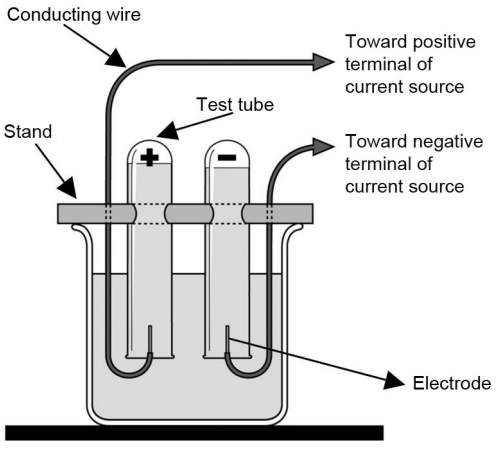
2. Add about 5 g of sodium carbonate to the beaker.

3. Mix with the glass stirring rod until dissolution is complete.

4. Write "+" on one test tube and "–" on the second test tube with the marker.

5. Fill both test tubes with distilled water.

6. Upend both test tubes into the beaker without letting in air bubbles.



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7. Secure the test tubes to the electrolysis stand.
8. Connect the electrodes to the source of electric current.
9. Turn on the power and wait for a few minutes.
10. Record your observations.
11. Turn off the power when one test tube fills halfway with gas.
12. Measure the height of the gas column in each test tube. Record your results.
13. Turn on the power and continue until both test tubes fill with gas.
14. Quickly remove each test tube from the beaker and close it with the stopper.
15. Disconnect the source of electric current.
16. Conduct tests to identify the gas collected in each test tube.
17. Clean up and put away materials.

Results

Record your results in the table below. Give the table a title.

Title:

Characteristic tested	Test tube +	Test tube –

Analysis of the results

1. What gas is collected in test tube +? Explain your answer.

_____

_____

2. What gas is collected in test tube –? Explain your answer.

_____

_____

3. Is this a physical change or a chemical change? Explain your answer.

_____

4. What is the relationship between the volumes of gases obtained?

_____

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5. What is the type of reaction observed?

_____

6. What form of energy is involved in this change?

_____

7. Is energy absorbed or released? Explain your answer.

_____

_____

8. Write the chemical equation for the change observed. Include the place of energy.

_____

9. What are the possible sources of error in this lab?

_____

10. How could you improve the protocol for this lab?

_____

Conclusion

1. Complete the following sentences:

a) In this experiment, _____ of water produces _____ and _____

b) This change is called a _____

c) This change involves _____ energy that is _____

2. Was your hypothesis confirmed or not? Explain your answer.

_____

Application

What is the purpose of adding sodium carbonate to distilled water in this lab? Suggest a way to verify your hypothesis.

_____

_____

_____