

NAME _____ PREF ____ SECTION SC _____ DATE _____

EXPERIMENT 35: PREPARATION AND PROPERTIES OF CARBON DIOXIDE

Equipment: 1 generator set (made from: 6oz. bottle, 2 holed rubber stopper, thistle tube, delivery tube), test tube, ringstand, and clamp

Materials: 2-3 marble chips (CaCO_3), 10mL HCl, 10mL Ca(OH)_2 (limewater), blue litmus paper

In this experiment you will learn about the chemical and physical properties of CO_2 .

- A. i. Fit a six-ounce bottle with a two-hole rubber stopper, thistle tube, and delivery tube. Set up the apparatus for the collection of a gas by the upward displacement of air.
ii. Put some marble chips into the bottle to a depth of about one inch.
iii. Add enough dilute HCl to cover the marble chips and the bottom of the thistle tube.
iv. Add small amounts of HCl if the reaction slows down.
1. Which reactant is the source of the CO_2 ? _____
2. Write an equation for the formation of CO_2 from HCl and CaCO_3 . _____
- _____
3. Consider your answer to question 2. Relate this to acid rain? _____
- _____
- B. Collect a bottle of CO_2 by upward displacement of air. This bottle should be dry. The bottle is filled with gas when a lighted splint goes out as soon as it is lowered into the neck of the bottle.
4. Why is the gas collected by the upward displacement of air? _____
5. Explain the effect of CO_2 on the lighted splint. _____
- _____
6. How does your answer to questions 3 and 4 show the usefulness of CO_2 in firefighting? _____
- _____
- C. Allow the gas to bubble through 5 mL of water in a test tube for at least 5 minutes. Test the solution with blue litmus paper.
7. What is the effect of the solution on blue litmus paper? _____
8. Write an equation for the reaction of CO_2 and water. (HINT: Table L) _____
9. Explain the slight effect on blue litmus paper? (HINT: Table L again). _____
- _____
- D. Fill 1/4 of a test tube with a saturated solution of Ca(OH)_2 ("limewater") and allow CO_2 to bubble through it until a precipitate forms. Then, remove the delivery tube. The precipitate is CaCO_3 . To make that substance, you need Ca^{+2} ions (which are in the "limewater"), and CO_3^{-2} ions.
10. Write an equation for the formation of the precipitate CaCO_3 . _____
11. Write an equation to show where the CO_3^{-2} ions come from. (HINT: Table L -again!) _____
- _____
12. Part D will not work with a CaCl_2 in place of Ca(OH)_2 solution. Why not? (HINT: Le Chatelier's Principle and Table E). _____
13. Put the delivery tube back into the solution containing the CaCO_3 precipitate and allow the gas to bubble through for a while. Describe what happens. _____
- Explain the result. _____