Exothermic Reaction Lab

Materials:

- Calcium chloride
- Baking soda
- Phenol red (water based)
- Sealable plastic bag
- Vial
- Tray
- Matches

Procedure:

1. Mix 1 tsp. of baking soda and 2 tsp. of calcium chloride in a baggie.
2. Seal it and shake it. Does any reaction occur?
3. Pour 15 mL of phenol red into a vial. Stand it in the baggie without spilling it and reseal the bag. Try to let out as much air as possible before sealing it.
4. Invert the bag and shake it to mix the ingredients. Write at least four observations.
    a. The ingredients begin to foam.
    b. It inflates with a gas.
    c. The color turns from red to yellow.
    d. The baggie gets warm.
    e. If the bag is opened and a match is held near the opening, it will go out.

5. Design experiments so that you can determine which combinations of chemicals cause each of these reactions.

Answer key:

1. No reaction occurs when the calcium chloride and baking soda are mixed.
2. The heating is caused by calcium chloride and water. This is called an *exothermic* reaction. Energy is released.
3. Baking soda and water will actually cool a few degrees. It is *endothermic*. Energy is absorbed.
4. Calcium chloride, baking soda, and water will foam and inflate the bag. The gas will also extinguish a match. The gas is carbon dioxide. Since there is no color change, the phenol red must be responsible for that in some way.
5. Phenol red and calcium chloride do not change color.
6. Phenol red and baking soda do not change color.
7. Thus, phenol red is indicating a chemical change in the calcium chloride, baking soda, and water. Since these foam up much like vinegar and baking soda, the experiment can be repeated substituting vinegar for calcium chloride. The result is similar to this experiment.

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Isolating Reactions

Name_____

Date_____ Period____

Use today's labs to determine which chemicals are responsible for the reactions in this Lab.

1. What are the three (or four) chemicals that were used in the Lab?

   _____

2. What chemicals caused the reaction to change color? How can you tell this?

   _____

   _____

   _____

3. What chemicals caused the bag to inflate? How do you know this?

   _____

   _____

   _____

4. What chemicals caused the temperature to rise? How do you know this?

   _____

   _____

   _____

5. The phenol red is composed of water and an indicator chemical? What effect does the water have? What effect does the indicator have?

   _____

   _____

   _____

   _____

6. What does the word exothermic mean?

   _____

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