

2. Carbon Dioxide

Carbon dioxide will be produced by the reaction of sodium bicarbonate with hydrochloric acid. The reactions between $\text{CO}_2(\text{g})$ and water and $\text{CO}_2(\text{g})$ and aqueous calcium hydroxide will be examined.

1. Place about 2 g (1/2 teaspoon) of sodium bicarbonate, NaHCO_3 , into a bottom corner of a 1 pint heavy-duty Ziploc bag.
2. Fill a plastic pipet with 6 M HCl (caution). Place the pipet into the bag, smooth it to remove as much air as possible, and seal the bag. Be careful not to press against the pipet.
3. Expel the HCl from the pipet onto the sodium bicarbonate. The bag will fill with CO_2 .
4. Expel the air from a clean pipet, and carefully insert it into the gas-filled bag at one corner of the seal. Do not open the bag more than absolutely necessary. Taking care not to touch the liquids or solids in the bag, insert the pipet deep into the bag and release the bulb so that the pipet fills with gas. Remove the pipet and reseal the bag.
5. Put 1 mL of distilled water into a clean test tube and check the pH. Bubble the carbon dioxide into this water. Measure the pH of the resulting solution.
6. Obtain another pipet full of carbon dioxide, and bubble it into 1 mL of $\text{Ca}(\text{OH})_2(\text{aq})$. Record your observations.
7. Place the used bag in the waste bucket labeled "waste bags".

3. Sulfur Dioxide

Sodium sulfite will be reacted with sulfuric acid to produce sulfur dioxide gas. Note that sulfur dioxide gas is readily oxidized in air to form $\text{SO}_3(\text{g})$. The reaction between $\text{SO}_3(\text{g})$ and water will be studied.

1. Place about 2 g (1/2 teaspoon) of sodium sulfite, Na_2SO_3 , into a bottom corner of a 1 pint heavy-duty Ziploc bag.
2. Fill a plastic pipet with 6 M H_2SO_4 (caution). Place the pipet into the bag, smooth it to remove as much air as possible, and seal the bag. Be careful not to press against the pipet.
3. Move to a fume hood. Expel the H_2SO_4 from the pipet onto the Na_2SO_3 . The bag will fill with SO_2 .
4. Expel the air from a clean pipet, and carefully insert it into the gas-filled bag at one corner of the seal. Do not open the bag more than absolutely necessary. Taking care not to touch the liquids or solids in the bag, insert the pipet deep into the bag and release the bulb so that the pipet fills with gas. Remove the pipet and reseal the bag.
7. Put 1 mL of distilled water into a clean test tube. Bubble the sulfur dioxide into this water. Measure the pH of the resulting solution.
8. Place the used bag in the bucket labeled "waste bags".