

EXPERIMENT # 14
TABLE SALT FROM SODA ASH

PURPOSE:

To obtain sodium chloride from sodium carbonate and to study the stoichiometry of this reaction.

METHOD:

Soda ash is the common name for sodium carbonate [Na_2CO_3]; when sodium carbonate is treated with hydrochloric acid [$\text{HCl}(\text{aq})$] it produces a white solid residue (sodium chloride, commonly called table salt) and two gaseous products: water vapor and carbon dioxide.

PROCEDURE:

1. Mass a clean, dry, 50 mL beaker on the centigram balance. Add approximately 1.0g-1.5g of Na_2CO_3 into the beaker.
DO NOT EXCEED THE AMOUNT OF Na_2CO_3 INDICATED. Determine the exact mass of the beaker and its contents on the centigram balance. Determine the exact mass of the Na_2CO_3 in the beaker by difference.
2. In the fume hood, measure out 4-5 mL of concentrated hydrochloric acid (12 M) in your small graduated cylinder. Record this volume to the nearest 0.1 mL (You must measure out at least 4.0 mL).

CAUTION! CONCENTRATED HYDROCHLORIC ACID IS HIGHLY CORROSIVE AND GIVES OFF NOXIOUS FUMES!

Transfer the concentrated hydrochloric acid to a small beaker and cover it with a watch glass. Leave the beaker under the fume hood.

DO NOT RETURN ANY OF THE CONCENTRATED HYDROCHLORIC ACID TO THE ORIGINAL REAGENT BOTTLE. DO NOT REMOVE THE CONTAINER WITH HYDROCHLORIC ACID FROM THE FUME HOOD.

If you measured out too much concentrated hydrochloric acid, dispose of it into an appropriately labeled **waste** container found under the fume hood.

3. In the fume hood, add **dropwise** (use a Pasteur pipet) the concentrated hydrochloric acid to the Na_2CO_3 in the beaker and observe the effervescence.

If the effervescence is too vigorous, slow down the rate at which the concentrated hydrochloric acid is added, to avoid splattering of the sample. This step is completed when all of the concentrated hydrochloric acid has been added to the Na_2CO_3 .

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4. Heat the beaker containing the residue under the fume hood, by placing the beaker on a wire gauze supported by a ring. Continue heating until the residue appears dry.
5. Remove the beaker from the hood and continue heating at your bench until constant mass is achieved (successive massings agree within 0.01 g).

Adjust the height of the ring and of the flame in such a manner as not to heat too strongly. (The contents of the beaker should not splatter and the beaker should not turn red-hot).

If you detect any trace of objectionable fumes given off by the residue, return immediately the beaker to the fume hood and resume heating in the fume hood.

If the contents of the beaker start to melt (glassy appearance), this indicates that the heating is too strong and the residue had probably been already heated to dryness and hence constant mass.

Keep in mind that heating is done with the sole purpose to completely drive off the gaseous products, and not to melt the residue.

6. Record the mass of the beaker and the residue (constant mass) and determine the mass of the residue.