

Neutralization Reactions Lab

Purpose

The purpose is to investigate the neutralization of an acid with a base.

Materials

Hot Plate	Phenolphthalein	Evaporating dish
Graduated cylinder	Dropper	
HCl	Crucible tongs	
NaOH	Appropriate PPE	

Procedure

1. Measure **5 mL** of hydrochloric acid (**HCl**) in a graduated cylinder. Pour the acid into an evaporating dish.
2. Add 2-3 drops of the indicator **phenolphthalein**.
3. Pour **7 mL** of the sodium hydroxide base (**NaOH**) into a graduated cylinder.
4. Add **3 mL** of the NaOH to the acid in the evaporating dish. Stir. If the mixture isn't pink, add the NaOH **ONE** drop at a time, and **stir** each time. Keep adding the base until the mixture stays slightly **pink**. Record the total **amount** of NaOH added to the acid.
You have now **neutralized** the acid.
5. **Heat** the solution on a hot plate. When the liquid has almost all evaporated, turn off the heat and let the evaporating dish cool. – **OR** – Label the evaporating dish and allow the liquid to evaporate to dryness at room temperature. Check with your teacher as to which method to follow.
6. Describe the salt produced below.
7. After the dish has cooled, dispose of the chemicals as directed by the teacher.

Observations

Complete the table below.

How many mL of NaOH were added to neutralize the HCl	Description of the salt

Discussion

1. Was there a **chemical reaction** during this experiment? If yes, how do you know?
2. Write the word equation for the neutralization reaction between the hydrochloric acid and the sodium hydroxide.
3. Write the balanced chemical equation for the neutralization reaction.
4. Would it be safe to taste the salt? Why or Why Not?

Timing

This lab should be conducted after students have learned the difference between acids and bases and conducted the labs involving Acid/Base Indicators and Identifying Household Substances

Curriculum links

A1.6	gather data from laboratory and other sources, and organize and record the data using appropriate formats, including tables, flow charts, graphs, and/or diagrams
A1.11	communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models)
C2.4	investigate simple chemical reactions including synthesis, decomposition, and displacement reactions and represent them using a variety of formats [PR, AI]
C2.5	plan and conduct an inquiry to identify the evidence of chemical change (e.g., the formation of a gas or precipitate, a change in colour or odour, a change in temperature) [IP, PR, AI]

Materials (per group)

- appropriate PPE
- evaporating dish
- 10 mL graduated cylinders (or 10 mL syringes without needles)
- 1.0 mol/L HCl (5 mL)
- approximately 1.0 mol/L NaOH (5 - 10 ml depending on the concentration)
- phenolphthalein (2 – 3 drops)
- dropper
- crucible tongs
- hot plate

Safety Precautions

- Review the Section and Appendix on Heating Substances of the DSBN Science Safety Manual prior to beginning this experiment.
- If students are using gloves for the mixing of the chemicals, ensure they are removed
- during the heating portion of the lab.
- If the sample is heated, ensure heating is stopped early enough to avoid “popping” of the salt.
- If the sample is evaporated to dryness at room temperature, ensure samples are correctly stored during the drying process.