

Practical activity that forms part of the Gr 10 Physical Sciences 3-in-1
Class text and Study Guide. See p. 122 MODULE 3 TOPIC 1 Unit 2 for the theory.



PRACTICAL EXPERIMENT 2

FOR INFORMAL
ASSESSMENT
Reaction of hydrochloric acid (HCl)
with sodium hydroxide (NaOH)
Materials

- glass beaker
- two test tubes
- spatula
- chemical scale / mass meter
- hydrochloric acid (HCl)
- sodium hydroxide (NaOH)
- bromothymol blue indicator

Method

- 1 Prepare solutions of sodium hydroxide (NaOH) and hydrochloric acid (HCl) with equal concentrations, e.g. $0,5 \text{ mol} \cdot \text{dm}^{-3}$.

**NOTE**

For the reactants to react completely, the mole ratio must be 1:1. See Stoichiometric Calculations (p. xx).

- 2 Measure out equal volumes of the solutions into two separate test tubes.
- 3 Add a few drops of bromothymol blue indicator to the NaOH solution.

NOTE

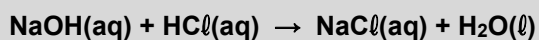
Bromothymol blue indicator appears blue in a basic medium, yellow in an acidic medium and green in a neutral medium.



- 4 Follow Steps 3 – 5 in Experiment 1 (p. 123) to determine the initial mass of the test tubes with the solutions and the glass beaker, and the final mass after the reactants are added together. Note what may be observed.

Observations and discussion

- When equivalent amounts of the acid (HCl) and base (NaOH) are added together, they neutralise each other and the mixture turns green.
- A chemical reaction has taken place, as indicated by the colour change of the indicator.
 - During an **acid-base** reaction, a **salt** and **water** is formed.
 - Sodium chloride (NaCl), which remains in solution, is formed in this reaction:



NOTE

NaCl is commonly known as table salt.



- The total mass of the beaker, including the products NaCl and H_2O , along with the empty test tubes, is the same as the initial combined mass of the beaker, test tubes, and the reactants NaOH and HCl .

Conclusion

- The mass of the system remains the same before and after the reaction.
- Therefore, the mass of the reaction mixture in the beaker is conserved throughout the reaction, demonstrating the **Law of Conservation of Mass** (or **Matter**).