

## RS•C

# 91. Making a fertiliser

## Topic

Ammonia, the Haber process, industrial chemistry.

## Timing

60 min.

## Description

This experiment involves preparing ammonium sulfate. This is an effective fertiliser.

## Apparatus and equipment (per group)

- ▼ Evaporating basin
- ▼ Gauze
- ▼ Tripod
- ▼ Bunsen burner
- ▼ 20 cm<sup>3</sup> Measuring cylinder
- ▼ Filter paper
- ▼ Filter funnel
- ▼ Conical flask (to stand funnel on)
- ▼ Glass rod.

## Chemicals (per group)

- ▼ Sulfuric acid 1 mol dm<sup>-3</sup> (**Corrosive**)
- ▼ Ammonia solution 2 mol dm<sup>-3</sup>
- ▼ Full range indicator paper.

## Teaching tips

Students may need to be told that a way of checking the pH of their solutions is to take a drop on a glass rod and place it on a piece of full range indicator paper.

## Background theory

Students should understand that ammonia is an alkali and neutralises acid. They should also be aware that crystals can be obtained by evaporating a solution and leaving it to cool.

## Safety

Wear eye protection.

The ammonia solution gives off ammonia which irritates eyes, lungs and respiratory system.

Sulfuric acid causes burns.

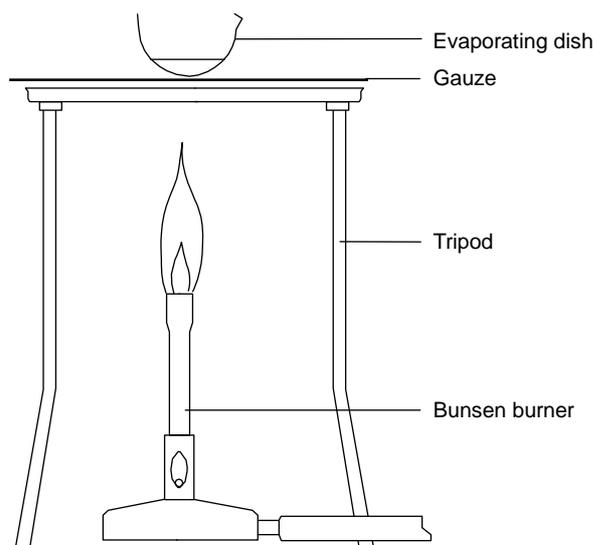
## Answers

1. Ammonia + sulfuric acid → ammonium sulfate + water
2.  $2\text{NH}_4\text{OH} + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4 + 2\text{H}_2\text{O}$
3. 21 per cent nitrogen.

# Making a fertiliser

## Introduction

Producing fertilisers is very important. This experiment involves preparing ammonium sulfate. Ammonium sulfate is a popular and effective fertiliser.



## What to record

What was done and what was observed.

## What to do

1. Put 20 cm<sup>3</sup> sulfuric acid into an evaporating basin.
2. Add the ammonia solution a little at a time, with stirring, until a definite smell of ammonia is obtained.
3. Check the pH is 7 or above with indicator paper.
4. Evaporate the solution to about one-fifth of its original volume (**Care** – do not let the solution spit), and cool.
5. Filter off the crystals and dry.

## Safety

Wear eye protection.

The ammonia solution gives off ammonia which irritates eyes, lungs and respiratory system.

Sulfuric acid causes burns.

## Questions

1. Write a word equation for this preparation.
2. Write a balanced symbol equation for this preparation.
3. Calculate the percentage of nitrogen in this fertiliser.