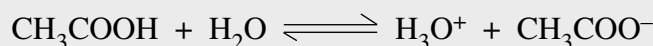


The Effect of Dilution on Ethanoic Acid

Introduction

Acids are substances which dissociate in water to produce hydrogen ions. When ethanoic acid is placed in water, the following equilibrium is established:



Since ethanoic acid is a weak acid, the equilibrium lies heavily towards the reactants. As more water is added however, the concentration of H_2O increases and so the acid dissociates into H_3O^+ and CH_3COO^- to a greater extent.

You will need

Conductivity apparatus; test tubes; glacial ethanoic acid; magnesium ribbon; pH indicator paper (e.g. universal indicator); powdered calcium carbonate.

Aim

To observe the effect of dilution on the properties of ethanoic acid

Safety notes

- Glacial acetic acid is flammable and causes severe burns.
- Wear safety glasses during this practical.

Method

1. Take about 2 cm of indicator paper. On each end of it place a drop of glacial ethanoic acid. Add a drop of water to one of these drops. Record your observations in the table below.
2. Take about 2 mL of glacial ethanoic acid in a test tube and add about 2 mL of water. Then add 1 cm of magnesium to the solution and record your observations in the table below. Repeat this test using a small amount of powdered calcium carbonate.
3. Repeat instruction 2 above using the magnesium and calcium carbonate with 1 mL of glacial ethanoic acid in a **dry** test tube.
4. **Teacher Demonstration**
 - (a) The electrical conductivity of about 10 mL of glacial ethanoic acid is tested in a small beaker.
 - (b) The conductivity of distilled water is tested.
 - (c) An equal volume of distilled water is added to the acid and the conductivity retested.

Results

OBSERVATIONS

ACID	INDICATOR PAPER	MAGNESIUM	CALCIUM CARBONATE	CONDUCTIVITY
glacial ethanoic acid				
water + ethanoic acid				

Equations

ethanoic acid + magnesium (write both molecular and ionic equations)

ethanoic acid + calcium carbonate (write both molecular and ionic equations)

ethanoic acid + water (write an ionic equation)

Discussion questions

1. Why are acid properties only seen in aqueous solutions of an acid?

2. Would you expect to see similar results if you tested other acids such as pure sulfuric acid? Give reasons for your answer.

Conclusion

What effect does dilution have on the properties of ethanoic acid?