

Experiment worksheet answers

4.2 Acid reactions depend on strength and concentration

Pages 92–93 and 203

Experiment 4.2: Acid titrations

Discussion

1 When you tested the pH of the two acids, you used the same concentration (0.1 M).

a Why were they compared at the same concentration?

So that the concentration was controlled and any variation that occurred was a result of the strength of the acid.

b Why did they have a different pH?

Hydrochloric acid is able to release a hydrogen ion more easily than ethanoic acid. pH is a measure of how easily the acid can release the hydrogen ion.

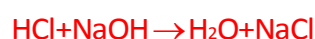
c What can be concluded about the strength of ethanoic acid compared with the strength of hydrochloric acid?

Hydrochloric acid was stronger than ethanoic acid.

2 Compare the number of drops of sodium hydroxide used to neutralise each acid. Is this what you expected? Explain using your results.

Students' results will reflect their results.

3 Write a balanced equation for each neutralisation reaction.



4 The pop test is the standard test for hydrogen gas. The 'pop' sound is a mini-explosion due to the combustion of hydrogen gas in air, which is a very exothermic (heat producing) reaction.

The equation for the reaction is: $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{energy}$

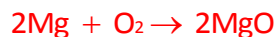
a Did your tests confirm that hydrogen gas was produced?

Yes

b Was there a difference in how fast the reactions with the two different acids occurred? If so, suggest why.

Yes. Strong acids and more concentrated acids are more likely to release a hydrogen ion and therefore form the product water at an increased rate.

- 5 Write a balance chemical equation for the reaction between the two acids and the magnesium ribbon.



Conclusion

- 1 What do you know about neutralisation reactions?

They form water and a metal salt.

- 2 What do you know about reactions between metals and acids?

They form hydrogen gas.

- 3 What do you know about the difference between strength and concentration of acids?

Strength is an indication of how readily the acid releases a hydrogen ion. Concentration is an indication of how many acid molecules there are. Increased strength or concentration increases the rate of a reaction.