

ibdp chemistry ia enthalpy change of neutralisation flashcard



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Aim: To calculate the enthalpy change of neutralization of the given pairs of acid and base.

Theory: When alkali neutralizes an acid. A salt and water are formed.

Aqueous hydrogen ions, from the acid react with the hydroxide ions, OH⁻(aq) from the alkali, forming water. Ionic equation: H⁺ (aq) + OH⁻ (aq) → H₂O (l)

The Identity of the salt will depend on the nature of the acid and alkali used.

The combination of H⁺ and OH⁻ ions in this way releases energy. In this practical, the enthalpy changes accompanying different neutralization reactions will be measured.

It is because the number of moles of water formed varies according to the acid and alkali used, it is the convention to measure enthalpy change of neutralization in kJ mol⁻¹ when 1 mole of water is formed. We will use a simple calorimeter to determine the enthalpy change of neutralization for the pairs of acid and base given. Apparatus and Materials: 1.0 mol dm⁻³ sodium hydroxide solution, 1.0 mol dm⁻³ hydrochloric acid, 1.0 mol dm⁻³ ethanoic acid, polystyrene cup with lid, thermometer, two 50.0 cm³ measuring cylinders, stopwatch, three 50.0 cm³ beakers, dropper Variables: Manipulated variable: Type of acids used

In this experiment, type of acids used would be manipulating variable.

Different acids such as HCl or CH₃COOH are added to NaOH respectively and measure the increase in temperature respectively. Responding variable:

Temperature, T Responding variable will be the temperature. First, we have to measure and record the initial temperature of the sodium hydroxide solution. After acid has been added, Controlled variable: Concentration of

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sodium hydroxide In this experiment, variables that have to be kept constant will be the factors that will affect the exothermic neutralization reaction.

Thus, concentration of sodium hydroxide has to be kept constant.

This is to make sure the number of moles of hydroxide ions OH^- reacts with H^+ remains constant, so as to determine the concentration of the acids.

Diagram: Thermometer Cover Polystyrene cup 25.0 cm³ HCl Diagram 1:

Set-up of the apparatus Safety and Precaution Steps: 1. Always wear an apron and goggles in the lab. 2. Acids are corrosive; make sure that gloves are worn throughout the experiment.

Procedure: 1. Measure 25.0 cm³ of the hydrochloric acid using a 50.0 cm³ measuring cylinder into a polystyrene cup.

Record its temperature for 3 minutes at 1 minute intervals.