

Friday Worksheet

Name:

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Volumetric 5

The solubility of highly soluble, thermally unstable salts such as ammonium chloride may be determined by back titration.

In one experiment a 5.00 mL saturated solution of ammonium chloride, NH_4Cl , at $20.0\text{ }^\circ\text{C}$, was diluted with distilled water to 250.0 mL in a standard flask.

A 20.0 mL aliquot of this solution was added to 10.0 mL of 0.400 M NaOH solution. The solution was heated to drive off the ammonia formed by this reaction.

When the flask had cooled, the excess hydroxide ions were neutralised by 14.7 mL of 0.125 M HCl solution. The molar mass of ammonium chloride is 53.5 g mol^{-1} . i. the amount, in mol, of NaOH that is added to the acid H_2X initially.

a) i. Write an equation for the neutralisation reaction

ii. Determine the amount, in mole, of NaOH that was originally added to the ammonium chloride solution

iii. Determine the amount, in mole, of ammonium chloride in the 20.0 mL aliquot.

iv. Calculate the amount, in mole, of ammonium chloride in 5.00 mL of the saturated solution

v. Calculate the solubility, in g L^{-1} of ammonium chloride in water at $20\text{ }^\circ\text{C}$.

b) If the burette was rinsed with water instead of acid before the titration, how would the calculated solubility of ammonium chloride be affected? Explain your answer.