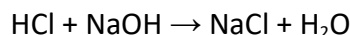


Titration: Sodium Hydroxide in Drain Cleaner

Aim: To verify the stated concentration of sodium hydroxide (NaOH) present in drain cleaner by titration against a standard solution of 0.1 mol L^{-1} hydrochloric acid (HCl).



Hypothesis: The concentration of sodium hydroxide present in drain cleaner is 100%

Procedure:

1. Accurately weigh out approximately 1 g of the drain cleaner into a clean dry 100 mL beaker.
Safety note: *Drain cleaner is corrosive. Wear safety glasses and avoid contact with skin.*
2. Use enough distilled water from a wash bottle to rinse the solid into a 250 mL volumetric flask, and swirl the flask until it dissolves.
3. Carefully fill the volumetric flask to 250mL with distilled water. Stopper and invert to ensure homogeneity (even concentration throughout).
4. Continue with the usual titration procedure, using hydrochloric acid in the burette, sodium hydroxide in the conical flask (transferring 20 mL by pipette), and three drops of methyl orange as the indicator.
5. Hand up this sheet along with a correctly formatted report including the following sections:
 - Aim
 - Hypothesis
 - Results (includes a table and any observations)
 - Manipulation and Collaboration (including care and safety precautions taken, and working together)
 - Calculations
 - (a) Draw a labelled diagram of the experimental procedure
 - (b) Calculate the average titre value
 - (c) Hence calculate the number of moles of HCl that reacted
 - (d) Use a mole ratio to determine the number of moles of NaOH that reacted
 - (e) Hence calculate the concentration of NaOH in the 20 mL sample
 - (f) Hence calculate the number of moles of NaOH in the 250 mL flask
 - (g) Hence calculate the mass of NaOH in the 250 mL flask
 - (h) Hence calculate the percentage of NaOH in the drain cleaner
 - Discussion (including analysis of results with discussions of possible sources of error, evaluation of the method and suggestions for improvements)
 - Conclusion

Sodium Hydroxide in Drain Cleaner

Titration Skills Checklist

<i>Electronic balance</i>	Solid transferred carefully (by taking the beaker off the scales)	
	Mass recorded accurately	
<i>Volumetric flask</i>	Solid transferred carefully (using a funnel and washing)	
	Solid dissolved before filling volumetric flask	
	Volumetric flask filled accurately (to bottom of meniscus)	
<i>Volumetric pipette</i>	Final rinse correct (with solution to be delivered)	
	Filled accurately (to bottom of meniscus)	
	Delivered carefully (touching tip against side of conical flask)	
<i>Conical flask</i>	Rinsed effectively (with distilled water)	
	Swirled effectively (minimal splashing)	
<i>Volumetric burette</i>	Final rinse correct (with solution to be delivered)	
	Solution transferred carefully (using a funnel)	
	Measured accurately (from bottom of meniscus)	
	Tap used effectively (flow rate under control)	
<i>General skills</i>	Effective judgement of endpoint colour change	
	Equipment set up correctly (including good height of burette)	
	Equipment rinsed correctly (with tap water and then distilled water)	
<i>Safety and cooperation</i>	Safe and appropriate laboratory behaviour	
	Cooperative collaborative work (equal sharing of roles)	