

# Sodium carbonate and hydrochloric acid

A standard solution was prepared by dissolving 2.6061g of anhydrous sodium carbonate in distilled water and making up to 250cm<sup>3</sup>. A 25.0cm<sup>3</sup> portion of this solution was titrated against hydrochloric acid, using methyl orange as indicator. This indicator changes colour when sodium carbonate has been converted into sodium chloride. 18.7cm<sup>3</sup> of the acid were required for neutralisation. What is the concentration of the acid?

RMM (Na<sub>2</sub>CO<sub>3</sub>) = 106 g mol<sup>-1</sup>

Na<sub>2</sub>CO<sub>3</sub>  
2.6061g

amount =  $\frac{2.6061}{106}$   
= 2.459 x 10<sup>-2</sup> mol

250cm<sup>3</sup>

25cm<sup>3</sup>

18.7cm<sup>3</sup>  
HCl  
unknown concentration

1/10<sup>th</sup>

2.459 x 10<sup>-3</sup> mol  
Na<sub>2</sub>CO<sub>3</sub>

Equation	Na <sub>2</sub> CO <sub>3</sub> + 2HCl → 2NaCl + CO <sub>2</sub> + H <sub>2</sub> O
Ratio	1 : 2
Moles	2.459 x 10 <sup>-3</sup> : 2 x 2.459x10 <sup>-3</sup> = 4.917 x 10 <sup>-3</sup>

concentration = moles / volume

HCl

$$= \frac{4.917 \times 10^{-3}}{(18.7 / 1000)}$$

$$= \underline{\underline{0.263 \text{ mol dm}^{-3}}}$$