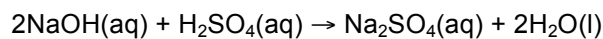**1** In a titration, 25.0 cm$^3$ of 0.200 mol/dm$^3$ sodium hydroxide solution reacted with 28.5 cm$^3$ of sulfuric acid. Find the concentration of the sulfuric acid in mol/dm$^3$.
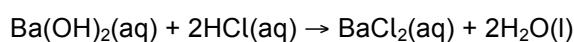
$$2NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$$

**25.0 cm$^3$      28.5 cm$^3$**

**0.200 mol/dm$^3$**

**moles NaOH = conc x volume (dm$^3$) = 0.200 x $\frac{25.0}{1000}$ = 0.0050 mol**

**moles H$_2$SO$_4$ = $\frac{\text{moles NaOH}}{2}$ = $\frac{0.0050}{2}$ = 0.0025 mol**

**concentration H$_2$SO$_4$ = $\frac{\text{moles NaOH}}{\text{volume (dm}^3)}$ = $\frac{0.0025}{\frac{28.5}{1000}}$ = 0.0877 mol/dm$^3$**

**2** In a titration, 25.0 cm$^3$ of 0.040 mol/dm$^3$ barium hydroxide solution reacted with 21.6 cm$^3$ of hydrochloric acid. Find the concentration of the hydrochloric acid in mol/dm$^3$ and g/dm$^3$.

$$Ba(OH)_2(aq) + 2HCl(aq) \rightarrow BaCl_2(aq) + 2H_2O(l)$$

**25.0 cm$^3$      21.6 cm$^3$**

**0.050 mol/dm$^3$**

**moles Ba(OH)$_2$ = conc x volume (dm$^3$) = 0.040 x $\frac{25.0}{1000}$ = 0.00100 mol**

**moles HCl = 2 x moles Ba(OH)$_2$ = 2 x 0.00100 mol = 0.00200 mol**

**concentration HCl in mol/dm$^3$ = $\frac{\text{moles NaOH}}{\text{volume (dm}^3)}$ = $\frac{0.00200}{\frac{21.6}{1000}}$ = 0.0926 mol/dm$^3$**

**concentration HCl in g/dm$^3$ = M$_r$ x concentration HCl in mol/dm$^3$ = 0.0926 x 36.5 = 3.38 g/dm$^3$**