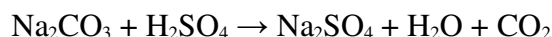


Year 12 Chemistry
Quick Quiz: Titration Question

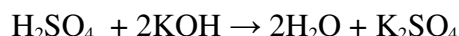
Some drugs taken in solid tablet form contain sodium carbonate to assist the drug delivery to the body's blood stream. The following procedure was used to determine the percentage, by mass, of sodium carbonate contained on average in each tablet.

Step 1 Three tablets, of total mass 3.02 g, were crushed and added to 250.0 mL of 0.0100 mol L⁻¹ H₂SO₄. Excess H₂SO₄ remained after the reaction was complete.



Step 2 25.0 mL samples of the excess H₂SO₄ were titrated with 0.0200 mol L⁻¹ KOH solution.

- (a) Calculate the initial number of moles of H₂SO₄ present before the reaction in Step 1.
- (b) The equation for the titration reaction in Step 2 is shown below:



The average titre value for this titration was 10.85 mL.

- (i) Calculate the number of moles of KOH needed to neutralise the H₂SO₄ in Step 2.
 - (ii) Hence state the number of moles of H₂SO₄ in each 25.0 mL sample.
 - (iii) Hence calculate the total number of moles of excess H₂SO₄ that remained after the reaction with the tablets in Step 1.
- (c) Calculate the number of moles of H₂SO₄ that reacted with the tablets in Step 1.
 - (d) Hence state the number of moles of Na₂CO₃ in the three tablets.
 - (e) Calculate the total mass of Na₂CO₃ in the three tablets.
 - (f) Calculate the percentage mass of Na₂CO₃ contained on average in each tablet.