

Back titration

Back titration is a technique used by chemists to determine the quantity of a material of interest. In a back titration, an excess quantity of a suitable reagent is reacted with the material of interest. A titration is then performed to determine the number of moles of reagent in excess from the first reaction. The data obtained from the titration is used to determine the number of moles of reagent that reacted with the material of interest in the first reaction.

Example 1.25

The percentage of calcium carbonate (CaCO_3) in an oyster shell can be determined by back titration.

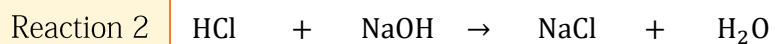
0.5 g of oyster shell was dissolved in 30.0 mL of 1.5 mol.L^{-1} hydrochloric acid solution.

The reaction of calcium carbonate and hydrochloric acid is described in the equation below.



The hydrochloric acid solution was in excess from Reaction 1.

The excess hydrochloric acid solution was titrated with 2.0 mol.L^{-1} sodium hydroxide solution and the average titre was 16.5 mL.



1. The first step in solving the problem is to determine the number of moles of sodium hydroxide solution that reacted with the excess hydrochloric acid solution in Reaction 2.

n_{NaOH}	=	cV
n_{NaOH}	=	2.0×0.0165
n_{NaOH}	=	0.0330 mol

2. The second step is to use the stoichiometric ratio to determine the number of moles of hydrochloric acid solution neutralised by the sodium hydroxide solution in Reaction 2. The number of moles of hydrochloric acid solution neutralised in Reaction 2 is equal to the number of moles of hydrochloric acid solution in excess from Reaction 1.

ratio	=	$1n_{\text{NaOH}} : 1n_{\text{HCl (excess)}}$
$n_{\text{HCl (excess)}}$	=	n_{NaOH}
$n_{\text{HCl (excess)}}$	=	0.0330 mol