

ANALYTICAL CHEMISTRY

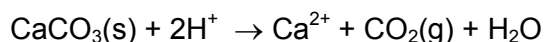
Tutorial: Titrimetric Analysis and Acid-Base Equilibria

Question 1

Calculate the pH after the addition of 0.00; 5.00; 50.00; and 60.00 mL of 0.1000 M HCl in the titration of 50.00 mL of 0.1000 M hydroxylamine. $K_a(\text{HONH}_2) = 1.10 \times 10^{-6}$

Question 2

Limestone consists mainly of the mineral calcite, CaCO_3 . The carbonate content of 0.5413 g of powdered limestone was measured by suspending the powder in water, adding 20.00 mL of 0.6981 M HCl, and heating to dissolve the solid and expel CO_2 :



The excess acid required 19.98 mL of 0.2008 M NaOH for complete titration to a phenolphthalein end point. Find the weight percent of calcite in limestone.

Question 3

The chloride concentration in a sea water sample was determined by a precipitation titration. A 10.00 mL aliquot of the sample was titrated with 15.00 mL of standard 0.1182 M AgNO_3 solution. The excess silver was titrated with standard 0.1010 M KSCN solution, requiring 2.38 mL to reach the red $\text{Fe}(\text{SCN})^{2+}$ endpoint. Calculate the concentration of chloride in the sea water in g L^{-1} .

Question 4

A 5.867 g sample of acetic acid (CH_3COOH ; $K_a = 1.75 \times 10^{-5}$) was dissolved in 800 mL of water. Calculate the pH of this solution after the addition of 100 mL of 0.500 M NaOH.