Analytical Chemistry

Chapter 6, 7 & 8

by
Wan Norfazilah Wan Ismail
Faculty of Industrial Sciences & Technology
norfazilah@ump.edu.my

Activity 8

1. 1.00 mole of ethanoic acid was allowed to react with 0.5 moles of ethanol. At equilibrium, 0.58 moles of acid was remaining. Calculate K_c for this reaction.

Activity 8

2. Equimolar amounts of hydrogen and iodine were allowed to reach equilibrium.

$$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$$

If 80% of the hydrogen can be converted to hydrogen iodide, calculate K_p.

Activity 8

3. Magnesium oxide is only slightly soluble in water, making it difficult to titrate directly.

   A student was required to use a back titration to determine the purity of a sample of magnesium oxide that weighed 4.06 g. This sample was completely dissolved in 100 cm^3 of 2.00 mol dm^{-3} hydrochloric acid (a known excess)

   The excess acid required 19.70 cm3 of 0.200 mol dm^{-3} sodium hydroxide for neutralisation. Calculate the percentage purity of magnesium oxide.

Activity 8

4. To determine the amount of magnetite (Fe_3O_4) in an impure ore, a 1.5419 g sample is dissolved in concentrated HCl, giving a mixture of Fe^{2+} and Fe^{3+}.

After adding HNO_3 to oxidize Fe^{2+} to Fe^{3+} and diluting with water, Fe^{3+} is precipitated as $Fe(OH)_3$ by adding NH_3.

Filtering, rinsing and igniting the precipitate provides 0.8525g of pure Fe_2O_3.

Calculate the %w/w Fe_3O_4 in the sample.

Fe: 55.8 g/mol, O: 16 g/mol, H: 1 g/mol

Activity 8

5. The basicity constant K_b for ammonia is 1.75×10^{-5} at 25 ^{o}C. (It is only coincidental that this is equal to K_a for acetic acid.) Calculate the pH and pOH for a 1.0×10^{-3} M solution of ammonia.

Activity 8

6. Calculate the pH of a solution prepared by mixing 2.0 mL of a strong acid solution of pH 3 and 3.0 mL of strong base of pH 10.

Editor: Wan Norfazilah Wan Ismail

Author: Siti Maznah Kabeb

Industrial Chemistry Programme
Faculty of Industrial Sciences & Technology
Universiti Malaysia Pahang