Chapter 3: conductivity and conductometry

ACTIVITY 3 : Conductometric titration of aspirin

Introduction

Conductivity method can be used as a simple and convenient technique for determining the concentration of weak acids such as acetylsalicylic acid. During the titration of the following reaction occurs:

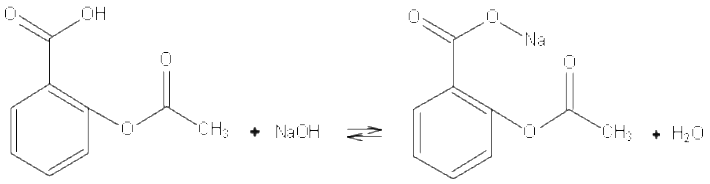

Fig.1. Reaction of Acidum Acetylsalicylicum with sodium hydroxide

Source: http://www.polymer-carbon.ch.pwr.edu.pl/polimery/data/E1.pdf

DOCUMENT 1: Conductometric measurements

Initially the conductance is low due to the feeble ionization of acetylsalicylic acid. The conductance increases on adding NaOH as it neutralizes the undissociated acetylsalicylic acid to its sodium salt which is the strong electrolyte. This increase in conductance continues to rise up to the equivalence point. The graph near the equivalence point is curved due the hydrolysis of salt. Beyond the equivalence point, conductance increases more rapidly with the addition of NaOH due to the highly conducting HO^- ions resulting in the disappearance of slightly dissociated acid, in place of which occurs a completely dissociated sodium salt, which has a higher conductivity than the undissociated acid form. The equivalence point of titration is determined by drawing a tangent to the titration curve (before and after equivalence point, Fig.4).

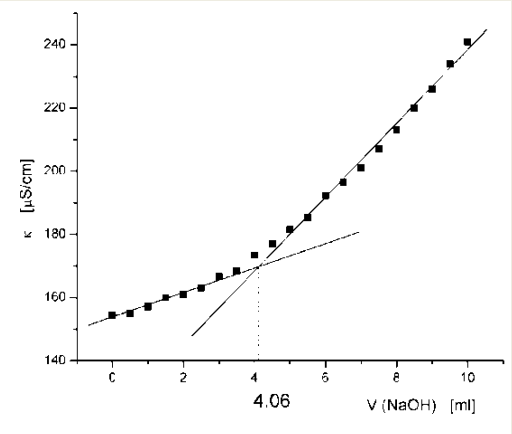

Fig. 4. Determination of equivalence point

Source: http://www.polymer-carbon.ch.pwr.edu.pl/polimery/data/E1.pdf

DOCUMENT 2: Materials and methods

Conductometer
Magnetic stirrer
Volumetric pipettes 100mL
Measuring cylinder 50mL
Volumetric flask 250mL
Beaker 150mL
0.1M NaOH solution
C_2H_5OH

Source: http://www.polymer-carbon.ch.pwr.edu.pl/polimery/data/E1.pdf

DOCUMENT 3: Procedure

Sample preparation

Check the weight of the drug tablet on an analytical balance, place the tablet in a volumetric flask (250mL). Add 15mL of distillated water and 30mL of ethanol to volumetric flask and mix it until tablet is dissolved. Fill volumetric flask to the mark, place a stir bar inside and continue mixing for 5 min.

Measurement

Pipette into a beaker 100mL of the solution. Place in a beaker and stir bar and conductivity cell. Each time add 0.5mL of NaOH solution, mix the solution for 1min, stop the stirrer before conductivity measurement. Write down the results.

Source: http://www.polymer-carbon.ch.pwr.edu.pl/polimery/data/E1.pdf

Acquiring vocabulary

English	French
feeble	
procedure	
weight	
measuring cylinder	
stirrer	

Understanding the titration

Carry out the experiment.

Present your results orally and try to answer the problem: what is the initial mass of aspirin in an aspirin tablet?

Activity summary

What you must remember:
- Conductivité
- Conductivité ionique molaire

Skills linked to the curriculum**:**

Compétences	Capacités à maitriser
– ANA	Interpréter ou prévoir l'allure d'une courbe de titrage conductimétrique à partir de données, sans tenir compte de l'effet de la dilution.
– REA	Réaliser un protocole de titrage mettant en jeu une réaction suivie par conductimétrie.
– COM	Formuler et argumenter des réponses structurées Formuler et présenter une conclusion