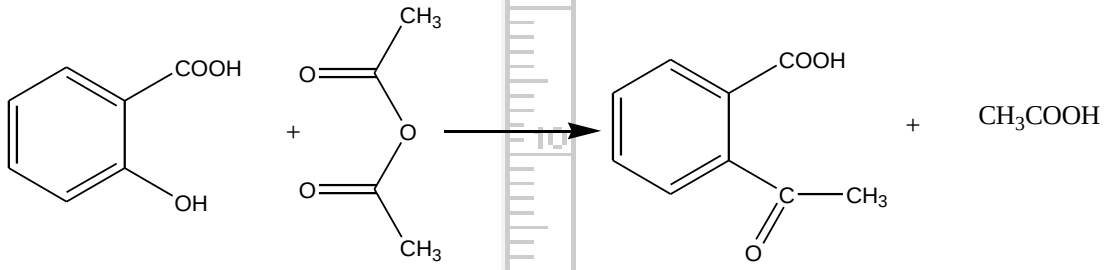
Determination the percent of Acetylsalicylic Acid in Aspirin

Introduction

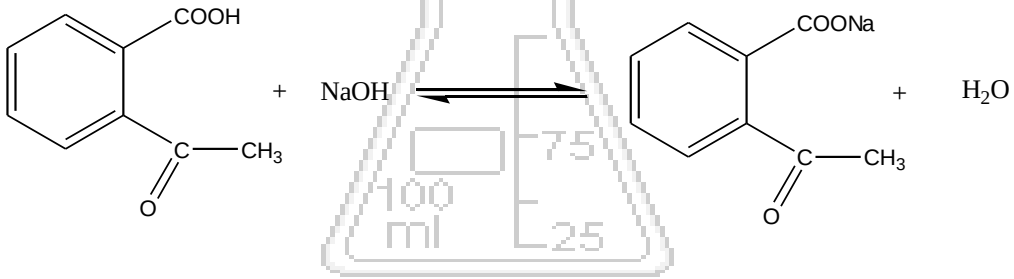
Aspirin (acetylsalicylic acid $HC_9H_7O_4$) is an organic weak monoprotic acid. It is used as a pain killer and fever-reducing. Aspirin is prepared by the reaction of acetic anhydride with salicylic acid as follow:



Salicylic acid — Acetic anhydride — Acetylsalicylic acid Aspirin — Acetic acid

The prepared aspirin tablets are not 100 percent acetylsalicylic acid. Most aspirin tablets contain a small amount of binder which helps prevent the tablets from crumbling. The binder is chemistry inert such as starch, but its presence means that aspirin tablets do not have 100 percent purity.

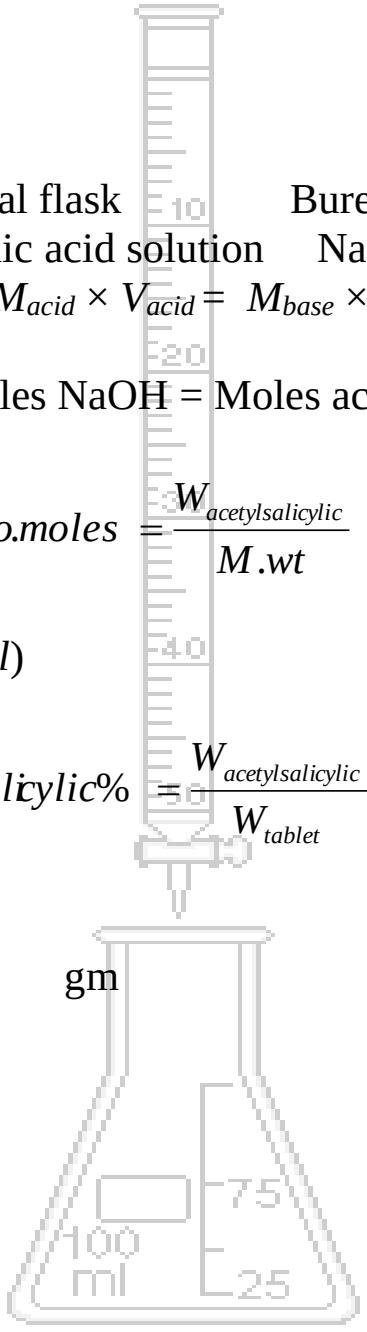
We can determine the percent by weight of acetylsalicylic acid in aspirin tablets by simple titration of aspirin(acetylsalicylic acid with standardized NaOH using phenolphthalein as indicator. Aspirin react with NaOH in one to one mole ratio, so the number of moles of NaOH used in the titration are equal to the number of moles of aspirin (acetylsalicylic acid) in that tablet.



Procedure

1- Place aspirin tablet into a clean conical flask, destroy the tablet and dissolve with (10) mL of ethanol, then add (15) mL of distilled water and mix well.

2- Add few drops of phenolphthalein indicator into the conical flask (no color observed colorless).
3- Fill the burette with standardized NaOH (0.1) M.
4- Begin the titration by slowly adding NaOH solution until the color is obtained (the color is pink) , then record the burette reading.



Calculations

Conical flask Burette

Acetylsalicylic acid solution NaOH solution

$$M_{acid} \times V_{acid} = M_{base} \times V_{base}$$

$M_{base} \times V_{base}$ = Moles NaOH = Moles acetylsalicylic acid

$$no.moles = \frac{W_{acetylsalicylic}}{M.wt}$$

(*M.wt=180.2 g/mol*)

$$acetylsalicylic\% = \frac{W_{acetylsalicylic}}{W_{tablet}} \times 100$$

W_{tablet}= gm