Assay of magnesium hydroxide

Magnesium hydroxide ($Mg_{(}$ OH $_{)2}$, m.wt = 58.32) is white or almost white , fine , amorphous powder that may contain magnesium oxide and magnesium sulphate as well . it is practically insoluble in water but dissolves in dilute acids .

Magnesium hydroxide is an antacid that is given orally . it is also given as an osmotic laxative . magnesium hydroxide has also been a food additive and as a magnesium supplement in deficiency states .

Chemical principle :

Assay of magnesium hydroxide follows acid – base reaction in which a standard acid is used .

Since magnesium hydroxide is practically insoluble in water , direct titration is not possible . thus , back or residual titration is employed .

Back titration is accomplished by dissolving the substance under estimation in an accurately measured excess quantity of a standard solution of known strength , and subsequently titrating the excess of the latter with another previously standardized solution .

Magnesium hydroxide is to be dissolved in excess of 1 N sulphuric acid and the unreacted excess of this acid is to be back titrated against 1 N sodium hydroxide solution :

$$H_2SO_4 + Mg(OH)_2 \rightarrow MgSO_4 + 2H_2O$$

$$H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$$

(Excess , unreacted)

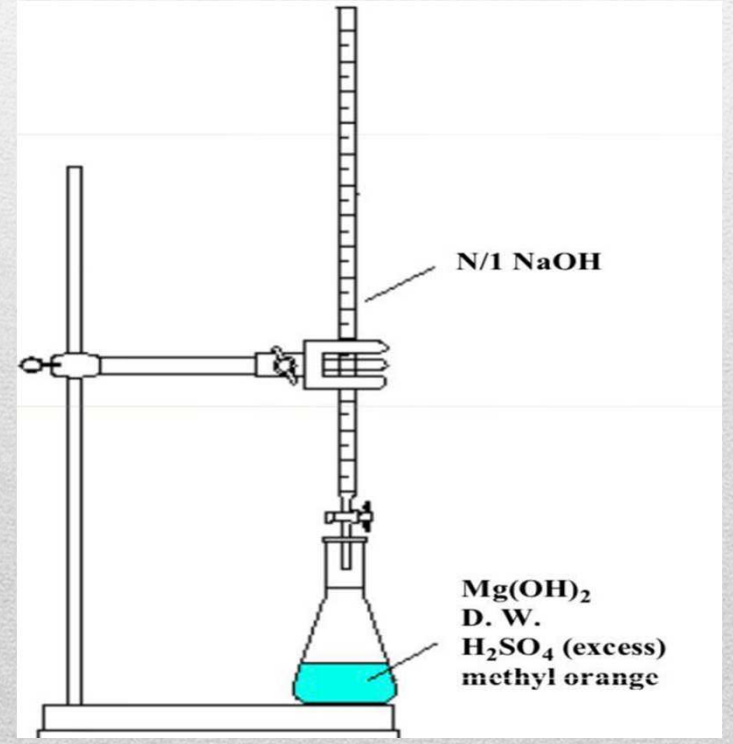
Application of back titration :

Back titration is usually carried out when the substance under estimation :

a) *Is insoluble in water (e.g. magnesium hydroxide and calcium carbonate , which require excess of the standard solution to be solubilized) .*
b) *Fails to give a sharp end point with the indicator used in direct titration .*
c) *volatile (e.g. , ammonia , some of which would be lost during the titration) .*
d) *Reacts rapidly only in the presence of excess of the standard solution (e.g. , aspirin and lactic acid) .*
e) *Decomposes when heated with the standard solution (e.g. , formaldehyde , heating is required during titration) .*

Procedure :

Dissolve your sample in sulphuric acid 1 N. add 2 drops of methyl – orange solution as the indicator (pink) and titrate against 1 N sodium hydroxide solution until reaching the end point (yellow) .



Calculations :

Calculate the chemical factor :
(each 1 ml of 1 N sulphuric acid solution is equivalent to 0.02916 g of magnesium hydroxide) .

V_1 is the volume of H_2SO_4 added .

V_2 is the volume of NaOH reacted with the excess H_2SO_4 .

$V_1 – V_2 = V_3$ the volume of N\1 H_2SO_4 consumed by the unknown .

Calculate the quantity of magnesium hydroxide present in your sample :

Wt. = V * chemical factor