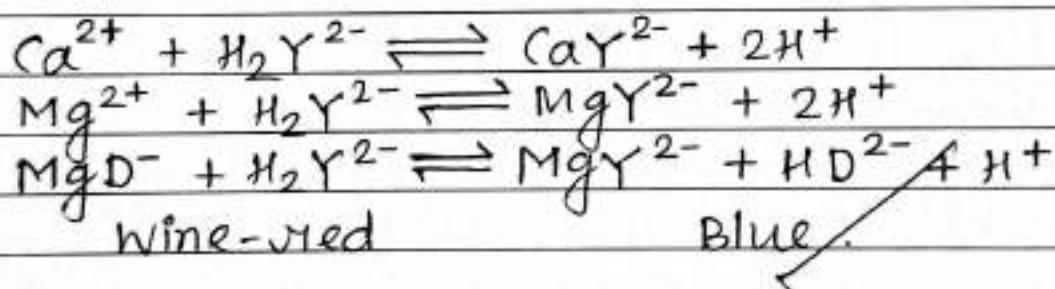




### Estimation of the percentage of $\text{CaCO}_3$ and $\text{MgCO}_3$ Present in supplied ore (Dolomite) :-

**Theory :-** Both  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  form stable complexes with EDTA at  $\text{pH} = 7-8$ , but  $\text{Ca-EDTA}$  complex is more stable than  $\text{Mg-EDTA}$  complex, again  $\text{Mg-indicator}$  complex is more stable than the  $\text{Ca-indicator}$  complex. So at first EDTA reacts with free  $\text{Ca}^{2+}$  ions, then with free  $\text{Mg}^{2+}$  ions and there after wine red coloured  $\text{Mg-indicator}$  complex to set free blue indicator. So a change in colour from wine red to blue marks the end point.



### Chemical required :-

(i)  $\left(\frac{M}{50}\right) \text{Zn(OAc)}_2$  Solution in 2%  $\text{NH}_4\text{Cl}$  solution.

(ii)  $\text{NH}_4\text{Cl-NH}_4\text{OH}$  buffer solution of  $\text{pH} 10$ ; Prepared by 70g  $\text{NH}_4\text{Cl} + 570 \text{ mL liq. NH}_3$  and diluted to 1000 mL with distilled water.

(iii) EBT indicator 0.1% solid mixture of EBT in 100 mL alcohol.

(iv)  $\left(\frac{M}{50}\right)$  EDTA Solution.

(v) 0.1 (M) NaOH

(vi)  $Ca^{2+}$  and  $Mg^{2+}$  stock solution. ✓

▣ Results:-

(i) Preparation of 250 ml standard  $\left(\frac{M}{50}\right)$   $Zn(OAc)_2$  Solution:-

Weight of $Zn(OAc)_2$ taken (g)	Weight of $Zn(OAc)_2$ to be taken (g)	Strength of $Zn(OAc)_2$ Solution. ( $S_1$ )
1.1	1.1	$S_1 = \left(\frac{1.1}{1.1} \times \frac{1}{50}\right) M$
		$S_1 = 0.02 (M)$

(ii) Standardization of EDTA Solution:-

Volume of Standard $Zn(OAc)_2$ Solution (ml) ( $V_1$ )	Volume of EDTA consumed (ml) ( $V_2$ )
25	17

Now applying the formula :-

$$V_1 S_1 = V_2 S_2$$

$$\Rightarrow 25 \times 0.02 = 17 \times S_2$$

$$\Rightarrow S_2 = \frac{25 \times 0.02}{17}$$

$$\Rightarrow S_2 = 0.03 \text{ (M)}$$

$\therefore$  strength of EDTA = 0.03 (M)

▣ Estimation of  $\text{Ca}^{2+}$  ions :-

volume of stock sol <sup>n</sup> (mL)	volume of EDTA consumed (mL)
25	16.5

▣ Calculation :-  $V_1 S_1 = V_2 S_2$

$$\Rightarrow 16.5 \times 0.03 = 25 \times S_2$$

$$\Rightarrow S_2 = \frac{16.5 \times 0.03}{25}$$

$$\Rightarrow S_2 = 0.0198$$



$$\boxed{\text{Amount of Ca}^{2+} = (0.0198 \times 40.08) = 0.79 \text{ gm}}$$

$$\boxed{\text{Amount of Mg}^{2+} = (0.0198 \times 24) = 0.475 \text{ gm}}$$

$$\boxed{\text{Total amount of Ca}^{2+} \text{ and Mg}^{2+} =$$

$$(0.79 + 0.475) \text{ gm}$$

$$= 1.265 \text{ gm.}$$