

## Chemistry Practical Write-up

Aim : To investigate the percentage of  $\text{CaCO}_3$  in a sample of marble

Materials used :

- Beaker
- Conical Flask
- Measuring Cylinder of 15 cc
- Burette
- Indicator
- Clamp Stand
- Pipette
- Beam Balance
- $\text{HNO}_3$  of 2M concentration
- $\text{NaOH}$  of 2M concentration

Procedure :

- Crush the sample of marble in to small pieces, and take 1 gram of it in a beaker
- Add excess of acid into the beaker, allow to react completely
- Pipette 25 cc of the mixture into the conical flask
- Add 2 drops of indicator (phenolphthalein) in the conical flask
- Rinse the burette with  $\text{NaOH}$ , then fill it with the latter up to the 0 cc mark
- Titrate the mixture with the base until color changes to purple. In the process, shake the conical flask thoroughly
- Calculate the amount of base reacted
- Repeat the titration again to improve accuracy.

Data Collection :

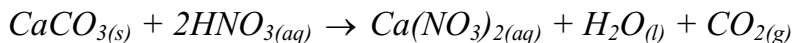
<u>Burette reading (<math>\text{NaOH}</math>) / cc</u>			<u><math>\text{HNO}_3</math> + marble used (cc)</u>
<u>Initial</u>	<u>Final</u>	<u>Used</u>	
0	19	19	25
0	18.8	18.8	25
0	18.5	18.5	25

Mass of marble used = 3 grams

Amount of acid used to dissolve the marble, 100 cc =  $0.1 \text{ dm}^3$

Volume of mixture taken =  $0.025 \text{ dm}^3$

Mean volume of  $\text{NaOH}$  used =  $18.76 \text{ cm}^3 = 0.01876 \text{ dm}^3$



Mol of  $\text{HNO}_3$  used =  $0.1 \times 2\text{M} = 0.2 \text{ mol}$

Molar ratio of  $\text{NaOH} \sim 0.01876 \times 2 = 0.03752 \text{ mol}$

Mol in  $0.1 \text{ dm}^3$  of  $\text{NaOH} = 0.03752 \times 4 = 0.15008 \text{ mol}$

Mol reacted with  $\text{HNO}_3 = 0.2 - 0.15008 = 0.04992 \text{ mol}$

Mol of  $\text{CaCO}_3 = 0.04992 = 0.02496 \text{ mol}$

Mass of  $\text{CaCO}_3 = 0.02496 \times 100 = 2.496 \text{ grams}$

% of  $\text{CaCO}_3 = 2.496/3 \times 100\% = \underline{83.2 \%}$

Precautions taken :

Make sure that the marble reacted completely with the acid, it may take quite a long time, but we are not allowed to proceed with the titration until the marble is completely reacted, because it will give us incorrect readings.

Care should be taken when titrating the mixture of acid and marble with  $\text{NaOH}$ . Because color changes may occur more than once, so we need to be attentive in the process.