

EXPERIMENT No. - 04NAME OF THE EXPERIMENT :-Estimation of Sulphate in soluble Sulphate.APPARATUS REQUIRED :-

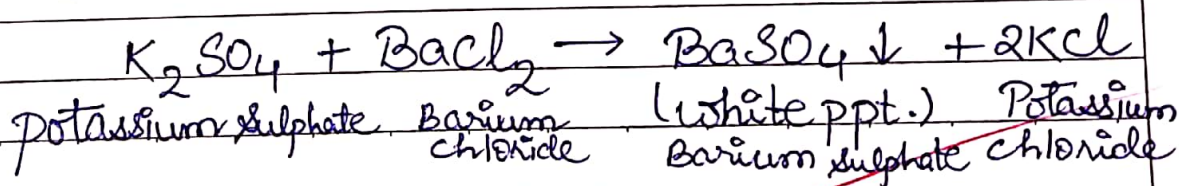
Beaker, (250 ml), Tripod Stand, wire Gauge, Conical Flask, Conical Funnel, Tong and Crucible with lid.

CHEMICALS REQUIRED :-

- ①  $K_2SO_4$  solution - 10 ml
- ②  $BaCl_2$  solution - 2 test tubes

THEORY :-

When an excess of dilute solution of Barium chloride is slowly added to a hot solution of a soluble sulphate which is acidified with hydrochloric acid, sulphate is quantitatively precipitated as barium sulphate. It can be filtered off, washed, dried and ignited to a constant weight. The amount of sulphate can be found out from the weight of barium sulphate formed.

Reaction

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$$\text{Molecular mass of BaSO}_4 = 137.36 + 32.06 + 64 \\ = 233.42 \text{ gm}$$

Thus, 233.42 g of  $\text{BaSO}_4$  contains = 96.06 gm of sulphate

$$\therefore 1 \text{ g of BaSO}_4 \text{ contains} = \frac{96.06 \text{ gm of sulphate}}{233.42}$$

$$= 0.4115 \text{ gm of sulphate}$$

### PROCEDURE :-

10 ml of the supplied potassium sulphate solution was acidified with 2-3 ml of conc.  $\text{H}_2\text{SO}_4$  and the mixture was heated in a beaker. Then, 25-30 ml bench barium chloride solution was added in the beaker and started heating the mixture gently with constant stirring. 2 test tubes of water was added to keep the precipitate curdy.

After 20-30 minutes continuous heating, the precipitate formation takes place completely. The white precipitate was filtered out with the help of Whatman No. 42 filter paper and then, the precipitate along with the filter paper was ignited such that all the part could be collected out in the crucible. The weight of the crucible with lid and the ignited part was measured out.

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OBSERVATION AND CALCULATION :-

Weight of the Crucible with its lid = 74.755 gm  
Weight of the Crucible with its lid and  $\text{BaSO}_4$  = 75.255 gm

$$\therefore \text{Weight of } \text{BaSO}_4 = 75.255 \text{ gm} - 74.755 \text{ gm} \\ = 0.450 \text{ gm}$$

Now,

1 gm of  $\text{BaSO}_4$  contains 0.4115 gm of sulphate

$$\Rightarrow 0.450 \text{ gm of } \text{BaSO}_4 \text{ contains} = 0.4115 \times 0.450 \\ = 0.1851 \text{ gm}$$

Thus,

10 ml of the sulphate solution ( $\text{K}_2\text{SO}_4$ ) contains 0.1851 gm of sulphate

$$\therefore 1 \text{ ml of the sulphate solution contains} = \frac{0.1851 \text{ gm of sulphate}}{10}$$

$$\therefore 1000 \text{ ml (1 l) of the sulphate solution contains} = \frac{0.1851 \times 1000 \text{ gm}}{10} \\ \text{of sulphate}$$

$$= 18.51 \text{ gm of sulphate}$$

RESULT :- 1 Litre of soluble sulphate solution ( $\text{K}_2\text{SO}_4$ ) contains 18.51 gm of sulphate ( $\text{SO}_4$ ).

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