

Gravimetric analysis



**ASSIGN
BUSTER**

By gravimetric analysis, we are able to determine the amount of sulphate in barium sulphate quantitatively. We can do so by slowly adding dilute barium sulphate to an unknown sulphate solution that has been heated and acidified with concentrated hydrochloric acid slightly. A white precipitate will be yield from filtering the solution. It will then be washed with distilled water to rid any impurities and be put into an oven to dry.

Once the precipitate has been dried, it will be taken out to be weighed as barium sulphate. The percentage of sulphate can then be obtained by calculating it from the weight of barium sulphate measured. The aim of this experiment is to use the gravimetric analysis to determine the amount of sulphate in a solution. When aqueous barium chloride and the aqueous unknown sulphate solution are added together, a solid precipitate of barium sulphate will be formed.

Only a few drops of concentrated hydrochloric acid is added to water to dilute it, ensuring a low concentration for a good precipitation. The solution will be heated below boiling point for a period of time and the beaker would be covered with a watch glass to ensure no sputtering would occur and at the same time, ensure that the most number of frequent effective collisions between particles can be reached and that the speed of reaction is at its optimum. A vacuum pump is used to speed up the process of filtration to obtain the precipitate.

The crucible used to contain the precipitate is porcelain and unreactive, so that it will not react with the precipitate and affect the accuracy of the experiment. It is also resistant to high heat, making it convenient for drying using an oven, effectively ridding all water content, so that an accurate mass

of the precipitate can be measured. BaSO₄ 25mL of the given sulphate solution will be pipetted into a 250mL breaker. 50mL of distilled water and 5 drops of concentrated hydrochloric acid is then added as well.

This is done so in the fume-hood, as hydrochloric acid is corrosive. Then, 10mL of 10% barium chloride solution is added and stirred, drop by drop, from a measuring cylinder into the beaker while it is being heated to boiling. Once done, the beaker would be covered with a watch glass and be left to digest for 20 minutes. After 20 minutes, a few drops of barium chloride would be added to the solution to test for complete precipitation.

A crucible lined with filter paper to cover its base completely would be weighed before it is used for filtration. Using a vacuum pump, the clear supernatant liquid would be decanted. The beaker should be rinsed with warm deionised water and emptied into the crucible a few times to ensure that all the particles of the precipitate will be collected in the crucible. The collected precipitate should be washed two more times with warm deionised water before being removed from the vacuum pump.

Once the filtrate has been discarded, the crucible is then left in the oven at 150 degrees Celsius for about half an hour for drying. The crucible is then weighed once it has been taken out of the oven and cooled for 10 minutes. The weight of the precipitate would be obtained by subtracting the weight of the crucible with the filter paper from the final weight of the crucible with the precipitate in it. The above drying process can be repeated a few times until a constant result is obtained to ensure accuracy.

The results obtained could be inaccurate, caused by several experimental errors. The weight of the precipitate when weighed the first time differs from <https://assignbuster.com/gravimetric-analysis/>

that of the second time. This could be because the precipitate was not fully dry the first time it was being taken out of the oven, and still had water content in it. To resolve this problem, the drying process should be repeated several times until the weight of the precipitate remains constant.

The precipitate obtained would also be lesser than the actual expected amount. There might be minute particles that are not visible to the eye, left behind on the beaker, that were not transferred into the crucible. This resulted in a lesser amount of precipitate collected. There is also a possibility that the precipitate might contain impurities as all the apparatus might not have been cleansed before use