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Paper I, Group B
Inorganic Chemistry

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TOPIC:- HEATING, EVAPORATION, PRECIPITATION, DIGESTION, FILTRATION, DRYING, IGNITION AND COOLING OF PRECIPITATES

HEATING, EVAPORATION, PRECIPITATION, DIGESTION, FILTRATION, DRYING, IGNITION AND COOLING OF PRECIPITATES

In chemistry, we study about gravimetric analysis. In gravimetric analysis, the end product is weighted and has direct relationship with the substance to be quantitatively analyzed or simply we can say that in gravimetric analysis, we convert the soluble form of a substance into a solid which involves heating, evaporation, precipitation, digestion, filtration, drying, ignition and cooling. The solid thus produced is weighted. All these processes are discussed as follows: Precipitation is a formation of a solid (precipitate) in a solution. The chemical substance used to form a precipitate is called as precipitant or precipitating reagent. The precipitate gets collected at the bottom of the solution.The soluble form of a substance whose gravimetric estimation is to be performed, if concentrated is diluted using distilled water and then heated slowly. Now in order to form a precipitate, a precipitating reagent is added into the solution slowly with constant stirring as by this we obtain large crystals. Heating is done in order to have good crystals. Precipitating reagent is added in such an amount that the substance gets completely precipitated because an extra addition of precipitating reagent makes the precipitate partially soluble. In order to check the complete precipitation of the substance, few drops

of precipitating reagent is added in such a way that the solution remains undisturbed. If on adding precipitating reagent, there is formation of a precipitate, then more precipitating reagent is added. If no such precipitation takes place in the solution above the precipitate then it shows that the precipitation is completed. The precipitate thus formed is heated gently or slowly on water bath for half an hour. This process of heating the precipitate slowly for half an hour is known as digestion. The precipitate is said to be digested. After digestion, filtration process is performed. Filtration involves the separation of precipitates from the solution. Filter paper, asbestos mats, porous glass crucibles are used. Porous means with pores. We generally use filter paper and porous crucibles for filtration. Filter papers are available in large amount which differ in the pore size. Whatman number 42 is a commonly used filter paper for the process of filtration. In a funnel, filter paper is wrapped properly and kept over the tripod stand. The solution having precipitate is added slowly over the funnel provided with beaker placed below it. In this way, we obtain precipitate as residue on the filter paper and the solution (liquid) is collected into a beaker. The precipitate is then washed in order to remove unwanted ions. These ions are attached to the precipitate causing high yield of the precipitate. Washing is done with fast current of the water. Fast current of the water allow the precipitate to

agitate due to which ions attached to the precipitate get disturbed. The unwanted ions take time to settle being lighter and as a result they get filtered. After washing, the filtrate is tested in order to detect unwanted ions. If the filtrate contains unwanted ions it is further washed with fast current of water and the process of washing is continued till the filtrate thus obtained is free from unwanted ions. Now after washing of the precipitate, drying of the precipitate is performed. The funnel having filter paper containing precipitate is covered with a paper having small pores is placed on the tripod stand and is heated. This is the common method of drying. It can also be performed in an electric oven also. Dried precipitate is collected on a butter paper in order to avoid the loss of the yield. The precipitate is then covered with a funnel (by inverting it). We will observe that even after removing the dried precipitate from the filter paper, still some precipitate will remain attached to the filter paper. In order to remove some remaining precipitate, the process of ignition is performed. In this process, the filter paper containing some precipitate is folded and is burned completely in a non-sooty flame by holding it with a pair of tongs. A silica crucible taken and is weigh empty. As a result of burning ash is obtained which is then taken in a silica crucible. The ash is then heated till it becomes white. Now the precipitate which gets

reduced is recovered. Different chemicals are required for the recovery of the precipitate. Now the precipitate is transferred from butter paper to the crucible. The crucible is then cooled, weighted by using a digital analytical balance. In this way we can obtain a solid mass from the solution. There are several experiments on the gravimetric analysis which are being discussed in next unit.