**Week 8**

**Introduction to Gravimetric analysis**

**Gravimetric analysis** describes a set of methods in [analytical chemistry](http://en.wikipedia.org/wiki/Analytical_chemistry) for the quantitative determination of an [analyte](http://en.wikipedia.org/wiki/Analyte) based on the mass of a solid.

the analyte must first be converted to a solid by [precipitation](http://en.wikipedia.org/wiki/Precipitation_(chemistry)) with an appropriate reagent ,the precipitate can then be collected by filtration, washed, dried to remove traces of moisture from the solution, and weighed. The amount of analyte in the original sample can then be calculated from the mass of the precipitate and its chemical composition.

. **Steps in a Gravimetric Analysis**

. For precipitation techniques the usual steps are:

**1-Prelamirly treatment:**

- The sample is dissolved, if it is not already insoluble.

The solution may be treated to adjust the [pH](http://en.wikipedia.org/wiki/PH) to

1-formation the proper precipitate

2- Or to suppress the formation of other precipitates

**2-precipitation**

The precipitating reagent is added at a concentration that favors the formation of a "good" precipitate this may require low concentration, extensive heating (often described as "digestion"), or careful control of the pH.

**3-Filtration and washing**

After the precipitate has formed and been allowed to "digest", the solution is carefully filtered. The [filter](http://en.wikipedia.org/wiki/Filter_(chemistry)) is chosen to trap the precipitate;

, the filter might be a piece of [filter paper](http://en.wikipedia.org/wiki/Filter_paper) in a fluted funnel, or a filter [crucible](http://en.wikipedia.org/wiki/Crucible)

Then. The precipitate is often washed to remove impurities [adsorbed](http://en.wikipedia.org/wiki/Adsorption) onto the surface of the particles. Washing may be done with a solution of the precipitating agent or water.

**4. Convert the precipitated form of the analyte to a more reliable weighing form (usually by heating**) :

After filtration, the precipitate – including the filter paper or crucible – is heated. This achieves two purposes:

* + The remaining moisture is removed (drying).
  + Secondly, the precipitate is converted to a more chemically stable form

After the precipitate is allowed to cool (preferably in a [desiccator](http://en.wikipedia.org/wiki/Desiccator) to keep it from absorbing moisture), it is weighed (in the crucible). The mass of the crucible is subtracted from the combined mass, giving the mass of the precipitated analyte. Since the composition of the precipitate is known, it is simple to calculate the mass of analyte in the original sample.

**Gravimetric Calculations:**

• Gravimetric calculations are usually expressed as wt %

Gravimetric Calculations

The % of Analyte can be expressed as:

**% Analyte =Wt of Analyte /Wt of Sample x100**

The weight of the analyte is calculated from the amount of analyte

contained in the precipitate by using the gravimetric factor, G.F

**G.F =AWt. of Analyte/FWt. of Precipitate**

**So % of Analyte = Wt of ppt x G.F X100**

**Wt of sample**

**Gravimetric determination of water content in barium chloride dehydrate**

BaCl2 xH2O + heat -----> BaCl2 + x H2O (g)

**Measuring water content**

• Water is a component in many consumer products

• It may occur naturally or may be added in manufacturing

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**Procedure for determining water content**

1-Weight 1 g of sample

2-Heat the sample in an oven at 110oC

3-Allow the sample to cool in a dessicator

4-Re-weigh