Safety: Wear safety glasses and/or goggles and gloves when handling hot crucibles.

Purpose: LOSS ON IGNITION (LOI)

Procedure:

Background Information :

Epsom Salt crystals forming in a cooled solution of magnesium sulfate develop in the "heptahydrate" form. This ,means that the molecules includes not only $MgSO_4$, but seven moles of water for each mole of $MgSO_4$. Each molecule of Epsom Salt in crystalline form is expressed therefore as $MgSO_4 \bullet 7H_2O$, however, is not tightly bound, and can be readily driven off by subjecting the salt to rather mild heat conditions starting about 40 °C. Such a temperature, and higher, may be encountered during the final drying process. Hence it become necessary to check the product from time to time to make sure that none of the H2O has been inadvertently driven off, and final yield diminished thereby. Extensive heating also results in crystal damage and degradation, resulting in the formation of dust.

Scope :

A small amount of each submitted dry sample is placed in a porcelain crucible and heated extensively until it is certain that all of the water has been driven off. By weighing and calculation it can then be determined if the full amount, or what part, of the original seven moles of water existed in the submitted sample. The theoretical result of the loss of all seven moles of water should be 51.2%. If less, the submitted sample had been subjected to some degradation by overheating. Any figure under 50% is cause for alarm.

Equipment :

Porcelain Crucible -- #C6450-4. 10 mL. capacity

Weighing balance -- B440 Satorius

Drying Oven (Low temperature) -- S/P TempCon Gravity convection N8620-5

Muffle Furnace (High temperature) -- Thermodyne Type 1300 120V

Dessicator -- Jencon's 10" Dry Seal

Tongs -- T5010 9" Steel

Small Spatula

Procedure :

1. The empty weighing balance is first tarred to zero.

2. A dry porcelain crucible is placed upon the scale and its weight is recorded.

3. Approximately 5 grams of a dry salt sample is then added to the crucible and the total weight of the sample and the crucible are

   recorded

   (the weight of the sample is measured by subtracting the prerecorded weight of the crucible)

4. The crucible is then placed in the drying oven at a temperature of 100° C for two hours.

5. The crucible is then removed from the drying oven using tongs and placed in a muffle furnace at 450° C overnight.

6. The next day the crucible is removed from the muffle furnace, again using the tongs, and placed in the dissector to cool.

7. After a suitable time period the crucible is placed on the balance and the weight is recorded.

8. By dividing the difference between the total weights and dividing the mass of the sample before heating the percent loss on ignition is provided (see below)

$$\frac{\text{(total weight before heating) - (total weight after heating)}}{\text{(weight of sample before heating)}}$$

TRAINING DOCUMENTATION

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