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the mass of



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BUSTER**

For the lab that was conducted magnesium sulfate had been heated to help find by calculation the amount of water in the sample provided. To properly determine the amount of water. The sample has to be weighed to know the mass both before and after heating. When the sample provided is heated the water within the sample will evaporate.

This then creates an easy calculation and determination of the waters mass, by figuring out the difference of the original mass from before heating and the mass after heating. After this it is possible to then calculate the percent composition and the empirical formula. When starting the experiment the crucible had to be weighed to determine its original mass, which happened to be 18. 81g. Next magnesium sulfate specifically around 3 grams was put into the crucible, then weighed again with the magnesium sulfate inside.

After being weighed the mass of the crucible with the magnesium sulfate in it was 21. 97g. Due to the change in mass from the crucible to when it had the sample in it you are able to determine the mass of the sample by subtracting the crucible original mass from the total combined mass. The mass of the sample had been calculated to 3. 16g. Before the heating of the magnesium sulfate occurred it was observed to be white, large, and loose/separated crystals.

Then in the lab the next part was for the sample to be put over a bunsen burner and heated for around 10 minutes. During the 10 minute time span the heat from the burner was increased slowly every few minutes. When the magnesium sulfate was being heated up it was observed that it made hissing

noises this proved and clarified that the water was evaporating from the sample. After the heating occurred it needed to be cooled.

Once the sample had been cooled it had to be weighed again. After weighing it on the scale the mass was 20.39g. Then the crucible mass needed to be subtracted from the 20.

39g in order to find that the mass of our sample after heat was used turned out to be 1.58g. To then find the evaporated water mass the subtraction of the original sample mass from post heated mass needed to be calculated. The water mass turned out to be 1.58g. Next was that the percent composition needed to be calculated. You can achieve this by taking the grams of magnesium sulfate and water and converting it into moles.

Once calculated it was found that there was 0.0151 moles of the magnesium sulfate in our sample and 0.0877 moles of water in the sample. Lastly, the measurements that were calculated were then divided by the smallest measurement found, which happened to be 0.0151. Over all, this gave us the mole ratio of magnesium sulfate to water within the sample, and that was a 1:6 mole ratio.

From the mole ratio you can then find the empirical formula by calculation, and turned out to be  $\text{MgSO}_4 \cdot 6\text{H}_2\text{O}$ . Through this hydrate lab there were many chances for error to occur. One of these areas of error could have occurred during measurement. It is a possibility that due to human error the measurements in grams of the sample and the crucible were not completely accurate both before and after being heated up. If the measurements were off then, this could have given incorrect calculations of the amount of water

within the sample and given us the wrong percent composition as well.

Lastly, another possibility is that our sample was not fully and properly heated, so therefore the water could have not completely evaporated during the lab.

This error would lead to incorrect calculations of the water and percent composition also. To extend and expand this type of experiment one should test multiple samples, and also keeping each sample the same mass. This would insure a more precise and accurate data set.