Water of Hydration Lab

Purpose: The purpose of this lab is to dehydrate a sample of magnesium sulfate to a constant mass by heating it. Then use experimental data to calculate the number of moles of water released by the hydrate.

Materials:

* Electronic balance
* Bunsen burner and hose
* Ring stand and ring
* Clay triangle
* Striker
* Crucible
* Spatula
* Magnesium sulfate crystals, MgSO₄

Procedure:

1. Record at least five qualitative observations as you work through this lab.
2. Measure the empty mass of the crucible and record in your data table.
3. Using a spatula, add approximately 5.0 grams of magnesium sulfate hydrate crystals to the crucible and record in data table.
4. Find the initial mass of the magnesium sulfate hydrate crystals and record in data table.
5. Place the clay triangle on the ring stand and put the crucible with the magnesium sulfate crystals on top of the clay triangle.
6. Place the Bunsen burner under the ring stand and ignite the burner with the striker.
7. Gently heat the crucible for approximately 5 minutes.
8. Let the crucible cool 2-3 minutes after turning off the burner.
9. When cool, measure the mass of the crucible and magnesium sulfate product after heating. Record mass in data table.
10. Remove the anhydrous (dry) magnesium sulfate from your crucible and place in the discard container.
11. Repeat steps 2-10 with trials 2 and 3.
12. Thoroughly wash and dry all equipment and clean your lab station.
13. Find the average mass of anhydrous (dry) magnesium sulfate from the three trials. Then find the average number of moles of anhydrous magnesium sulfate.
14. Find the average mass of water released during the three trials. Then find the average number of moles of water released.

Data Table:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Trial 1 | Trial 2 | Trial 3 |
| Mass of empty crucible (g) |  |  |  |
| Mass of crucible and magnesium sulfate hydrate (g) (before heating) |  |  |  |
| Mass of initial magnesium sulfate hydrate (g) (before heating) |  |  |  |
| Mass of crucible and magnesium sulfate after heating (g) |  |  |  |
| Final mass of anhydrous (dry) magnesium sulfate (g) |  |  |  |
| Mass of water released during heating |  |  |  |

Average mass of three trials of anhydrous magnesium sulfate

Average number of moles of three trials of anhydrous magnesium sulfate

Average mass of three trials of water released

Average number of moles of three trials of water released

Analysis:

A well thought out evaluation of data collected. Identify all trends or outliers in the data. Did you achieve the results expected? Compare the average mass of the anhydrous magnesium sulfate with the mass of water released. Reflect upon the experiment and identify at least two possible errors that affected your measurements. As you reflect back upon the procedure and how you communicated and worked with your partner, identify at least two suggestions for improvement in the future that would improve your results, and make the lab run more efficiently.

Analysis needs to be in essay format using complete sentences with appropriate grammar and punctuation. Do not repeat the steps from your procedure.