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AP LAB 01C: Empirical formula of a hydrated salt

Aim To determine the formula of a hydrated salt

Apparatus Test tube, test tube holder, Bunsen burner, spatula, goggles, electronic balance

Chemicals Hydrated magnesium sulfate (Epsom salts)

Method

1. Weigh an empty test tube on the electronic balance. Record the mass.

2. Add approximately 3.00 g of the hydrated magnesium sulfate to the test tube and record the total mass.

3. To avoid splattering, *gently* heat the test tube and its contents using the blue Bunsen flame (by wafting the test tube back and forth in the flame) for approximately two minutes, record your observations. As much as possible, avoid over-heating and/or discoloring the salt.

4. **Allow the test tube to cool for about five minutes**. Record the mass using the electronic balance. **DO NOT PLACE HOT TEST TUBES ON THE ELECTRONIC BALANCES.**

5. Repeat steps #3 and #4 as necessary, until a constant mass is obtained. (A constant mass is one that after repeated, heating, cooling and re-weighing, stays the same).

6. Repeat the whole procedure for a second sample of the salt.

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Results

Observations

	1st Sample	2nd Sample
Mass of empty test tube		
Mass of test tube + hydrated salt BEFORE heating		
Mass of test tube + salt after first heating and cooling cycle		
Mass of test tube + salt after second heating and cooling cycle		
Mass of test tube + salt after third heating and cooling cycle		
Mass of test tube + salt after fourth heating and cooling cycle		
Mass of test tube + salt after fifth heating and cooling cycle		
Mass of test tube + salt after sixth heating and cooling cycle.		
etc.		

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Conclusion/Calculation

1. Perform the calculations below.

1st Sample	2nd Sample
(i) Calculate the mass of hydrated salt added to the test tube at the start of the experiment.	
(ii) Calculate the mass of the anhydrous (without water) salt at the end of the experiment.	
(iii) Calculate the mass of water driven off by heating the hydrated salt.	
(iv) Calculate the moles of the anhydrous (without water) salt present.	
(v) Calculate the moles of water driven off by heating.	
(vi) Compare your answers to (iv) & (v) in order to determine the formula of the hydrated salt.	

2. In another similar experiment, a student heats the hydrated salt carelessly and some of the salt spits out of the test tube. What would be the effect of this experimental error on the calculation of the formula of the hydrated salt?

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