

Revised August 2012



HONORS WORKSHEET 4f: Hydrated salts



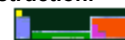
QUESTION 1

Sodium carbonate is found as a hydrated salt, $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$.

A student carefully heats a 0.286 g sample of the hydrated salt to a constant mass of 0.106 g.

- What is meant by constant mass? Why is achieving a constant mass, important? (2)
- How many moles are there in 0.106 g of anhydrous sodium carbonate? (2)
- What mass of water is lost during the heating of the hydrated salt? (1)
- How many moles of water were lost? (2)
- What is the value of x in the formula of the hydrated salt? Explain your answer. (4)

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QUESTION 2

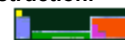
(a) Use the data below to calculate the value of b , in the formula $\text{BaCl}_2 \cdot b\text{H}_2\text{O}$. (6)

| | |
|---|-----------------|
| Mass of empty crucible | 29.280 g |
| Mass of empty crucible plus hydrated barium chloride | 30.500 g |
| Mass of crucible plus contents after first heating | 30.444 g |
| Mass of crucible plus contents after second heating | 36.145 g |
| Mass of crucible plus contents after third heating | 30.320 g |
| Mass of crucible plus contents after fourth heating | 30.320 g |

(b) One of the pieces of data in (a) contains an error. Which piece? Explain. (2)

(c) In another experiment the student heated the salt in a careless manner and a large portion of it splattered out of the crucible. Would he calculate b to be too large or too small if he failed to realize the mistake? Explain. (2)

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QUESTION 3

When a sample of a hydrated salt with the formula $\text{MgSO}_4 \cdot y\text{H}_2\text{O}$ is heated until all of the water is removed, it loses 51.22 % of its mass. Calculate the value of y . (4)