

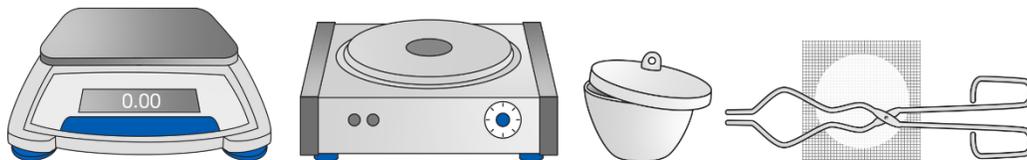
6C – PERCENT COMPOSITION OF A HYDRATE

INQUIRY

How can you tell the percentage of a portion of a compound?

MATERIALS

- Heater stirrer
- Balance (readability: 0.01 g)
- Crucible and cover
- Crucible tongs
- Wire gauze
- Sample of $\text{CuSO}_4 \cdot ?\text{H}_2\text{O}$



BACKGROUND

A major emphasis of laboratory work for a chemist is determining the chemical composition of a compound. There are many tools such as chromatographic separation and spectroscopy, and several techniques such as heating, available to aid the chemist in determining chemical composition. By keeping track of mass and breaking a compound down into its component pieces, the pieces can be measured and the composition of the compound can be determined.

SAFETY

Follow these important precautions in addition to your regular lab safety procedures.

- Wear safety goggles at all times.
- If the crucible tips off the heater stirrer, just let it fall. Do not try to grab it with your hands while it is hot.
- Do not place the hot crucible directly on the table. Use the wire gauze beneath the hot crucible.

PROCEDURE

1. Measure and record the mass of the crucible and cover in Table 1 on your answer sheet.
2. Remove the cover and tare the balance with only the crucible on it to eliminate the mass of the crucible. Measure the assigned amount of hydrate directly into the crucible. Record the mass of the hydrate crystals in Table 1.
3. Remove the crucible and hydrate from the balance and tare it. Measure and record the mass of the crucible with its cover and crystals in Table.
4. What color are the majority of the hydrate crystals? Record your answer in the space provided above Table 1.
5. Turn on the heater to a medium/high heat setting.
6. Place the crucible with cover tilted open on the heater. Heat for 5-10 minutes.
7. Use tongs to first remove the crucible cover and then the crucible from the heater. Place both on the wire gauze to cool.

PROCEDURE

- Record the mass of the crucible with its cover in Table 1 when cool to the touch.
- Place the crucible, cover and hydrate on the heater for an additional 5-10 minutes of heating. Calculate the mass of crystals after heating and change in crystal mass for the previous trial while you wait. Record your answers in Table 1.
- Continue steps 7 - 9 until the mass of the hydrate is equal to the mass of anhydrous crystals (no change in mass). Record data in Table 1. Assume the mass of the crucible with its cover is constant.
- When you complete your final trial, record the color of the crystals in the space provided and complete Table 1. To get the total change in mass, subtract the final crystal mass after heating from the mass of crystals before heating in Trial 1.
- Exchange the initial crystal mass from Trial 1, final crystal mass after heating and total change in crystal mass with three other lab groups to complete Table 2: Class data. Calculate class averages and enter them in Table 2 on your answer sheet.

ANALYSIS

Complete the analysis on your answer sheet.

QUESTIONS

Answer the questions on your answer sheet.