Learning objectives

- To gain an understanding of the requirements of your chosen subject in preparation for a September start

Key words:

Preparation

Organisation

Punctuality

Commitment

Success

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Explanation

Core Expectations for **Every Lesson**

1. Attend lessons on time and in professional attire
2. Be prepared for each lesson by ensuring you bring the appropriate equipment
3. Ensure all work is organised in the appropriate section of your subject folder
4. All deadlines must be met to avoid a 6 week “Risk of Failure” program
5. Respect the classroom, Replace chairs, Rubbish in bins
6. Speak to **ALL** members of the HT community with respect
7. No mobile phones/ear pods to be used in lessons or around the school
8. Starters are to be completed in silence
9. Be proactive and not reactive
10. Expect to work harder than you ever have before

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Explanation

Task: To determine the 'water of crystallisation' of a hydrated salt.

A hydrated salt is one in which the ions in its crystalline structure are coupled with a set number of water molecules

These water molecules are not just physically trapped in the crystal lattice, but are an integral part of the crystal structure. They play a crucial role in the formation and stability of the crystal. Without these water molecules, the crystal structure would not form or would be significantly different.

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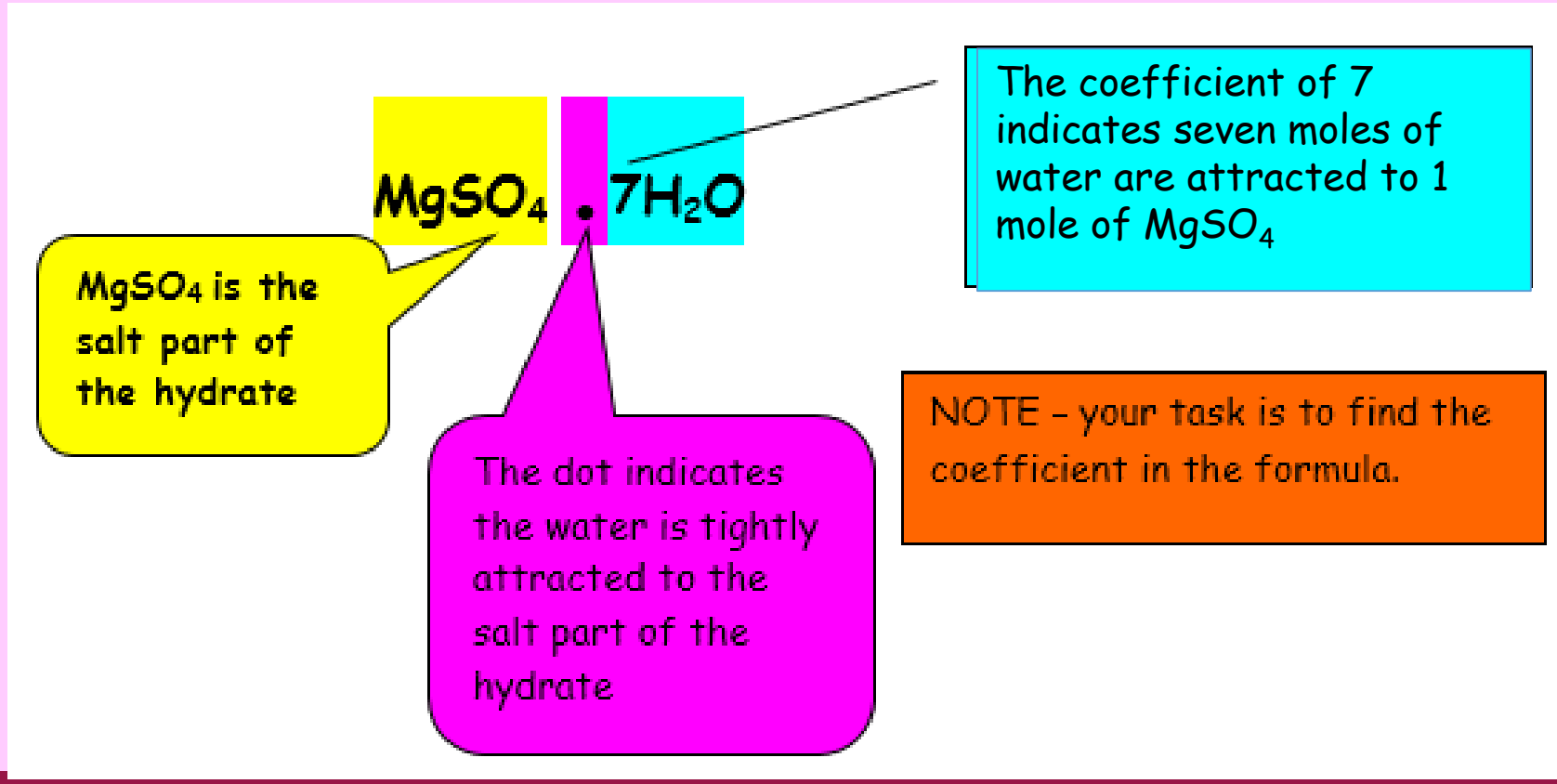
Task: To determine the 'water of crystallisation' of a hydrated salt.



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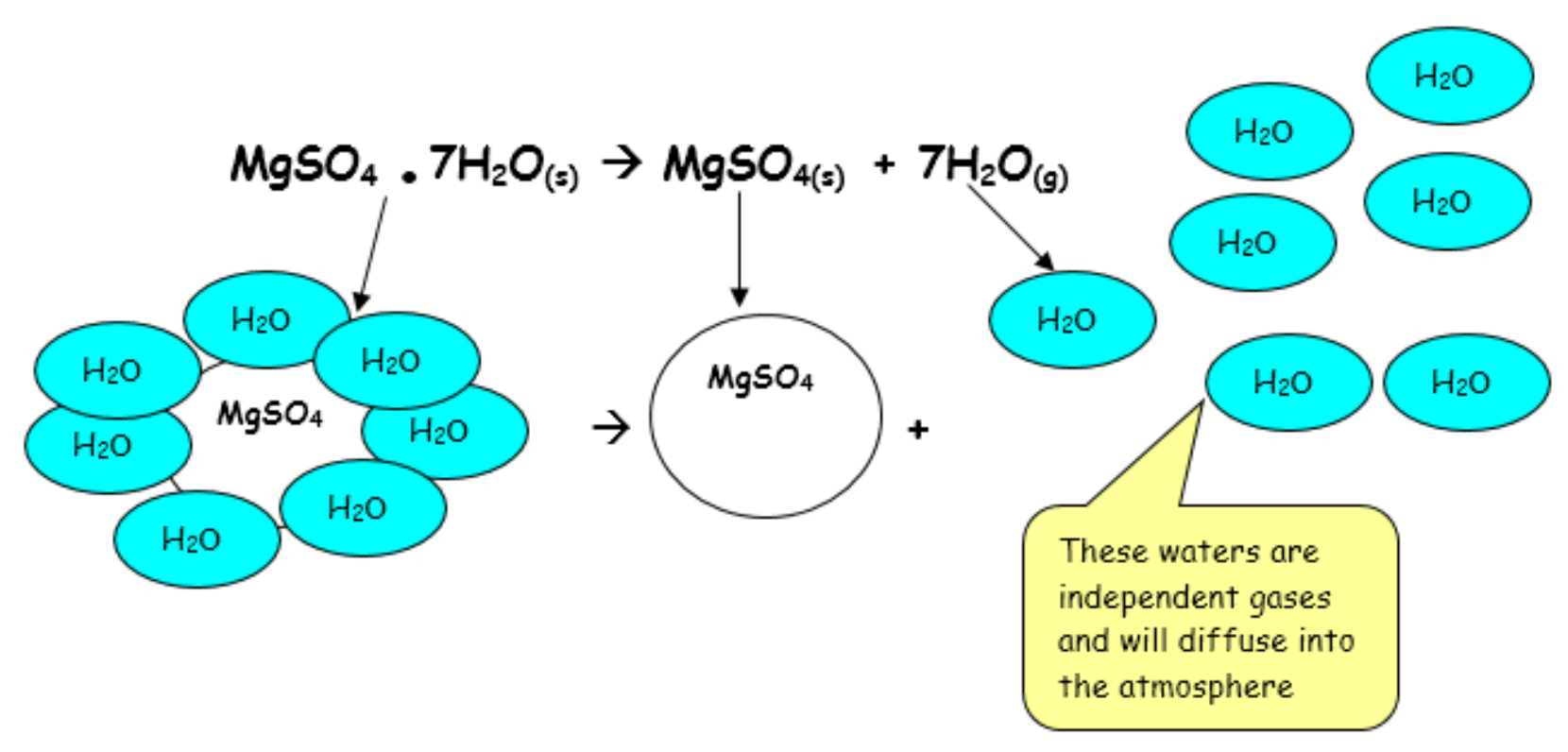
Explanation

What conditions would you need to make these products?



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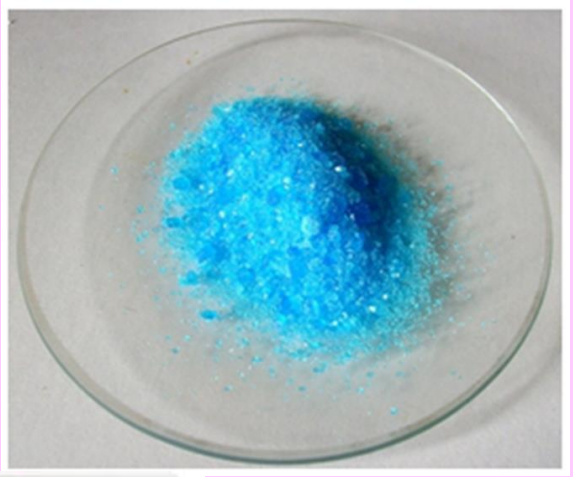
Explanation

This is hydrated copper sulfate. The copper sulfate molecules have water molecules bonded to them. Your task is to work out how many water molecules are bonded to every 1 copper sulfate molecule.



Calculate the Mr of:

- $CuSO_4$
- H_2O

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Explanation

Your aim:

To calculate the number of water molecules bound to a copper sulphate salt. To do this you will find the mass of hydrous and anhydrous copper sulphate salt allowing you to find the number of moles of water present for each mole of the salt.

$$CuSO_4 \cdot xH_2O$$

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Heating to Constant Mass:

A cycle of

a. Heating for one min.
b. Cooling for one min.
c. Record the mass using a balance.
d. Repeat the steps until the mass is constant for three measurements.

1) Record the mass of your evaporating dish.
2) Add the copper sulphate salt to the evaporating dish till ~ 2.0 grams have been added. Record the total mass of the evaporating dish with its contents.
3) Heat the evaporating dish on a ceramic triangle. It is normal for the triangle and evaporating dish to emit an orange glow. It is important to **AGITATE** the hydrate during the heating. Do this by gently shaking the evaporating dish that is cradled in evaporating dish tongs.
4) After heating for about two minutes, cool and record the mass of the evaporating dish with its contents. Then heat to constant mass; be certain to record each mass during the process. The anhydrous form of the salt should be white

Measurement	Mass/g
Evaporating dish	
Evaporating dish + salt	
Salt	
Constant mass of dish and salt	
Constant mass of anhydrous salt	
Water	

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Explanation

Calculate the formula of the hydrated salt

Example:

A 15.67g sample of a hydrate of magnesium carbonate was heated, without decomposing the carbonate, to drive off the water. The mass was reduced to 7.58 g. What is the formula of the hydrate?

Solution:

1) Determine mass of water driven off:

15.67g - 7.58g = 8.09g of water

2) Determine moles of $MgCO_3$ and water using n = m/Mr

$MgCO_3 \Rightarrow 7.58\ g / 84.313 = 0.0899$ moles

$H_2O \Rightarrow 8.09\ g / 18.015\ g = 0.449$ moles

3) Find a whole number molar ratio:

$MgCO_3 \Rightarrow 0.0899\ mol / 0.0899\ mol = 1$

$H_2O \Rightarrow 0.449\ mol / 0.0899\ mol = 5$

$MgCO_3 \cdot 5H_2O$

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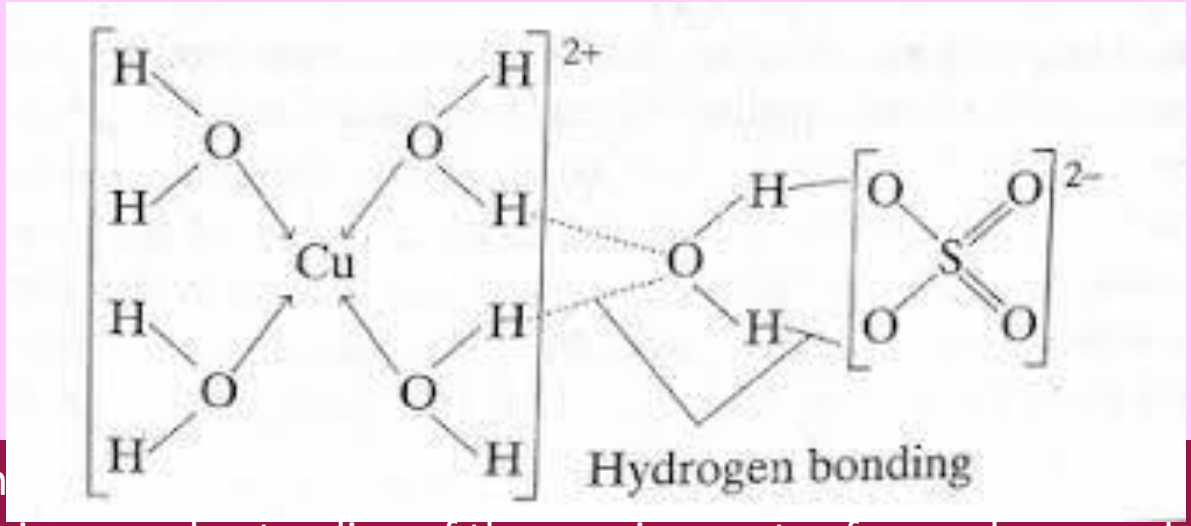
Checking Progress

$$CuSO_4 \cdot 5H_2O$$



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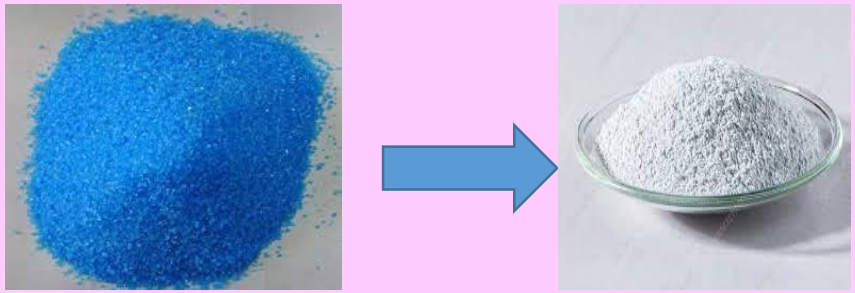

What could you do to reverse this reaction?

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https://edu.rsc.org/future-in-chemistry/career-options/job-profiles

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