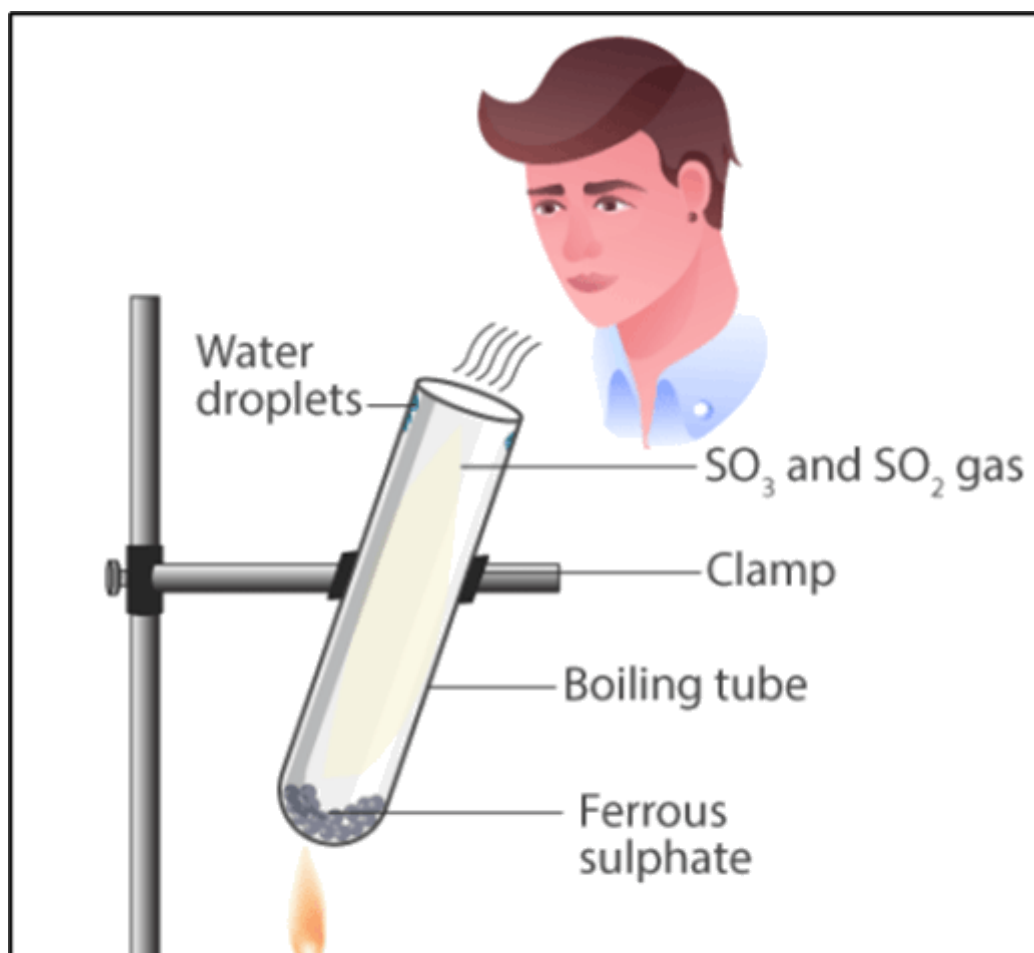
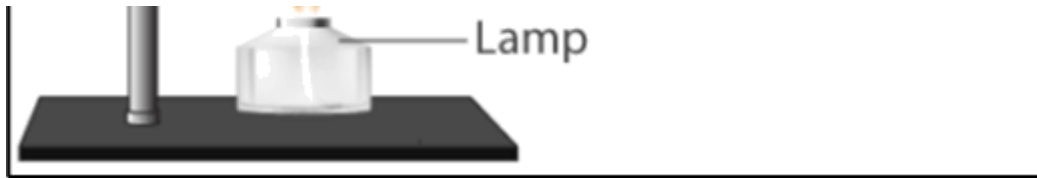


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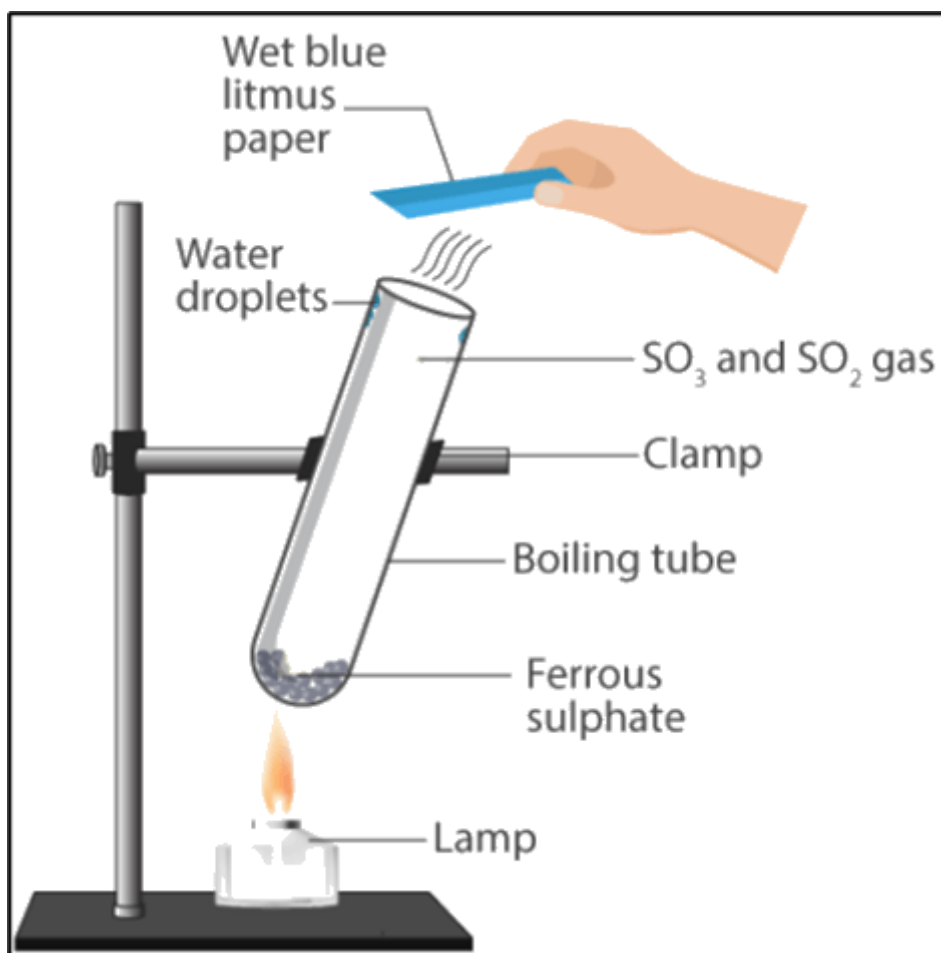
### Types of Decomposition, Materials Required, Theory, Precautions to be Taken During the Experiment (For CBSE, ICSE, IAS, NET, NRA 2022)

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## Materials Required

- Ferrous sulphate crystals
- Test tube holder
- Boiling tube
- Bunsen burner
- Safety glass
- Litmus paper strips

## Theory

- Ferrous sulphate crystals are ferrous sulphate heptahydrate with a chemical formula  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  and are green in colour.
- On heating the ferrous sulphate heptahydrate it loses seven water molecules to form anhydrous ferrous sulphate ( $\text{FeSO}_4$ ) and is white in colour. The reaction is as follows:

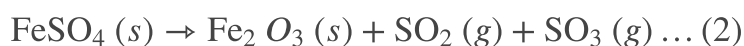
Heat



(Green colour) (white colour)

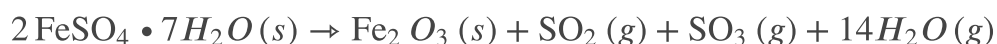
Ferrous sulphate when heated is decomposed to ferric oxide, Sulphur trioxide, and Sulphur dioxide. The reaction is as follows:

Heat



(White colour) (brown colour) (colourless) (colourless)

- In the reaction (2) one substance  $\text{FeSO}_4$  (Ferrous sulphate) splits into three substances ferric oxide ( $\text{Fe}_2\text{O}_3$ ), sulphur dioxide ( $\text{SO}_2$ ), and sulphur trioxide ( $\text{SO}_3$ ) due to heat. Therefore, this reaction is called decomposition reaction or also known as a thermal decomposition reaction.
- We can combine reaction (1) and (2) and write it as follows:



## Procedure

- Wash a boiling tube with distilled water and dry it.
- Take 2 grams of ferrous sulphate crystals in the tube.
- Make a note of the colour of the crystals.
- Use a test tube holder to hold the boiling tube.
- Heat the boiling tube on the Bunsen burner as shown in the figure.

- Observe the colour of the residue got and smell the odour of the gases evolved.
- Tiny colourless water droplets are seen near the neck of the tube.
- Gently turn it towards your nose and smell for any gas evolved.
- Wet blue and red litmus paper strips.
- Hold the litmus paper strips near the mouth of the boiling tube.
- Observe the change
- Classify the type of reaction.

### Observation

Experiment	Observation
Boiling tube test	Colour of Ferrous sulphate crystals changes from green to white and later brown. The gas evolved smells like burning Sulphur.
Litmus paper test	Blue litmus paper strip turns red when comes in contact with gas.
<i>Observation</i>	

### Result and Conclusion

From the above experiment 3 (B) we can conclude that the reaction occurred on heating ferrous sulphate crystals is decomposition reaction which decomposes to produce  $Fe_2O_3$ ,  $SO_2$ , and  $SO_3$ . Since this decomposition reaction is carried out by heating it is also known as a thermal decomposition reaction.

### Precautions to be Taken During the Experiment

- Do not keep the mouth of the boiling tube towards yourself.
- Do not smell the gas by directly getting it under your nose but gently turn it towards your nose and blow it with your hand.
- Wearing safety glasses is important while you are performing this experiment.
- Thoroughly wash the boiling tube with distilled water and dry it before using it.
- Use good quality boiling tube while heating the ferrous sulphate crystals.
- Take care to keep the Sulphur dioxide and Sulphur trioxide gas coming in contact with your eyes as they cause irritation to eyes.

### Questions

Can You Write the Formula of Ferrous Sulphate Crystals?

**Ans:**  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ .

Ferrous Sulphate Crystals Are Also Called \_\_\_\_\_

**Ans:** Green vitriol.

Name the Two Gases Evolved During the Decomposition Reaction

**Ans:** Sulphur dioxide and Sulphur trioxide.

What is the Colour of the Residue Left in the Boiling Tube After the Decomposition Reaction?

**Ans:** Brown.

Decomposition Reaction is Also Known as \_\_\_\_\_

**Ans:** Thermal decomposition reaction.

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