

# Puspa Shrestha

Best Quality Resource Site for Class 11 And 12 Students  
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Puspa Shrestha

## EXPERIMENT NO. 10

NAME OF EXPERIMENT: TO PREPARE H<sub>2</sub>S GAS AND STUDY ITS PROPERTIES

### APPARATUS REQUIRED

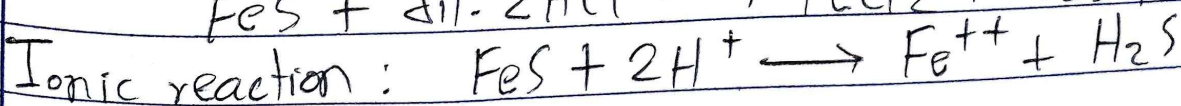
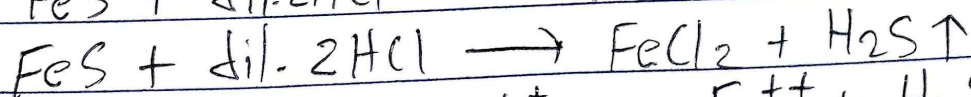
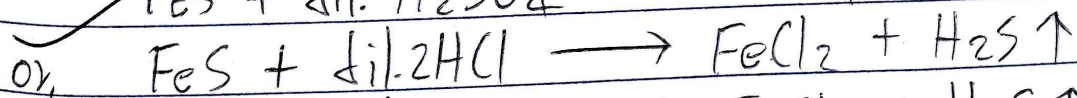
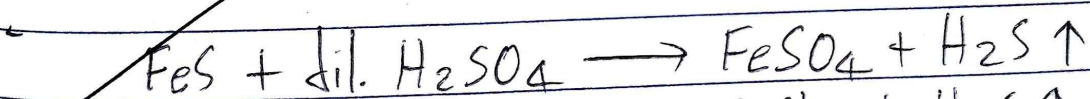
1. Woulfe's bottle
2. Thistle funnel
3. Delivery tube.
4. Gas jar

### CHEMICALS REQUIRED

1. Iron sulphide
2. Lead acetate solution
3. Dilute H<sub>2</sub>SO<sub>4</sub>
4. KMnO<sub>4</sub> solution
5. K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution
6. FeCl<sub>3</sub> solution
7. CuSO<sub>4</sub> solution
8. NiSO<sub>4</sub> solution
9. ZnSO<sub>4</sub> solution

### THEORY

Most of the metallic sulphides are decomposed by dilute acids and produce H<sub>2</sub>S gas. In laboratory, it is prepared by the action of dilute HCl or dilute H<sub>2</sub>SO<sub>4</sub> on iron sulphide. The gas is collected by upward displacement of air since it is water soluble and slightly heavier than air.



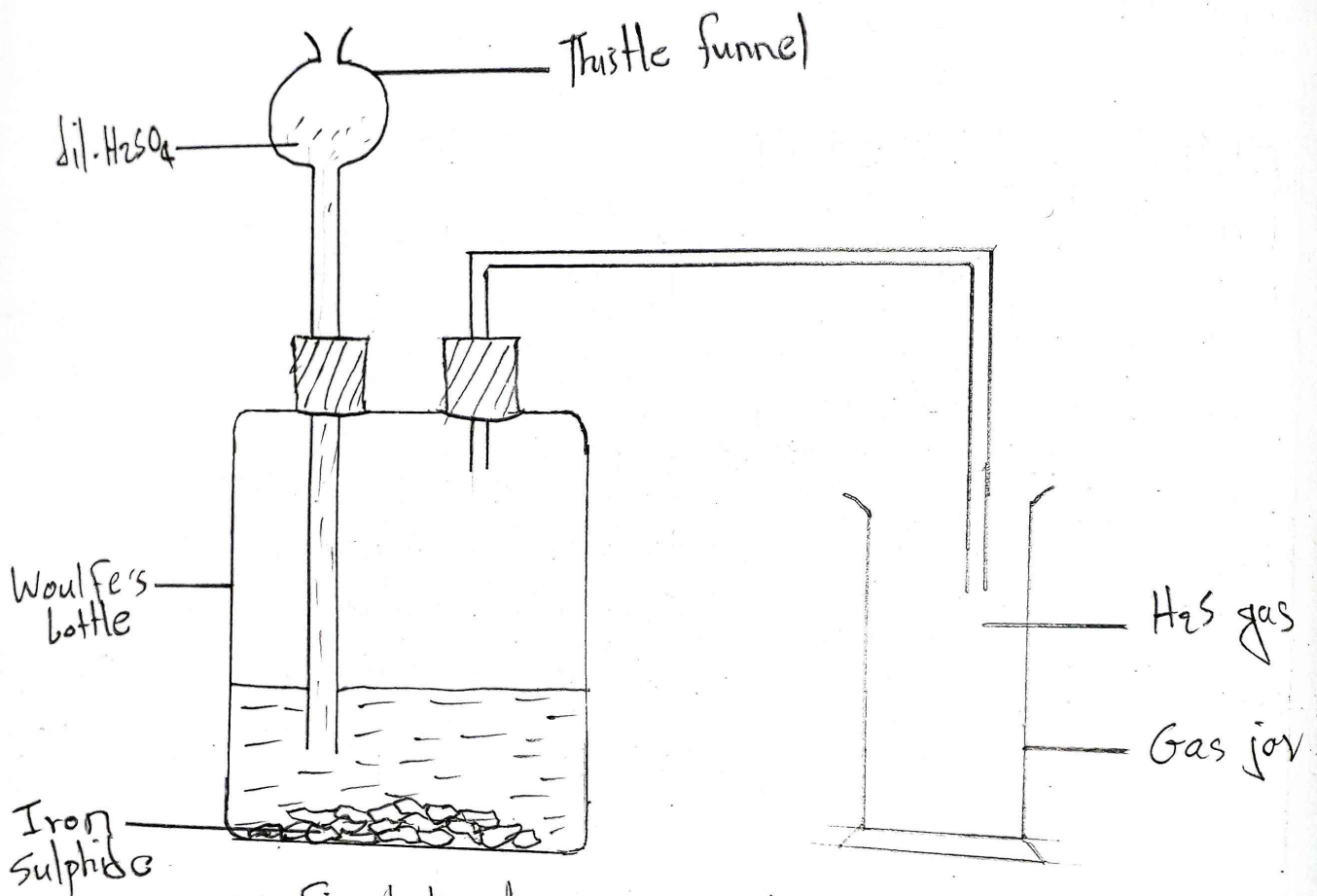


fig. Laboratory preparation of H<sub>2</sub>S gas.

PROCESS

The apparatus was fitted as shown in figure. The apparatus was made airtight and some pieces of iron sulphide were put on the woulfer's bottle. Dilute  $H_2SO_4$  was poured down from the thistle funnel such that the lower end of the funnel dipped under the acid. The  $H_2S$  gas was collected in the gas jar by upward displacement of air. Lead acetate paper was taken near the mouth of the gas jar. As the jar was filled with  $H_2S$  gas, the paper gave shining black colour. The following experiments were conducted to study the properties of the gas.

OBSERVATIONS

Experiment	Observation	Inference
1. The colour and odour of the gas was noted	1. No colour but had rotten egg smell.	1. $H_2S$ gas is colourless but has smell of rotten egg.
2. A lighted candle was introduced into the jar of $H_2S$ .	2. The candle was extinguished but the gas was burned with pale yellow flame on the mouth of the jar.	2. The gas is combustible but not the supporter of combustion.
3. The $H_2S$ gas jar was inverted over water and shaken.	3. Water was risen up in the jar slowly.	3. It is slightly soluble in water.
4. A moist blue litmus	4. Blue litmus turned	4. It is weak acid.

paper was introduced into faint red.  
into the jar of  $H_2S$ .

5. The lead acetate paper was put into the jar of  $H_2S$ .

5. The paper was turned into shining black.

5. It forms insoluble lead sulphide with lead acetate solution.

Reducing properties of  $H_2S$ :

6.  $H_2S$  gas was passed through dilute  $KMnO_4$  solution acidified with dilute  $H_2SO_4$ .

6. The pink colour of  $KMnO_4$  solution was discharged and yellowish white substance was precipitated out.

6.  $H_2S$  reduces acidified  $KMnO_4$  solution.

7.  $H_2S$  gas was passed through dilute  $K_2Cr_2O_7$  solution acidified with dilute  $H_2SO_4$ .

7. The orange colour of  $K_2Cr_2O_7$  solution was changed to green colour.

7.  $H_2S$  reduces acidified  $K_2Cr_2O_7$  solution.

8.  $H_2S$  gas was passed through  $FeCl_3$  solution.

8. The reddish brown colour of  $FeCl_3$  was slowly changed to pale yellow turbidity.

8.  $H_2S$  reduces ferric salts to ferrous salts.

~~8.  $H_2S$  gas as analytical reagent:~~

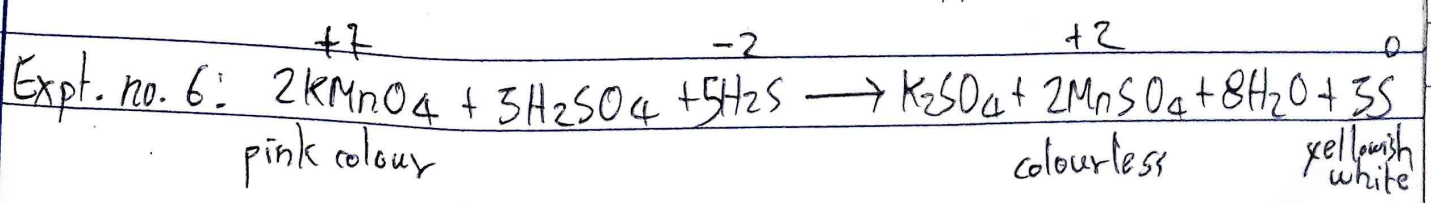
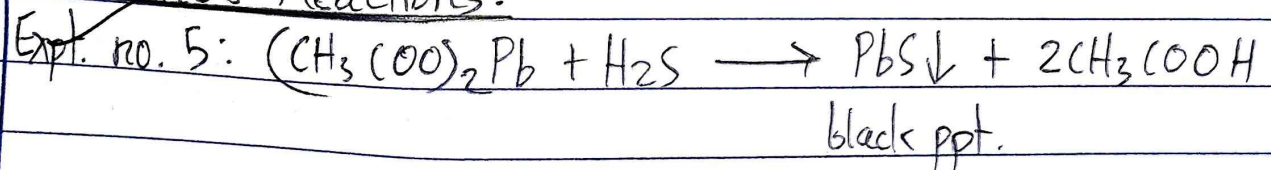
9.  $H_2S$  gas was passed into the  $CuSO_4$  solution acidified with few drops of dilute  $HCl$ .

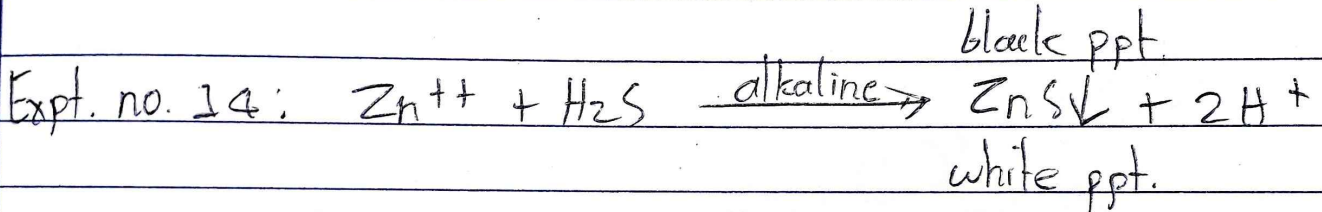
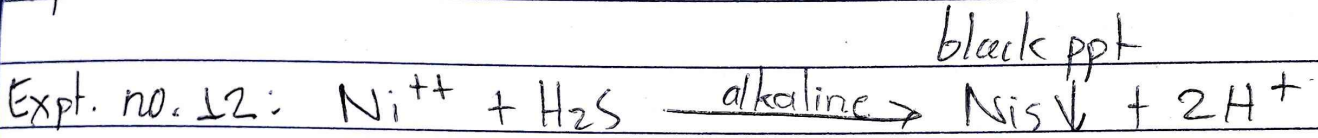
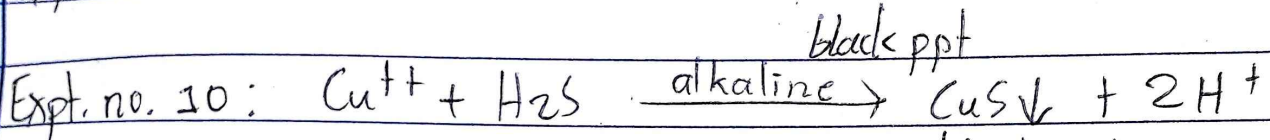
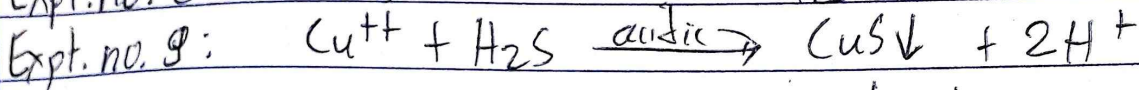
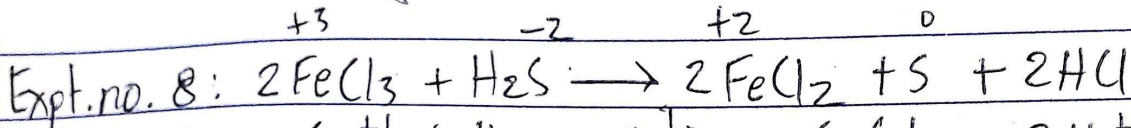
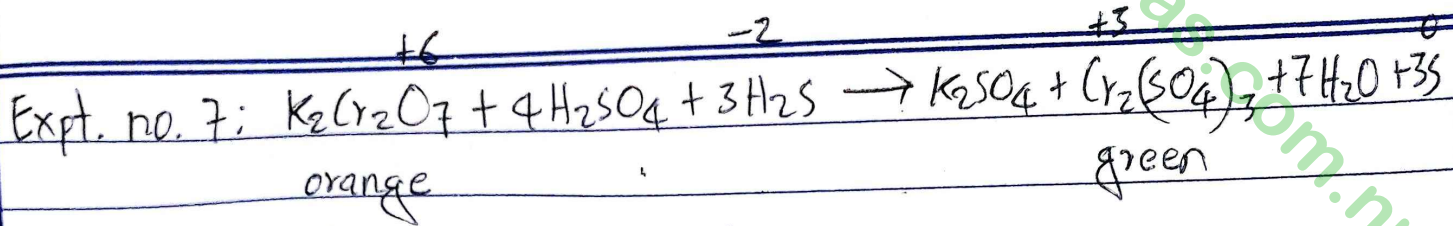
9. It gave black ppt.

9. Insoluble copper sulphide is formed.

10. H <sub>2</sub> S gas was passed to a test tube containing CuSO <sub>4</sub> solution made alkaline with NH <sub>4</sub> OH.	10. It gave black ppt.	10. Insoluble copper sulphide is formed.
11. H <sub>2</sub> S gas was passed into the NiSO <sub>4</sub> solution acidified with a few drops of dilute HCl.	11. No ppt.	11. No reaction in acidic medium
12. H <sub>2</sub> S gas was passed into NiSO <sub>4</sub> solution made alkaline with NH <sub>4</sub> OH.	12. Black ppt was formed.	12. In alkaline medium, H <sub>2</sub> S produces more S <sup>2-</sup> which is sufficient to precipitate NiS.
13. H <sub>2</sub> S gas was passed through acidified ZnSO <sub>4</sub> solution.	13. No ppt.	13. No reaction of H <sub>2</sub> S in acidic medium.
14. H <sub>2</sub> S gas was passed through ZnSO <sub>4</sub> solution made alkaline with NH <sub>4</sub> OH.	14. White ppt was formed.	14. Formation of ZnS in alkaline medium.

Concerned Reactions:





## RESULT

Hydrogen sulphide gas was prepared in laboratory by the action of dilute HCl or dilute H<sub>2</sub>SO<sub>4</sub> on iron sulphide and its properties were studied.

## PRECAUTIONS

1. All glasswares should be handled with care.
2. The lower end of the thistle funnel should dip into the acid.
3. The apparatus should be airtight.
4. The gas should not be inhaled directly.

*[Signature]*