To Prepare Colloidal Solution of Arsenious Sulphide, [$As_2 S_3$]

Theory

Arsenious sulpide, As_2S_3 is a lyophobic colloid. It is obtained by the hydrolysis of arsenious oxide (AS_20_3) with boiling distilled water, followed by passing H_2S gas through the solution obtained.

$$As_2O_3 + 3H_2O \xrightarrow{\text{Boil}} 2As(OH)_3$$

$$2As(OH)_3 + 3H_2S \longrightarrow \underset{\text{(Light yellow sol)}}{As_2S_3} + 6H_2O$$

In the colloidal solution of arsenious sulphide, each particle is surrounded by HS- ions, produced by the dissociation of H_2S. This sulphide ion layer is further surrounded by the counter ion layer of H+ ions.

Apparatus

Conical flasks (250 ml), beaker (250 ml), round-bottom flask (500 ml), glass-rod, funnel, glass tubing, filter-paper, tripod stand, wire-gauze, iron stand with clamp, burner, etc.

Materials Required

Solid arsenious oxide, H_2S gas and distilled water.

Procedure

1. Clean a conical flask (250 ml) by the use of steaming-out process.
2. To this cleaned flask, add 0.2 g of As_20_3 solid and add 100 ml of distilled water.

3. Boil the solution for about 10 minutes (Fig).

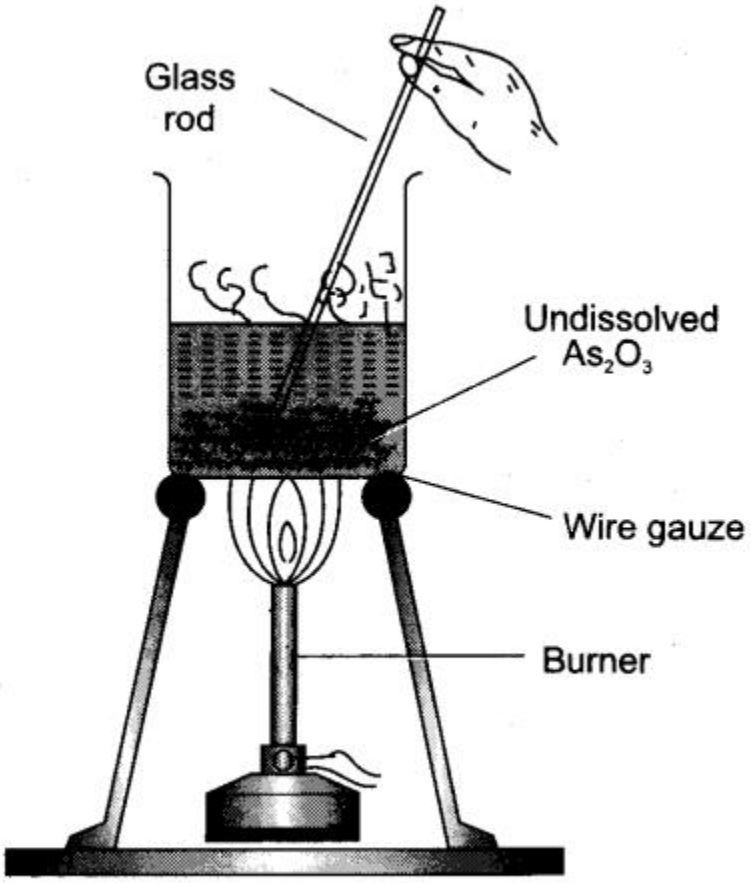

Fig.

4. Filter the above hot solution through flutted filter paper and receive the filtrate in another beaker (Fig).

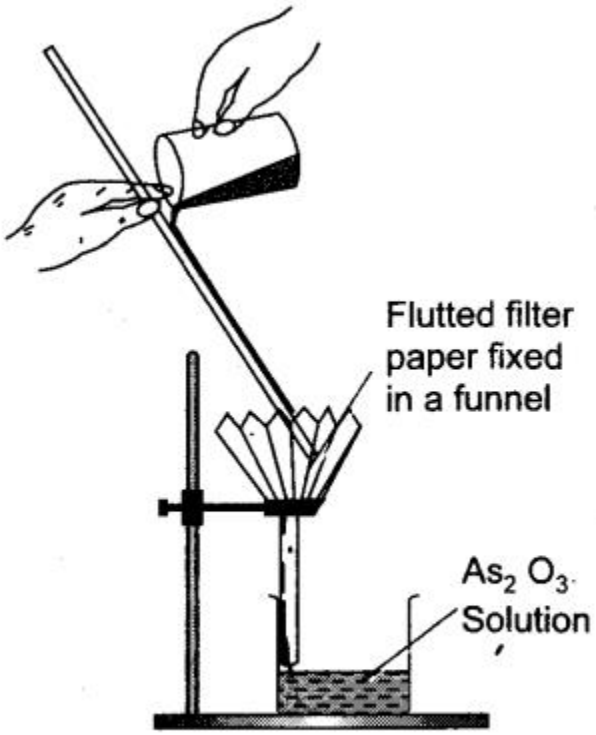

Fig.

5. Pass a slow current of H_2S into As_20_3 solution as shown in Fig.

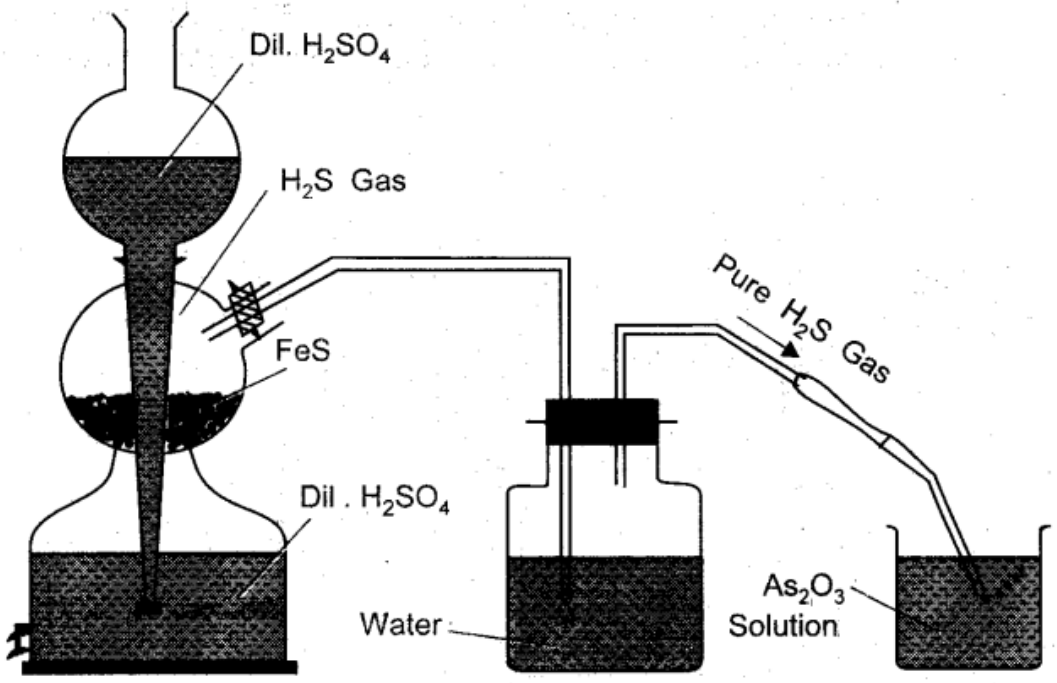

Fig. Preparation of As_2S_3 sol.

The solution develops a yellow colour due to formation of As_2S_3. Continue passing H_2S till the intensity of colour does not change further.

6. Expel excess of H_2S gas from the sol by boiling the sol till the escaping gas does not turn lead acetate paper black.
7. Filter the solution through flutted-filter paper and collect the bright yellow filtrate in a dry conical flask and cork it. Label it as “Arsenious Sulphide Sol”.

Precautions

1. Use cleaned apparatus since As_2S_3 sol is affected by even traces of impurities.
2. Handle arsenious oxide with care since it is highly poisonous. Wash your hands immediately every time after handling this chemical. While doing this experiment do not eat or drink anything.