

Preparation of Salts

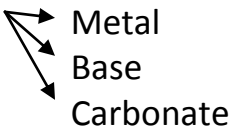
The method of preparation of salt depends on whether the salt is soluble in water or not.

Soluble and insoluble salts:

Salt	Soluble/Insoluble	Exceptions	
Nitrates	Soluble		
Chlorides	Soluble	Except	<i>Silver</i>
			<i>Lead</i>
			<i>Mercury</i>
Sulphates	Soluble	Except	<i>Barium</i>
			<i>Lead</i>
			<i>Calcium</i>
Carbonates	Insoluble	Except	<i>Sodium</i>
			<i>Potassium</i>
			<i>Ammonium</i>
All sodium, potassium and ammonium salts are soluble			

1. Preparation of soluble salts:

Soluble salts are prepared by reacting **insoluble solid** with dilute acid.

The insoluble solid can be a 

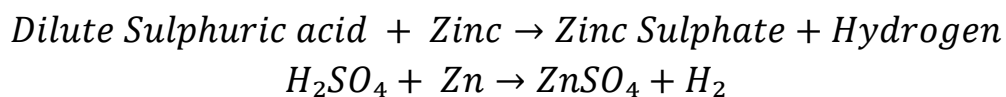
- Reacting dilute acid with a fairly reactive metal

A fairly reactive metal such as magnesium, zinc and iron can be used. For metals below hydrogen in the reactivity series, no reaction occurs.

Metals more reactive produce very vigorous reactions which are dangerous to carry in the lab.

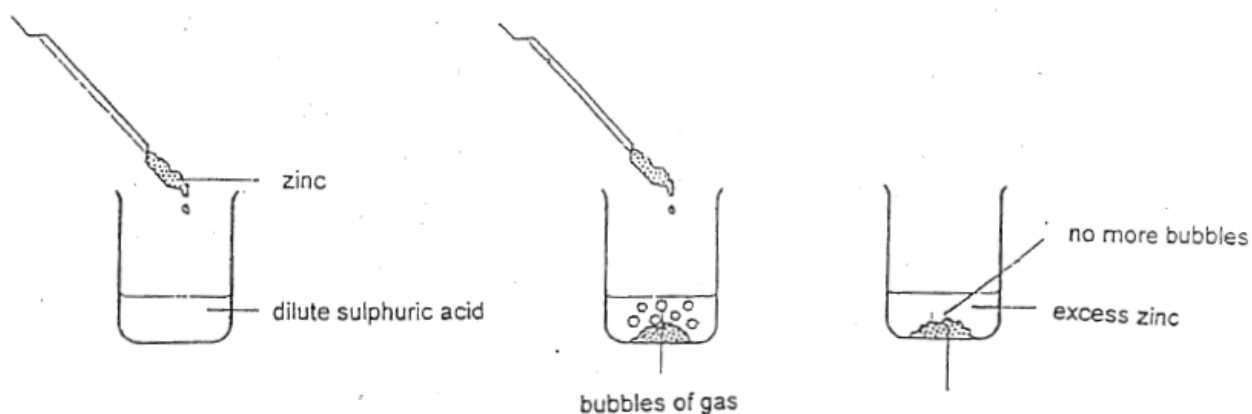


E.g. The preparation of zinc sulphate:



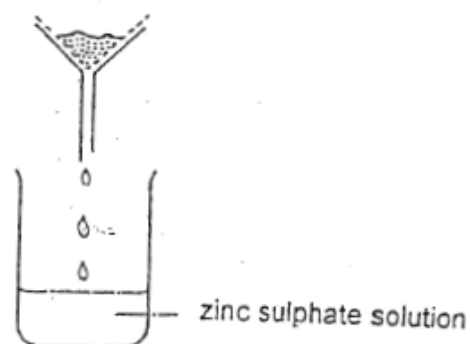
Step 1:

Add excess zinc is added to dilute acid in beaker until reaction stops (no fizzing)



Step 2:

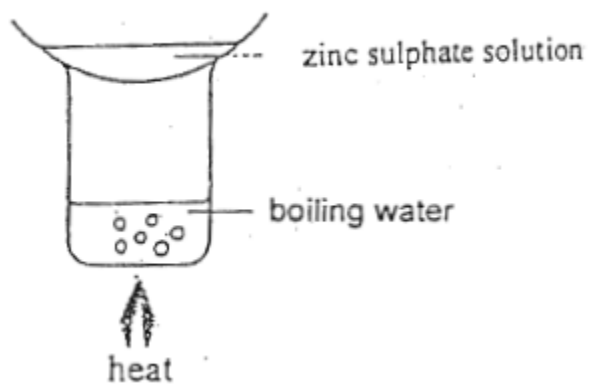
Filter off the excess zinc and collect the filtrate.



Step 3:

Evapourate off most of the water using a hot water bath

Leave the remaining solution to cool down and the salt to crystallize out. Filter the crystals and dry them on filter paper.

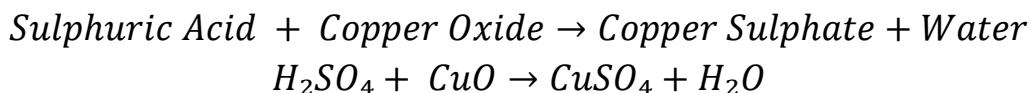


- Reacting a dilute acid with an **Insoluble** base

The reaction here is the same as in 1) but with heating to speed up the reaction. The base neutralizes the acid.

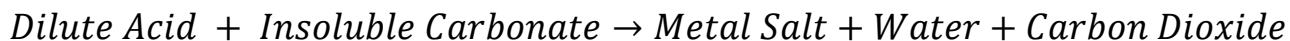


e.g. Preparation of copper (II) sulphate

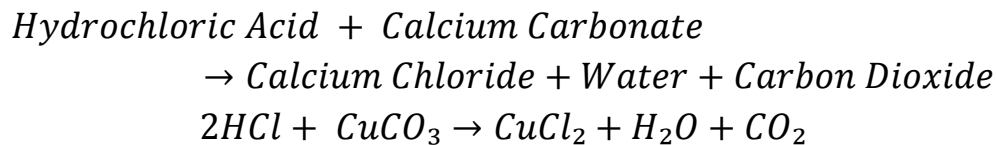


- Reacting dilute acid with an **insoluble** carbonate

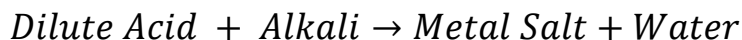
The procedure is the same as in 1)



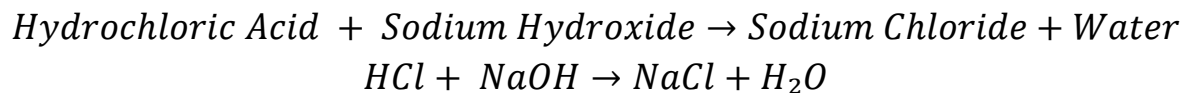
e.g. Preparation of Calcium Chloride



- Reacting dilute acid with an **alkali (soluble** base)



E.g. Preparation of sodium chloride



Procedure (this is called titration):

Step 1:

Fill a burette with dilute acid to zero mark.

Step 2:

Put 25 cm³ of dilute sodium hydroxide into a conical flask with a pipette.

Step 3:

Add few drops of a suitable indicator such as universal indicator.

Step 4:

Run the acid from the burette into the flask of alkali until one or more drop of acid is enough to turn the indicator from violet to green.

Step 5:

The volume of acid used to neutralize the 25 cm³ of alkali is noted. E.g. 23 cm³ of HCl

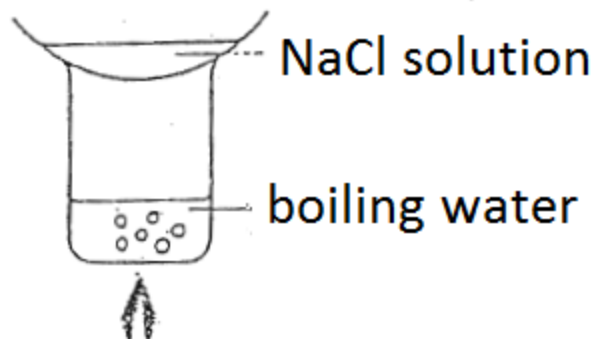
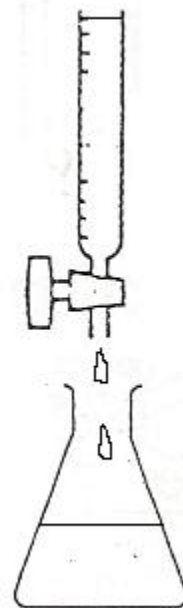
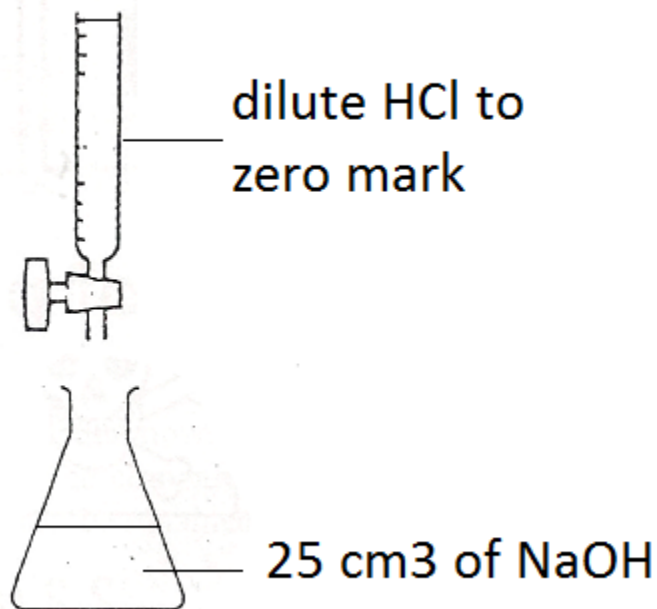
Step 6:

The process is repeated with the volume noted for the acid and the same volume of alkali used, but without the indicator.

Step 7:

Evaporate most of the water from the solution using a hot water bath in a crystallizing dish.

Let the solution cool and crystallize out. Filter the crystals on a filter paper and dry them.



2. Preparation of **insoluble** salts:

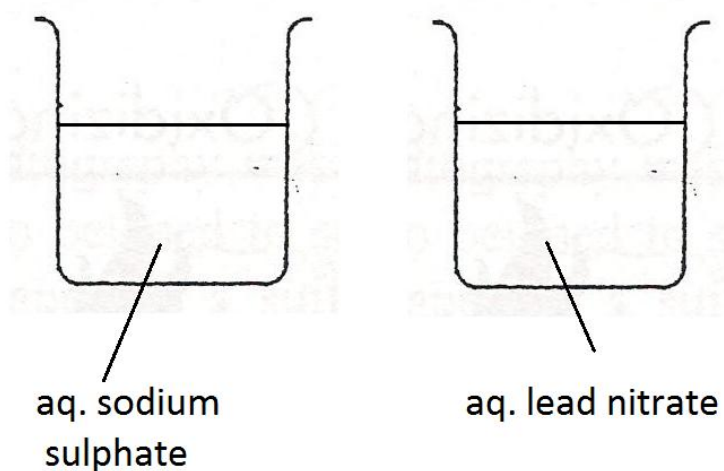
Insoluble salts are prepared by mixing 2 soluble salts together, each containing half the needed salt.

This process is called precipitation.

e.g. Preparation of insoluble lead sulphate (PbSO_4):

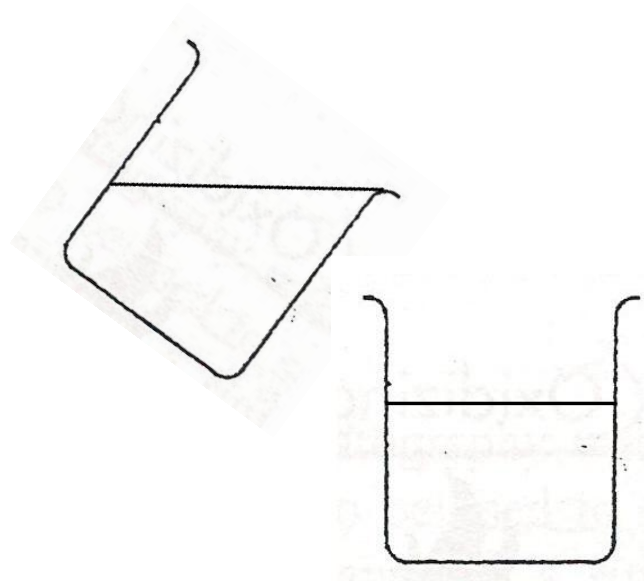
Step 1:

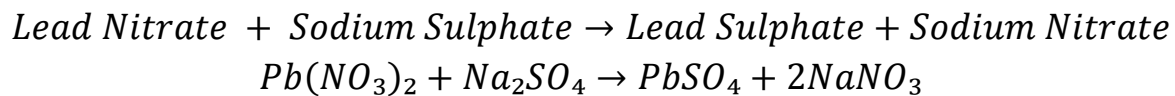
Choose 2 suitable soluble salts, e.g. lead nitrate and sodium sulphate. Make aqueous solutions of both.



Step 2:

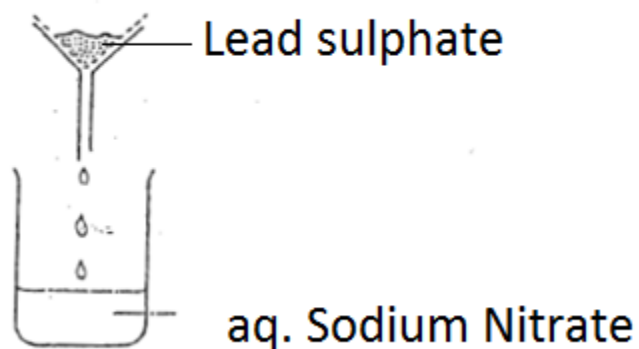
Mix the two aqueous solutions together. An insoluble precipitate of lead sulphate is formed.





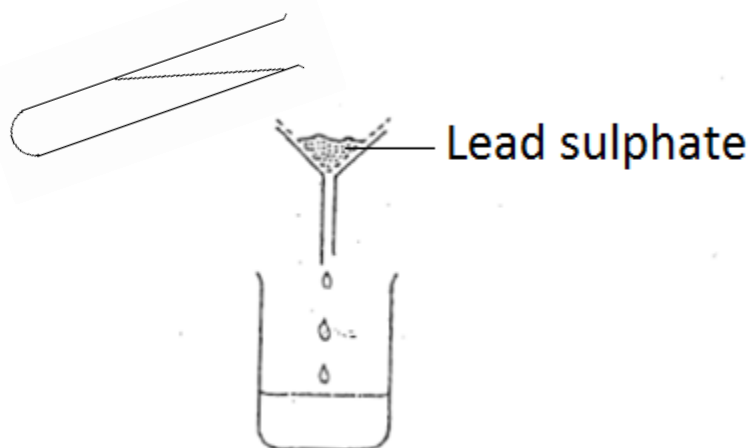
Step 3:

Filter the solution formed to get lead sulphate in filter paper.



Step 4:

Wash the filter paper with distilled water to remove trace of soluble salt.



Step 5:

The filter paper is dried in a warm oven. The salt is then scraped off it.