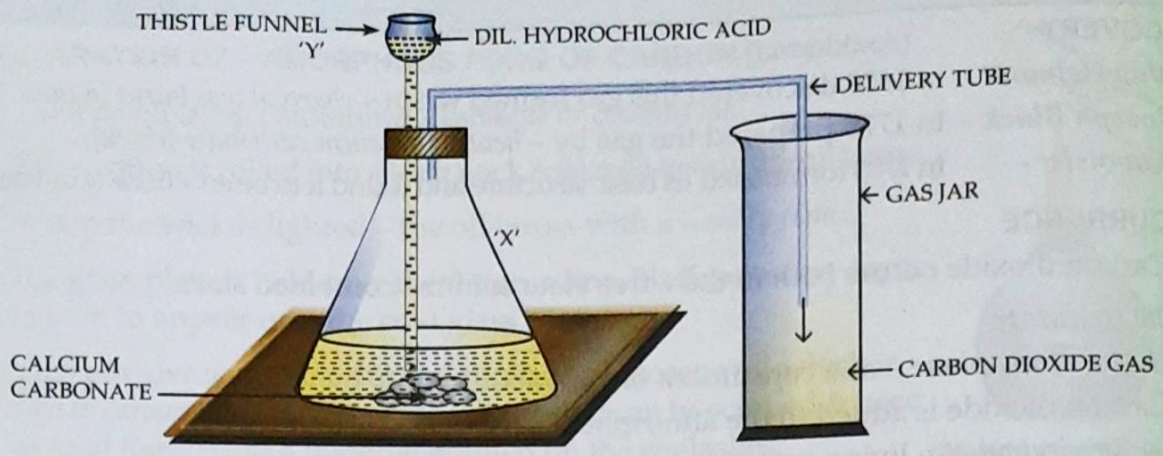
CARBON DIOXIDE – Laboratory preparation



Laboratory preparation of carbon dioxide by action of dil. HCl on calcium carbonate

REACTION : $CaCO_3 + 2HCl\ [dil.] \rightarrow CaCl_2 + H_2O + CO_2$

REACTANTS :
- Marble chips [$CaCO_3$].
- Dil. hydrochloric acid [HCl].

PROCEDURE :
- Calcium carbonate or marble chips are placed – in the flat bottom flask 'X' as shown above.
- Dilute hydrochloric acid is – *added from the thistle funnel 'Y'.*
- Carbon dioxide gas is evolved, which if needed to be purified – is passed through two washer bottles – *to remove impurities*

  [i] $KHCO_3$ soln. to absorb – *residual HCl acid vapours* &

  [ii] Conc. H_2SO_4 to absorb – *moisture.*

METHOD OF COLLECTION : Pure dry carbon dioxide is collected by – the *upward displacement of air.*

Reason – Carbon dioxide is about – *1.5 times heavier than air.*

– It is not collected over water since – *it is fairly soluble in water*

Reason for not using dilute sulphuric acid, instead of – dilute hydrochloric acid

Dilute sulphuric acid reacts with calcium carbonate forming a coating of – *insoluble calcium sulphate* on the marble chips thereby – the reaction slowly *comes to a stop.*

$CaCO_3 + H_2SO_4\ [dil.] \rightarrow \underset{[insoluble]}{CaSO_4} + H_2O + CO_2$