

Chapter-2 Acid, Bases & Salt.

On the basis of chemical properties compounds can be classified into 3 groups, acids, bases & salts.

Indicators

Substance which changes it's colour when put into an acid or a base is called an Indicator.

Common Indicators :-

- Litmus.
- Methyl Orange.
- Phenolphthalein.

Litmus :-

- Acid turns blue litmus to red.
- Base turns red litmus to blue.

Methyl Orange :-

- Gives red colour in Acid solution.
- Gives yellow colour in Basic solution.

Phenolphthalein :-

- Colourless in Acid solution.
- Gives pink colour in basic solution.

Olfactory indicator

These substances whose smell changes in Acidic or basic solutions are called Olfactory indicators.

eg. Onion extract - Acidic Solution - does not destroy
Smell of onion.
~~Vanilla extract~~ Basic Solution - Smell cannot be detected.

Vanilla Extract - Acidic Solution - does not destroy
Smell

- Basic Solution - Smell cannot be
detected.

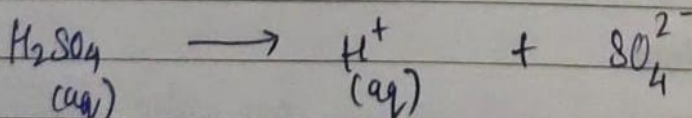
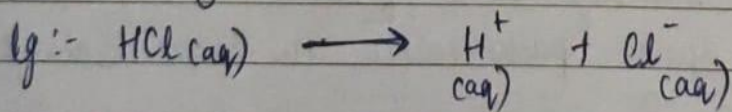
Clove oil.

Acids

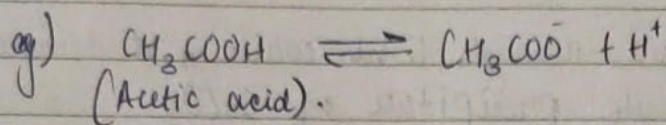
An acid is the substance that produces hydrogen ions (H^+)
when placed in water.

Strong acid & weak acid.

An acid which is completely ionized in water & thus
produces a large amount of hydrogen ions is called
as Strong acid.



- An acid which is partially ionized in water & produces a small amount of H^+ ions is called as Weak acid



- Concentrated and Dilute Acids.

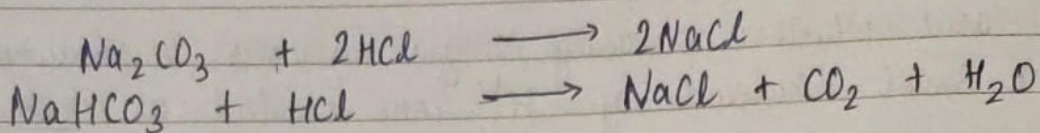
- Concentrated acid is one which contains the minimum possible amount of water in it.
- A dilute acid is one which contains much more water in it.

- Diluting Acids :-

The dilution of concentrated acid should always be done by adding concentrated acid to water gradually while stirring and not by adding water to concentrated acid.

This is because :-

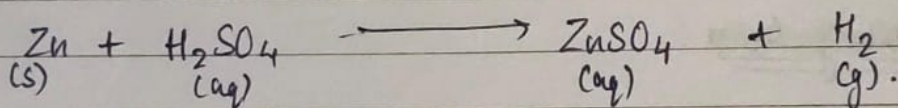
- When a concentrated acid is added to water for preparing a dilute acid, the heat is evolved gradually and easily absorbed by large amount of water to which acid is being
- If water is added to concentrated acid to dilute it then a large amount of heat is evolved at once. This heat changes some of the water to steam explosively which can splash the acid on our face or clothes and cause acid burns.



When CO_2 gas is passed through lime water, it turns milky due to white precipitate of CaCO_3 .

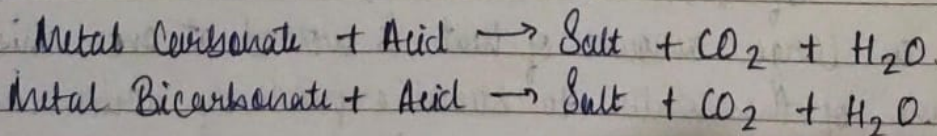
* Properties of ACIDS.

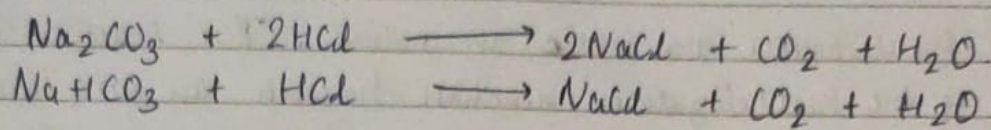
- 1) Acids have a sour taste.
- 2) Acids turn blue litmus to red.
- 3) Acidic Solution can conduct electricity.
- 4) Acid reacts with metals to form hydrogen gas.



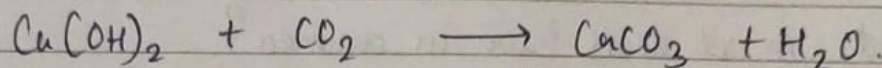
[NOTE:- Curd and other sour food stuffs should not be kept in metal vessel, because these sour food stuffs contains acid which can react with the metal to form poisonous metal compound which can cause food-poisoning.]

- 5) Acid reacts with metal carbonate or bicarbonate to form salt, CO_2 and water.

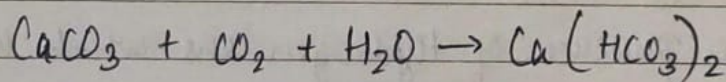




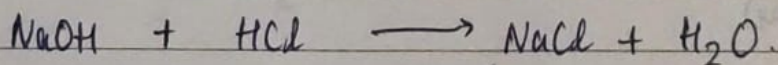
When CO_2 gas is passed through lime water, it turns milky due to which precipitation of CaCO_3 (Calcium Carbonate).



When excess of CO_2 is passed through lime water, then the white precipitate formed first dissolved due to the formation of a soluble salt called Calcium Hydrogen carbonate and the solution becomes clear again.



- 6) Acid reacts with base to form salt and water. When an acid is treated with a base, the base neutralizes the acid to form salt and water is called neutralisation reaction.



- 7) Acids react with Metal oxide to form salt and water. Dilute Hydrochloric acid reacts with copper (II) oxide to form copper (II) chloride and water.

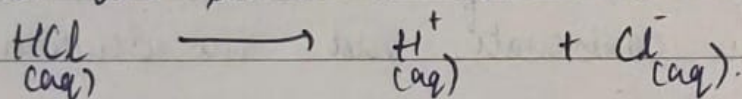


Metal oxides are basic in nature. This reaction is similar to the neutralization reaction between an acid and base to form salt and water. Thus, this reaction shows metal oxides are basic in nature.

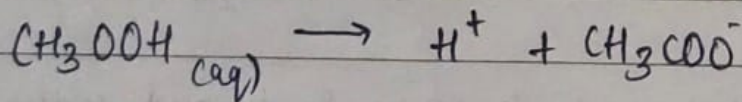
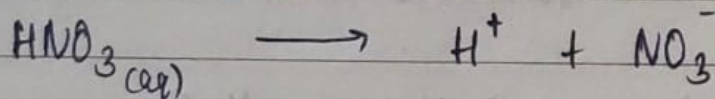
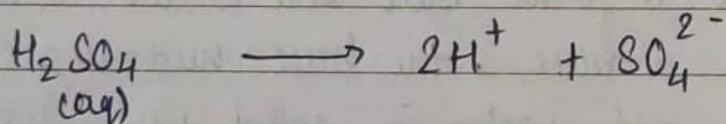
8) Acids have corrosive nature.

9) What do all acids have in common?

→ All acids contain hydrogen. When acid is dissolved in water, it separates out to give positively charged hydrogen ion and enters the solution.



It is the presence of hydrogen ions which makes it behave like an acid.



- To show all the compounds containing hydrogen are not acidic.

Experiment

- i) Take solutions of HCl, H_2SO_4 , glucose and alcohol.
- ii) Fix two iron nails on a rubber cork and place them in a beaker.
- iii) Connect the nails to the two terminals of 6V battery through a switch and bulb.
- iv) Pour some dilute HCl solution in the beaker and switch on the current. The bulb starts glowing. This shows that acidic solution conducts electricity.
- v) Take glucose solution in the beaker and switch on the current, bulb does not glow in the case. This shows that glucose solution does not conduct electricity.

Repeat the same with alcohol solution and see that it doesn't conduct electricity.

The aqueous solution of acid conducts electricity due to the presence of charged particles called ions. Glucose solution and alcohol solution do not conduct electricity due to the absence of ions.

From this experiment we conclude that the hydrogen containing compounds such as glucose and alcohol do not categorised as acids because they do not dissociate in water to produce H^+ ions.

BASES

- The substances that are bitter in taste, slippery to touch and changes colour of the indicator (for eg, from red litmus to blue) are called as Bases.
- Water Soluble bases are called Alkalies.

* Properties of Bases :-

- Bitter taste.
- Changes the ~~too~~ colours of dyes known as acid base indicator (for example - turns red litmus to blue).
- Reacts with Acid to form salt (ionized compound) and water.