

JSR IAS ACADEMY

GENERAL SCIENCE

CHEMISTRY

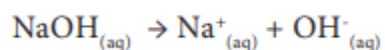
Bases

BASES

According to Arrhenius theory, bases are substances that ionise in water to form hydroxyl ions (OH^-).

Bases that are soluble in water are called **alkalis**.

Similarly, sodium hydroxide ionises in water to give hydroxyl ions and thus get dissolved in water. So it is an alkali.



Bases contain one or more replaceable oxide or hydroxyl ions in solution.

Base	Molecular Formula	Ions formed	No. of replaceable hydroxyl ion
Calcium oxide	CaO	Ca^{2+} O^{2-}	1
Sodium oxide	Na_2O	Na^+ O^{2-}	1
Potassium hydroxide	KOH	K^+ OH^-	1
Calcium hydroxide	$\text{Ca}(\text{OH})_2$	Ca^{2+} OH^-	2
Aluminium oxide	$\text{Al}(\text{OH})_3$	Al^{3+} OH^-	3

Classification of Bases**Based on their Acidity****a) Monoacidic Base:**

It is a base that ionises in water to give one hydroxide ion per molecule.

Example: NaOH , KOH

b) Diacidic Base:

It is a base that ionises in water to give two hydroxide ions per molecule.

Example: $\text{Ca}(\text{OH})_2$, $\text{Mg}(\text{OH})_2$

c) Triacidic Base:

It is a base that ionises in water to give three hydroxide ions per molecule.

Example: $\text{Al}(\text{OH})_3$, $\text{Fe}(\text{OH})_3$

Based on concentration**a) Concentrated Alkali**

It is an alkali having a relatively high percentage of alkali in its aqueous solution.

b) Dilute Alkali

It is an alkali having a relatively low percentage of alkali in its aqueous solution.

Based on Ionisation**a) Strong Bases:**

These are bases which ionise completely in aqueous solution.

Example: NaOH , KOH

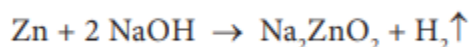
b) Weak Bases

These are bases that ionise partially in aqueous solution.

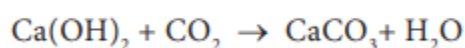
Example: NH_4OH , $\text{Ca}(\text{OH})_2$

Properties of Bases:

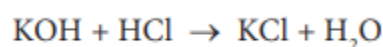
- They have bitter taste.
- Their aqueous solutions have soapy touch.
- They turn red litmus blue
- Their aqueous solutions conduct electricity
- Bases react with metals to form salt with the liberation of hydrogen gas.



- Bases react with non-metallic oxides to produce salt and water. Since this is similar to the reaction between a base and an acid, we can conclude that nonmetallic oxides are acidic in nature.

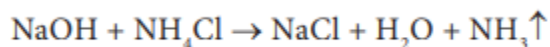


- Bases react with acids to form salt and water.



The above reaction between a base and an acid is known as Neutralisation reaction.

- On heating with ammonium salts, bases give ammonia gas.



Uses of Bases

- (i) **Sodium hydroxide** is used in the manufacture of soap.
- (ii) **Calcium hydroxide** is used in **white washing of building**.
- (iii) **Magnesium hydroxide** is used as a medicine for stomach disorder.
- (iv) **Ammonium hydroxide** is used to **remove grease stains from cloths**.

Tests for Acids and Bases

Indicator	Colour in acid	Colour in base
Litmus	Blue to Red	Red to Blue
Phenolphthalein	Colourless	Pink
Methyl orange	Pink	Yellow

Take a jar with cabbage leaves and pour boiling water to it. Allow it to cool to room temperature and filter it. It is your own indicator used to find whether the given solution is acidic or basic. This juice produces a red colour when mixed with an acid and a green colour with a base.