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Acids , Bases And Salts

Acids In A Water Solution

- When dissolved in water, all acids produces hydrogen ion.
- $\text{HCl (aq)} \rightarrow \text{H}^+ \text{ (aq)} + \text{Cl}^- \text{ (aq)}$
- Hydrogen ions cannot exist alone, but they exist after combining with water molecules. That's why they are always shown as $\text{H}^+ \text{ (aq)}$ or H_3O^+ (hydronium ion) .
- $\text{H}_2\text{O (aq)} + \text{H}^+ \rightarrow \text{H}_3\text{O}^+$

Acids And Hydrogen Ion

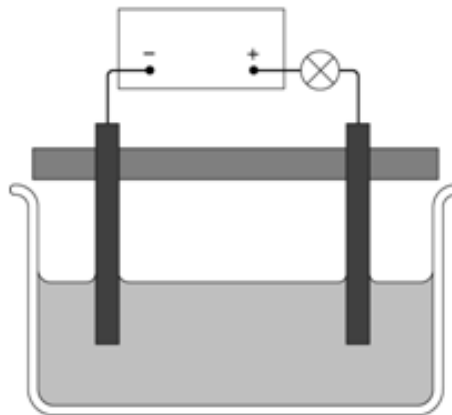
- All acids generate hydrogen gas on reacting with metals.
- When dissolved in water, all acids produces hydrogen ion.
- $\text{HCl (aq)} \rightarrow \text{H}^+ \text{ (aq)} + \text{Cl}^- \text{ (aq)}$
- The hydrogen ion is responsible for their acidic properties.
- HCl , HNO_3 , H_2SO_4 shows acidic character in aqueous solutions because of the presence of hydrogen ion.

Acids And Hydrogen Ion

- Solutions of compounds like alcohol and glucose do not show acidic character because they do not produce hydrogen ion in aqueous solution.
- Dry HCl gas does not change the colour of dry litmus paper because an acid shows its acidic properties in solution only due to production of hydrogen ions. In dry conditions, they are not able to show acidic properties due to absence of hydrogen ions.

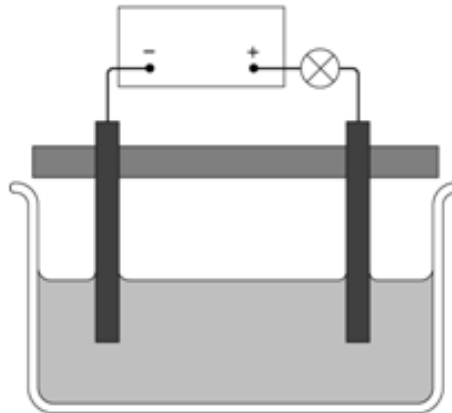
Acids And Hydrogen Ion

- Acids conduct electricity. The electric current is carried through the solutions by ions. Acids produces hydrogen ions in aqueous solution due to which they conduct electricity.



Acids And Hydrogen Ion

- Glucose and alcohol solutions do not conduct electricity because they do not produce hydrogen ions. Electric current is carried through the solution by ions only.



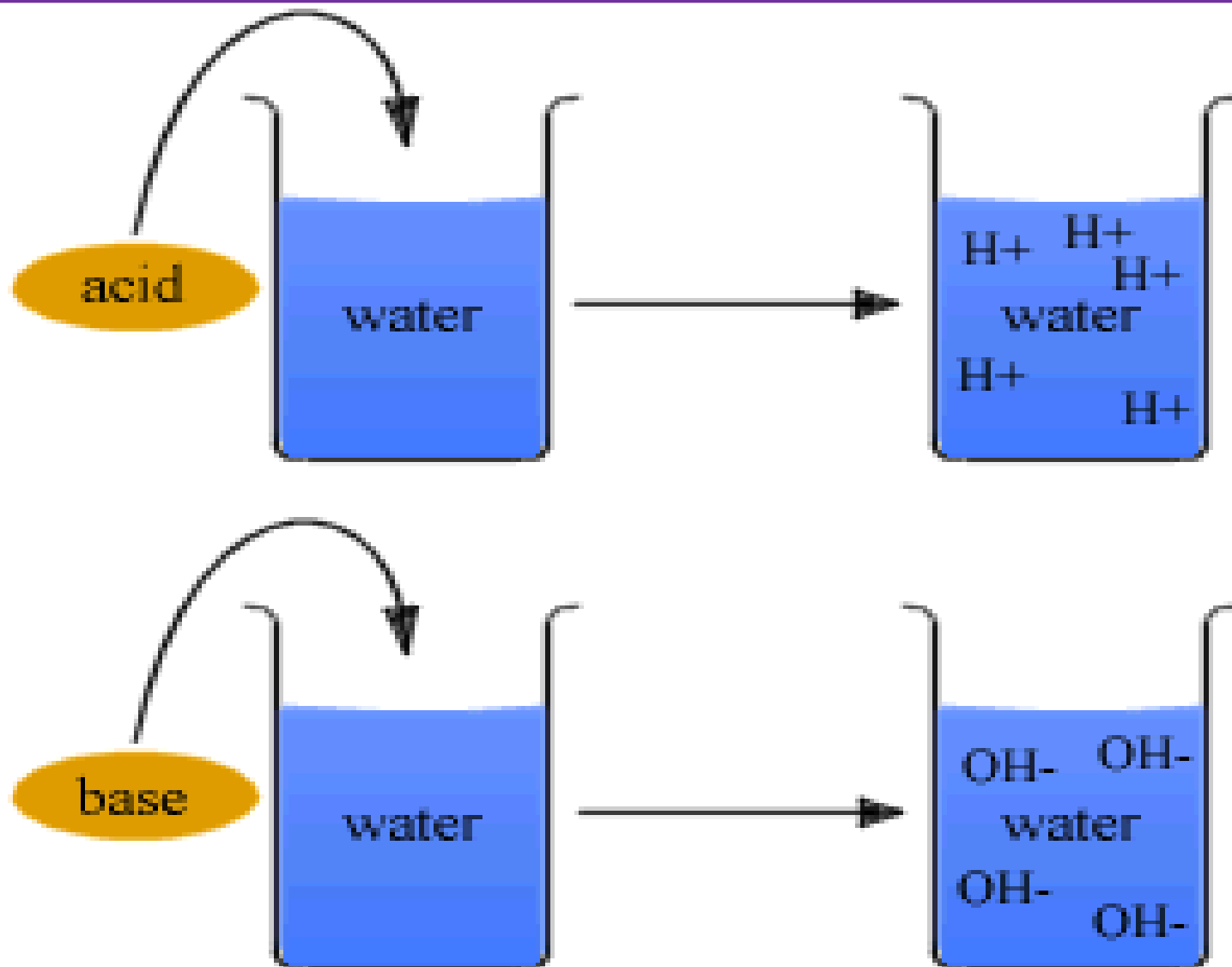
Bases In A Water Solution

- When dissolved in water, bases produces hydroxide ions.
- $\text{KOH (aq)} \rightarrow \text{K}^+ \text{(aq)} + \text{OH}^- \text{(aq)}$
- Bases which are soluble in water are called Alkalis.

Neutralisation Reaction

- All acids generate hydrogen ions and bases generate hydroxide ions.
- Acid + Base $\rightarrow$ Salt + Water
- $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- $\text{H}^+_{(\text{aq})} + \text{OH}^-_{(\text{aq})} \rightarrow \text{H}_2\text{O}_{(\text{l})}$

ACIDS AND BASES IN WATER

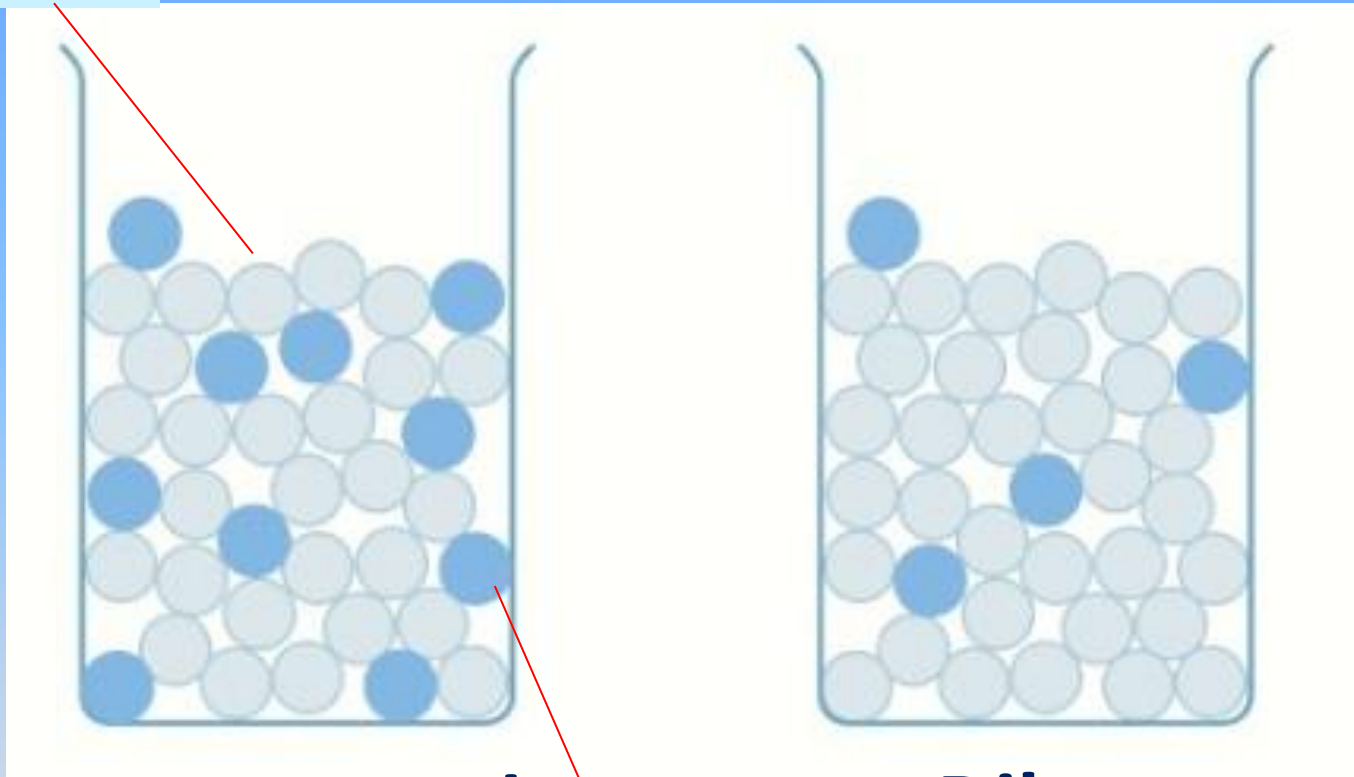


ACIDS AND BASES IN WATER

- Mixing an acid or base with water is called dilution and the acid or base is said to be diluted.
- An acid or base is said to be concentrated when it has more acid or base particles in it.



water
particles



Concentrated

Dilute

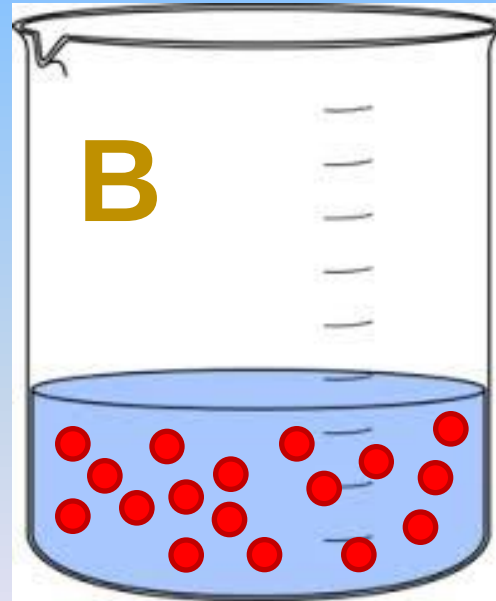
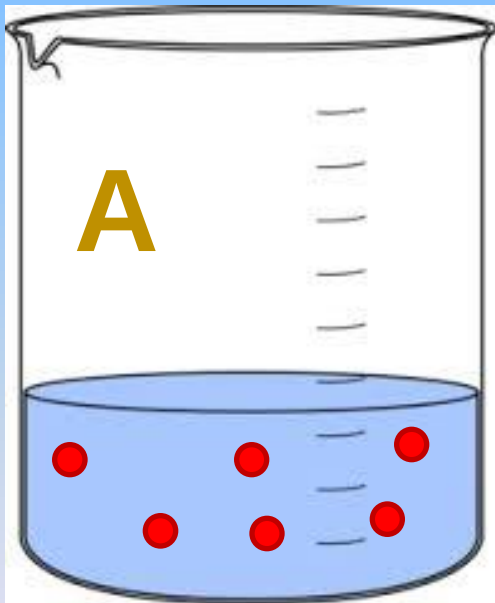
acid
particles

ACIDS AND BASES IN WATER

- = an acid particle.

Which is the more diluted acid?

Which is the more concentrated acid ?



ACIDS AND BASES IN WATER

- Mixing an acid with water results in decrease in the concentration of hydrogen ions because there is addition of more solvent particles.
- Mixing a base with water results in decrease in the concentration of hydroxide ions because there is addition of more solvent particles.

ACIDS AND BASES IN WATER

- The process of dissolving an acid or a base in water is a highly exothermic.



ACIDS AND BASES IN WATER

- While diluting an acid, it is recommended that the acid should be added to water and not water to the acid.
- If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating.

ACIDS AND BASES IN WATER

- A warning sign is displayed on the can of concentrated acids and bases which indicates that care must be taken while handling these chemicals.

