

Acids and Bases

ACIDS Acids in solution are sources of hydrogen ions.
Acidic solutions have lower pH values than neutral pH 7.

BASES A base is any substance that reacts with an acid to form a salt and water only.

Alkalis (soluble bases) in solution are sources of hydroxide ions.

Alkaline solutions have higher pH values than neutral 7.

Higher H⁺ concentration = lower pH

Higher OH⁻ concentration = higher pH

Descriptions/Forms of Acid

Concentrated acid a relatively large amount of solute dissolved in the solvent.

Dilute acid a relatively smaller amount of solute dissolved in the solvent.

Strong acid completely ionised in aqueous solution. Hydrochloric, nitric and sulfuric acid.

Weak acid only partially ionised in aqueous solution. Ethanoic, citric and carbonic. Further, it has a lower pH than a strong acid (aq) of the same concentration. This is because a weak acid has a lower concentration of hydrogen ions.

Reactions (Part2)

Salts can be made by reacting an acid with an alkali. Acid + Alkali + Salt + Water

Salts can be made by reacting an acid with an insoluble base. Acid + Bases = Salt + Water

Salts can be made by reacting an acid with a metal carbonate. Acid + Metal carbonate = Salt + Water + Carbon dioxide

Acids are neutralized by alkalis (e.g.: soluble metal hydroxides) and bases (e.g.: insoluble metal hydroxides and metal oxides) to produce salts and water and by metal carbonates to produce salts, water and carbon dioxide. The salt name depends on the acid used and the positive ions in the alkali, base or carbonate.

Indicators

Litmus goes red in acid and blue in alkali.

Methyl orange is red in acidic conditions, yellow in neutral and alkaline conditions.

Phenolphthalein is colourless in acidic and neutral conditions and pink in alkaline conditions.

Universal indicator - scale runs from 0 (red), 7 (green) to 14 (blue).

Reactions

Salts made when metals react with nitric acid are called nitrates. Zinc + Nitric acid = Zinc Nitrate + Hydrogen

Salts made when metals react with sulfuric acids are called sulfates. Iron + Sulfuric Acid = Iron Sulfate + Hydrogen

Salts made when metals react with hydrochloric acid are called chlorides. Magnesium + Hydrochloric acid = Magnesium Chloride + Hydrogen

Reactions between metals and acids only occur if the metal is more reactive than the hydrogen in the acid. If the metal is too reactive, the reaction with acid is violent.



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