

Acids

Definition: A substance that releases H^+ ions when dissolved in water

Examples:

- Strong
 - Hydrochloric Acid (HCl)
 - Sulfuric Acid (H_2SO_4)
 - Nitric Acid (HNO_3)
- Weak
 - Ethanoic Acid (CH_3COOH), also known as *vinegar*
 - Carbonic Acid (H_2CO_3)
 - Phosphoric Acid (H_3PO_4)
 - Citric Acid ($C_6H_8O_7$), stuff found in *citrae* organisms. Citrus fruits.

Characteristics

- Sour taste
- Turns litmus paper red
- **Acid + Metal \rightarrow Salt + Hydrogen**
- **Acid + Carbonate \rightarrow Salt + Water + Carbon Dioxide**
- **Acid + Metal Oxide \rightarrow Salt + Water**
- **Acid + Metal Hydroxide \rightarrow Salt + Water**
- Strong acids dissolve in water to form solutions that can conduct electricity

Basicity of acid: Number of H^+ released per molecule of acid **YOU HAVE TO WRITE THIS OK IF NOT YOU ARE WRONG**

Monobasic: HCl, HNO_3 , CH_3COOH (carbon attached to hydrogen does not split)

Dibasic: H_2SO_4

Bases

Definition: A substance that releases OH^- ions when dissolved in water. **OR.** A substance that reacts with acids to give a salt and water *only*. (Most bases are insoluble) All **metal oxides and hydroxides** can act as bases.

Soluble bases are known as *alkalis*.

Examples

- Soluble
 - Sodium Hydroxide (NaOH)
 - Potassium Hydroxide (KOH)
 - Ammonia (NH_3)
 - Does not contain OH^- ions but can react with water to release OH^- ions
- Insoluble
 - Iron (III) Oxide (Fe_2O_3)

- Magnesium Oxide (MgO)
- Copper (II) Oxide (CuO)

Characteristics

- Bitter taste
- Soapy feel
- Turns litmus paper blue
- Base + Acid → Salt + Water
- Alkali + Ammonium salt → Ammonia + Water + Salt
- Strong bases that can dissolve in water from solutions that can conduct electricity
 - Non-dissolvable bases cannot conduct electricity

Acidity of bases

- Eg.
 - Monoacidic
 - NaOH
 - KOH
 - NH₃
 - Diacidic
 - Ca(OH)₂, Ba(OH)₂

Dissociation of ions

Definition: Splitting of a soluble substance in water into ions, which are now free to move about in a solution.

Any hydrogen bonded with a carbon will not be lost

Covalent bonds are never broken during melting

Difference between Dissociation and Melting

- Dissociation requires water but melting does not
- Dissociation occurs over a range of temperatures but melting does not

Strength of acids

- Strong
 - Dissociates completely into H⁺ ions in water
 - Eg.
 - Acids
 - HCl
 - H₂SO₄
 - HNO₃
 - Bases
 - KOH
 - NaOH

- Ca(OH)_2
 - Conducts electricity well
- Weak
 - Dissociates partially into H^+ ions in water
 - Acids
 - CH_3COOH
 - Bases
 - NH_3
 - Does not conduct electricity well

Strength of acid cannot be changed, but concentration can.

% Dissociated → Strength

Concentration → pH

Oxides

Definition: Element + Oxygen only

- Metal
 - Basic
 - + Acid → Salt + Water, does not react with bases
 - Soluble
 - NaOH , KOH
 - Insoluble
 - MgO , CuO
 - Amphoteric
 - Both basic and acidic
 - Acid + Base → Salt + Water
 - Insoluble
 - ZnO , PbO (Lead (II) Oxide), Al_2O_3
- Non-metal
 - Acidic
 - + Base → Salt + Water
 - Does not react with acids
 - Soluble
 - CO_2 , SO_2
 - Insoluble
 - Neutral
 - Does not react with acids or bases
 - Insoluble
 - CO , NO

Concentration H^+

- Strength
- pH
 - >7
 - $\text{OH} > \text{H} \rightarrow \text{Basic}$
 - $=7$
 - $\text{OH} = \text{H} \rightarrow \text{Neutral}$
 - <7
 - $\text{OH} < \text{H} \rightarrow \text{Acid}$
- Basicity (of acid) /Acidity (of base)
- Concentration of acid

Get lost and revise indicators.

Reactions

- **Acid + Metal \rightarrow Salt + Hydrogen**
- **Acid + Carbonate \rightarrow Salt + Water + Carbon Dioxide**
 - **There will be effervescence and a colourless and odourless gas will be produced. A white precipitate will form in calcium hydroxide.**
 - $\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_2 + \text{H}_2\text{O}$ (the white ppt)
- **Acid + Base (Oxide or hydroxide) \rightarrow Salt + Water**
- **Base + Ammonium salt \rightarrow Ammonia + Salt + Water**

Go to “Chemistry Matters” and ~~study~~/memorise the solubility chart. You can take it from google or your sister’s textbook or your dog’s house.

Group 1 is always soluble. Ammonium ___ is always soluble. Anything with nitrate (NO_3^-) is always soluble