Chemistry 20

Unit C: Solutions and acid-base chemistry

Naming and testing acids and bases

Formulas and product labels

- HCl(aq) is hydrochloric acid, H_2SO_4(aq) is sulfuric acid, HNO_3(aq) is nitric acid, and CH_3COOH(aq) is ethanoic acid.
- NaOH(aq) is sodium hydroxide, the base that sits in the same recall set as those four acids.

Names first, then the empirical tests

- Each aqueous formula in the recall set has one IUPAC name, and the (aq) symbol is part of that match.
- Indicator colour, a pH reading, and conductivity are the empirical tests used to sort acidic, neutral, and basic solutions.

Key terms

aqueous acid

An acid whose IUPAC name is used when the formula is marked as dissolved in water. (HCl(aq))

hydronium ion

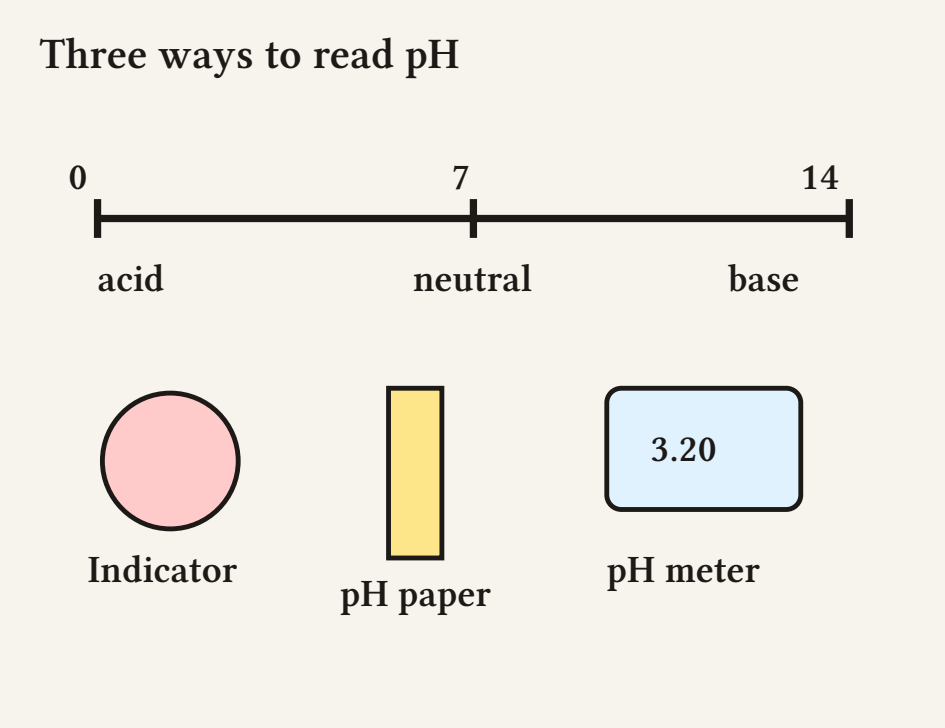
The ion $H_3O^+(aq)$. Square brackets in $[H_3O^+]$ mean its concentration in $mol \cdot L^{-1}$. ($[H_3O^+]$)

pH

The number from $pH = -\log[H_3O^+]$. At 25 °C, values below 7 are acidic, 7 is neutral, and values above 7 are basic. ($pH = -\log[H_3O^+]$)

Indicators and pH meters

- At 25 °C, acidic solutions have pH below 7, neutral solutions have pH 7, and basic solutions have pH above 7.
- An indicator uses a colour match, pH paper uses a paper scale, and a pH meter converts a voltage into pH.

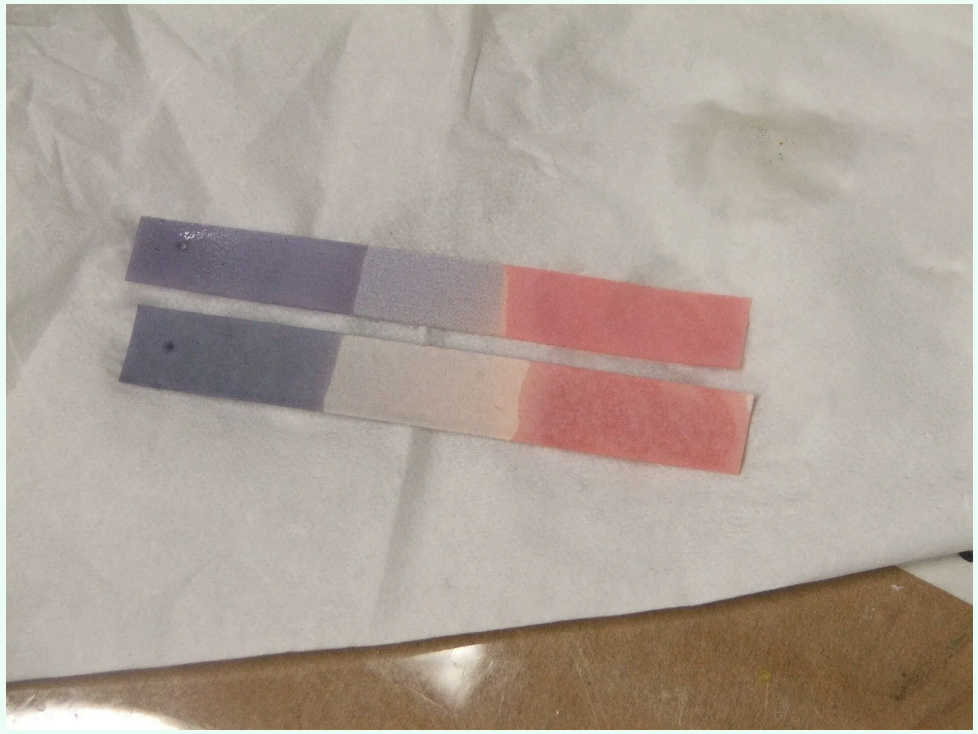


Three observations, one category

- Blue litmus turns red, the display reads pH 3.1, and the conductivity bulb lights.
- The sample is acidic at 25 °C because 3.1 sits below 7.

A cleaner above the neutral mark

- Red litmus turns blue, pH paper matches 10.5, and the solution conducts.
- The number 10.5 is above 7, so at 25 °C the cleaner is basic.



Retrieval of names and a neutral trap

- Give the IUPAC names for $HNO_3(aq)$ and $CH_3COOH(aq)$.
- Classify a conducting sample at pH 7.0 and 25 °C.

Image credits

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