

A thick black L-shaped frame is positioned on the left and bottom-right sides of the page, framing the central text.

# CAMBRIDGE IGCSE CHEMISTRY

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Lesson 2

# Your identity card: information included

- Name, surname
- Sex
- Date of birth
- Place of birth
- Height
- Eye colour
- Hair colour
- Job
- Marital status
- Address
- Etc.



# The identity card of a substance (water, for example) includes information as:

## Appearance

White crystalline solid, almost colourless liquid with a hint of blue, colourless gas

## Odour

None

## Density

Liquid:

0.9998396 g/ml at 0 °C

0.9970474 g/ml at 25 °C

0.961893 g/ml at 95 °C

Solid:

0.9167 g/ml at 0 °C

## Melting point

0.00 °C (32.00 °F; 273.15 K)

## Boiling point

99.98 °C (211.96 °F; 373.13 K)

Etc. (**viscosity\***, **refractive index\*\***, **electrical resistivity\*\*\***...)

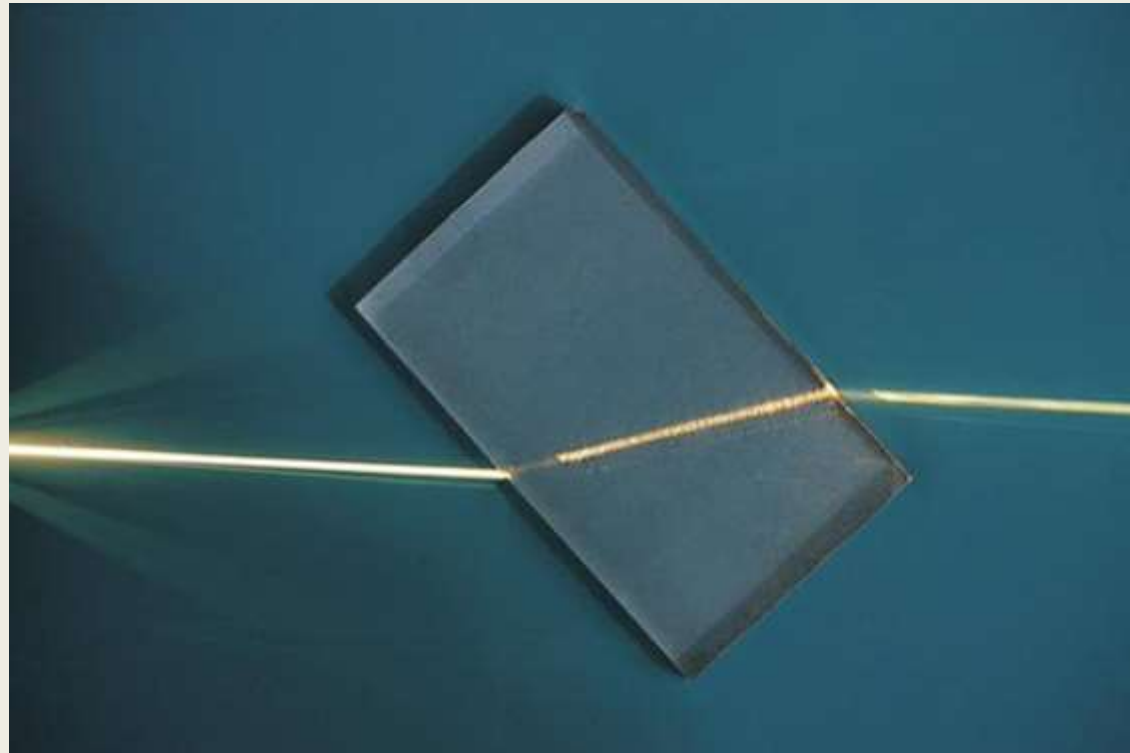


\* measure of the resistance of a fluid to gradual deformation. For liquids, it corresponds to the informal concept of "thickness" (e.g., honey has a higher viscosity than water). Dimension: [Pa x s]  
\*\* describes how light propagates through a material (dimensionless number)  
\*\*\*quantifies how strongly a material opposes the flow of electric current.

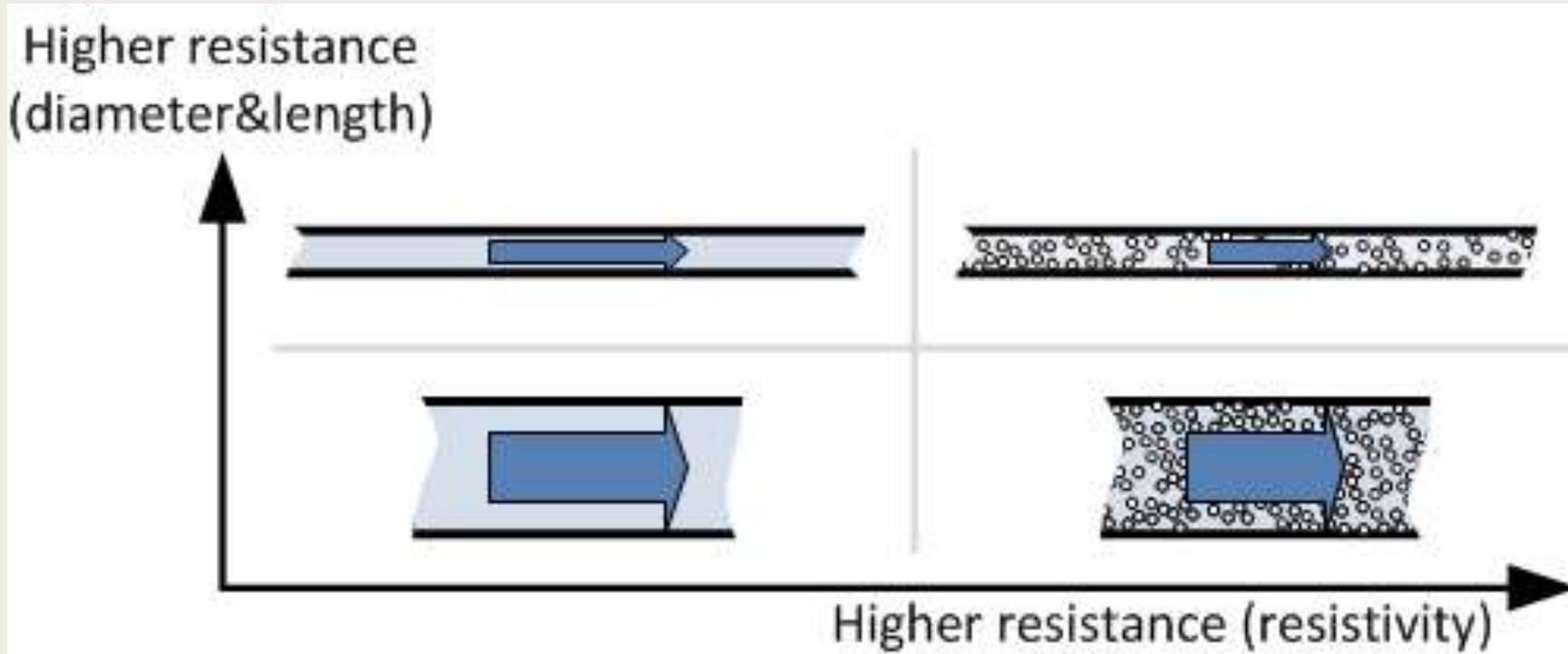
**Viscosity:** measure of the resistance of a fluid to gradual deformation. For liquids, it corresponds to the informal concept of "thickness" (e.g., honey has a higher viscosity than water).  
Dimension: [Pa x s]



**Refractive index** describes how light propagates through a material (dimensionless number)



Electrical resistivity quantifies how strongly a material opposes the flow of electric current



# Other properties

**Toxicity:** the degree to which a chemical can damage an organism. It is measured by its effects on the target (organism, organ, tissue or cell). Individuals typically have different levels of response to the same dose of a toxic substance. LD<sub>50</sub>: dose required to kill half the members of a tested population.



**Flammability:** flammable materials ignite more easily than other materials. Materials harder to ignite or materials burning less vigorously are combustible.



**Ductility:** property of a material associated with the ability to be hammered thin or stretched into wire without breaking

**Malleability:** property of a material associated with the degree to which it can be shaped

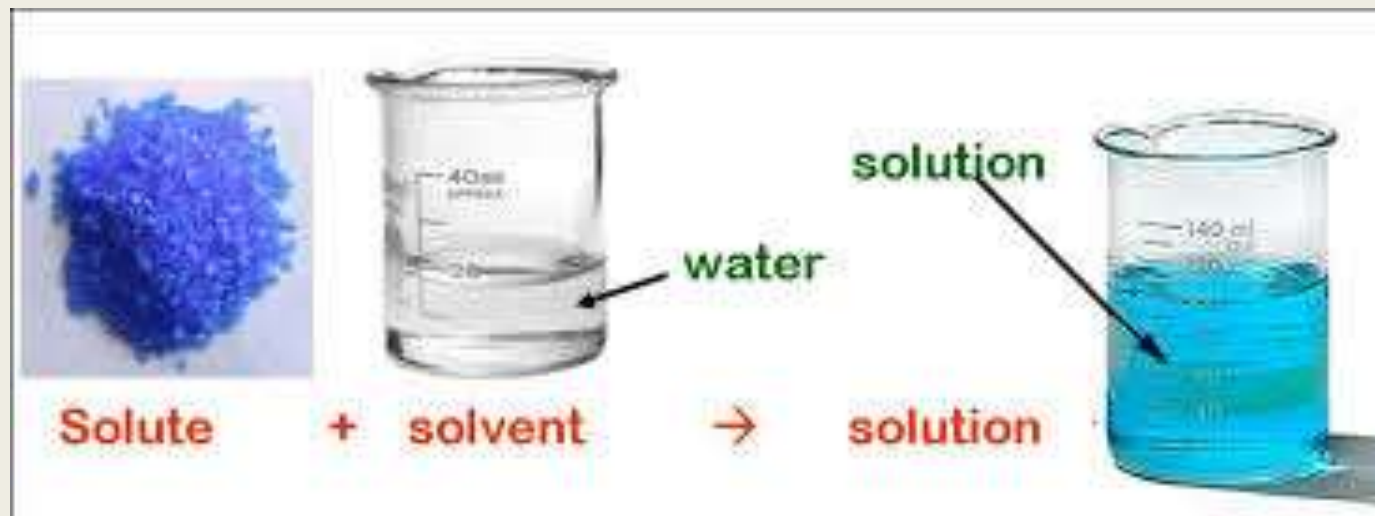


Which metal has the maximum ductility property?





Solubility: the property of a substance (solid, liquid or gaseous) called *solute* to dissolve in a *solvent* (solid, liquid or gaseous)



**Solute:** present in lower proportions.

**Solvent:** present in higher proportions

# Read and summarise:

- **Ethyl alcohol** is the most commonly used psychoactive drug in the world and the oldest known. Historical references abound in literature, religion and science about alcohol, its effects and its consequences.
- The production of alcohol results from a process of fermentation, in which water and yeast act on the different sugars. The psychoactive drug that is produced is ethyl alcohol.
- As a depressant drug, alcohol slows down the activity of the central nervous system. It can slow reflexes, depress respiration and heart rate and disrupt reasoning and judgement.
- Heavy drinkers usually develop a tolerance to alcohol and need to drink more to experience the same effect.
- The long term effects of alcohol include higher blood pressure, enlarged heart, cirrhosis of the liver, loss of memory, damage to unborn babies if the pregnant mother drinks.
- Ethyl alcohol is a colourless liquid at room temperature. It is a flammable liquid (boiling point 78.5 °C). It is soluble in water and used as a solvent.

# Read and summarize:

- Sodium chloride, commonly known as salt, is one of the most abundant minerals on Earth and an essential nutrient for many animals and plants. It is naturally found in seawater and in underground rock formations. Sodium chloride has been used to flavour and preserve foods for thousands of years.
- It is not expected to be potentially toxic or harmful. It has a very high solubility in water, and it can be used in cosmetics to increase viscosity.
- In the human body, this salt contributes in carry out nerve conduction, muscle contraction and normal renal function.
- Sodium chloride is a odourless, white crystalline solid with a high melting point (801 °C).
- Salt is used, directly or indirectly, in the production of many chemicals and to realise many processes, for example in de-icing.

**Intensive** properties do not depend on the amount of matter that is present.

**Extensive** properties depend on the amount of matter.

Density

Mass

Colour

Melting Point

Volume

Odour

Temperature

Refractive index

Luster

Size

Hardness

Ductility

Malleability

Length

Weight

State of matter

## Intensive Properties



Boiling Point



Color



Temperature



Luster



Hardness

## Extensive Properties



Volume



Mass



Size



Weight



Length

# Homework- Search for identity card of:

- **Iron** (phase at STP, appearance, melting point, boiling point, density, electrical resistivity)
- **Copper** (phase at STP, appearance, melting point, boiling point, density, electrical resistivity)
- **Aluminium** (phase at STP, appearance, melting point, boiling point, density, electrical resistivity)
- **Alcohol** (phase at STP, appearance, melting point, boiling point, density, solubility in water, refractive index, viscosity, flammability, toxicity)
- **Acetone** (nail varnish remover) (phase at STP, appearance, melting point, boiling point, density, solubility in water, refractive index, viscosity, flammability, toxicity)
- **Saccharose** (common sugar) (phase at STP, appearance, melting point, boiling point, density, solubility in water)
- **Calcium carbonate** (limestone) (phase at STP, appearance, melting point, boiling point, density, solubility in water)
- **Sodium chloride** (cooking salt) (phase at STP, appearance, melting point, boiling point, density, solubility in water)
- **Iodine** (phase at STP, appearance, melting point, boiling point, density, solubility in water)
- **Neon** (phase at STP, appearance, melting point, boiling point, density, colour exhibited when placed in an electric field)
- **Krypton** (phase at STP, appearance, melting point, boiling point, density, colour exhibited when placed in an electric field)

**Compare properties of the substances highlighted by the same colour. Distinguish intensive properties from extensive properties**

Note: STP = Standard conditions for Temperature and Pressure (temperature of 273.15 K (0 °C, 32 °F) and a pressure of  $10^5$  Pa (100 kPa, 1 bar).