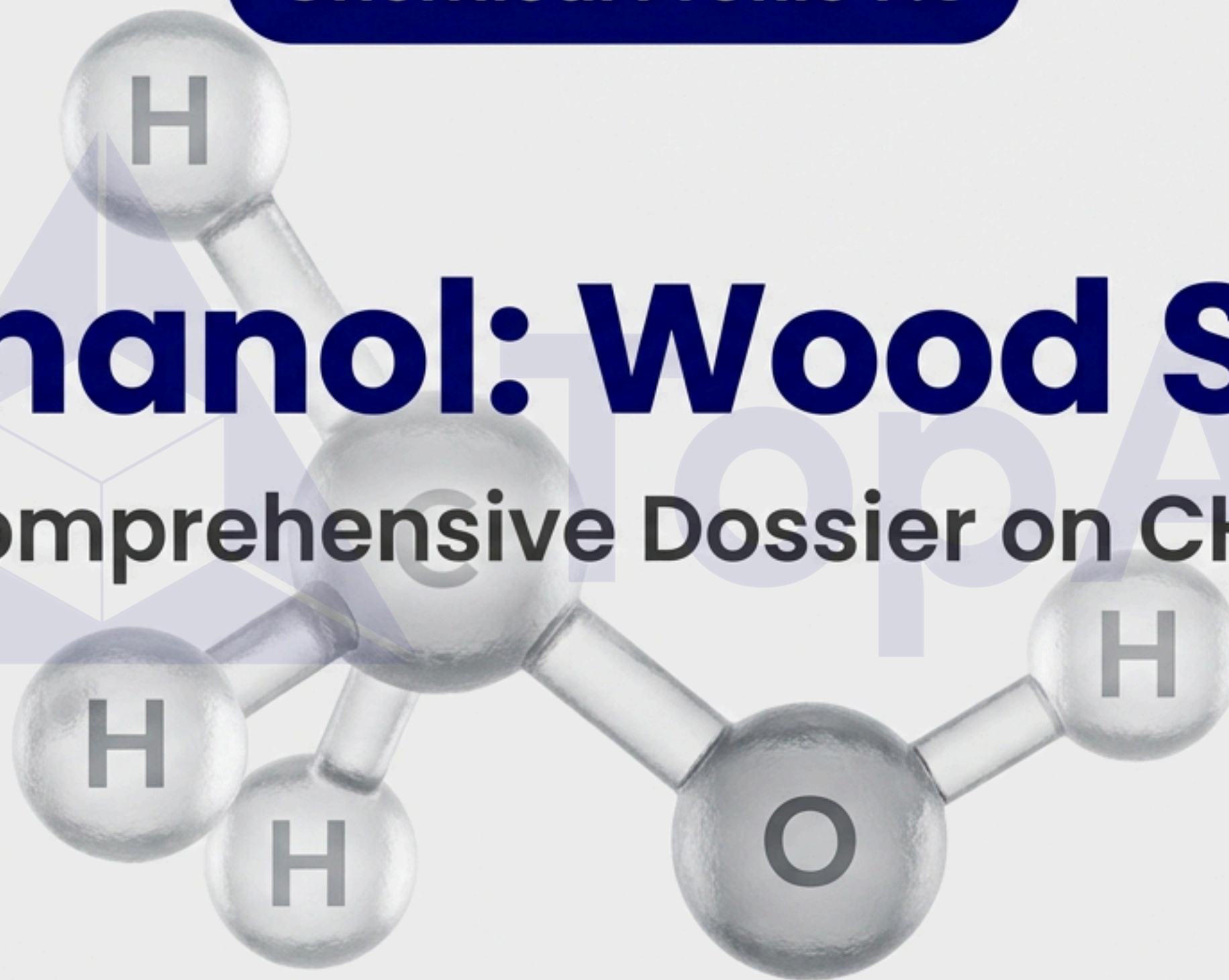


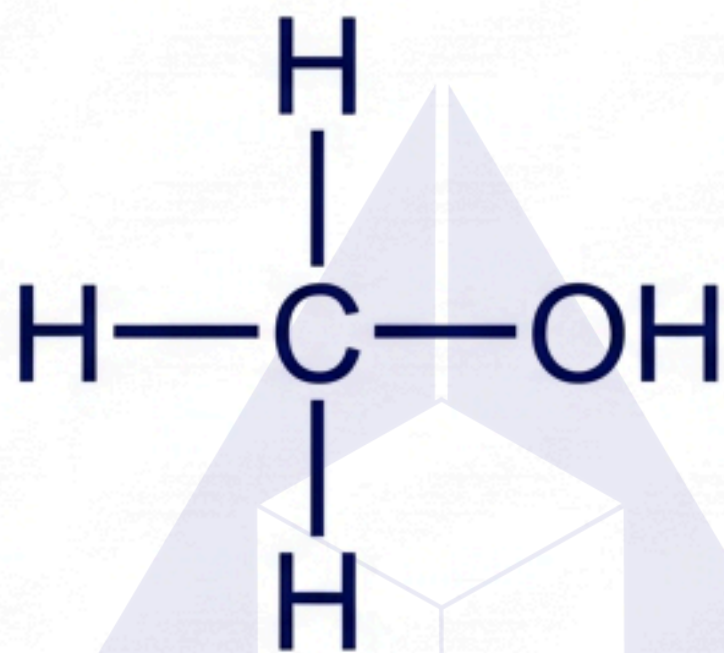
Chemical Profile 7.5

Methanol: Wood Spirit

A Comprehensive Dossier on CH_3OH



Chemical Identity



Aliphatic Alcohol
(simplest of its class)

Physical Profile



State: Colourless liquid

Boiling Point: 337 K

Miscibility: Highly miscible
in water due to intermolecular
hydrogen bonding.

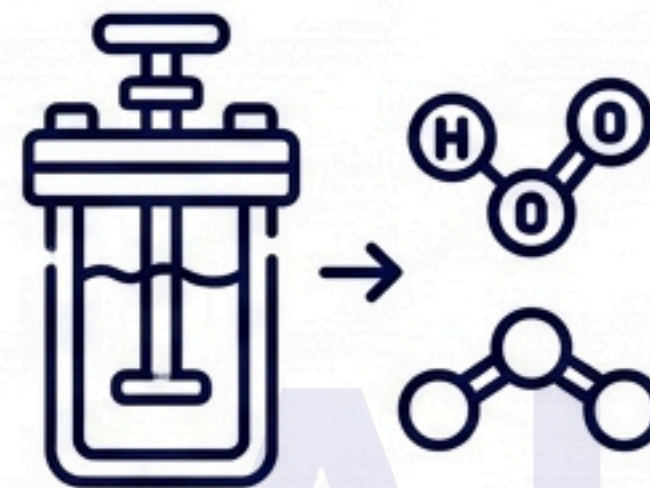
Destructive Distillation



Originally produced by the destructive distillation of wood.

This archaic method is the origin of the common, historical name 'Wood Spirit'.

Catalytic Hydrogenation



Produced by the catalytic hydrogenation of carbon monoxide under high pressure and temperature.



Catalyst Required: $\text{ZnO-Cr}_2\text{O}_3$



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Commercial & Industrial Utility



Primary Precursor

Chiefly used as the starting material for manufacturing formaldehyde (methanal).



Universal Solvent

Widely utilized as an industrial solvent, particularly in the production of paints and varnishes.

Key Takeaway: Methanol acts as a foundational building block for complex carbon compounds and industrial resins.



Severe Toxicity Profile

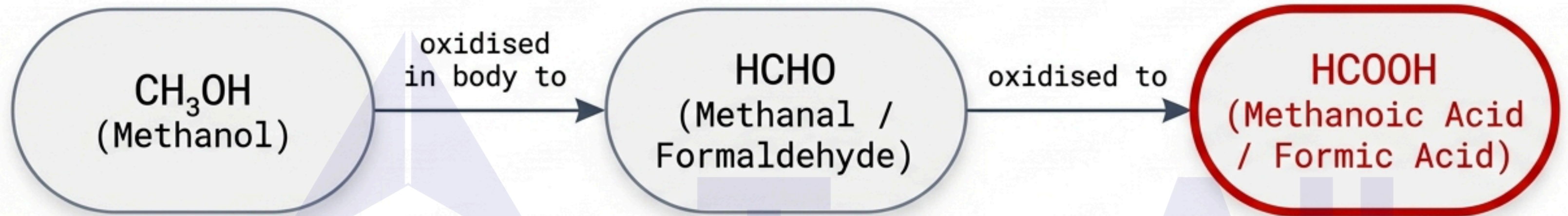
HIGHLY POISONOUS

Low Dose Impact: Ingestion of even minute quantities can cause permanent blindness.

High Dose Impact: Ingestion of larger quantities leads to central nervous system failure and death.

Important Context: Accidental or illegal mixing of methanol into commercial ethanol (denatured alcohol) is a primary cause of mass poisoning events.

Biological Oxidation & Chemical Rescue



Note: Methanoic acid is the true toxic agent that destroys the optic nerve and causes systemic death.



Intravenous Ethanol Antidote

Diluted ethanol is administered intravenously to swamp the oxidation enzymes.

This competitive inhibition prevents the formation of methanoic acid, allowing the kidneys time to safely excrete the un-oxidised methanol.

Dossier Synthesis: CH₃OH

Profile

Formula: CH₃OH

Boiling Point: 337 K

Key Uses: Essential industrial solvent and primary precursor for formaldehyde production.

Synthesis

Modern Process:
Catalytic
Hydrogenation

Equation:
$$\text{CO} + 2\text{H}_2 \rightarrow \text{CH}_3\text{OH}$$

Catalyst: ZnO-Cr₂O₃

Hazard

Warning: Lethal neurotoxin causing blindness or death.

Mechanism: Biological oxidation to Methanoic Acid.

Antidote: Enzyme swamping via IV Ethanol.



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