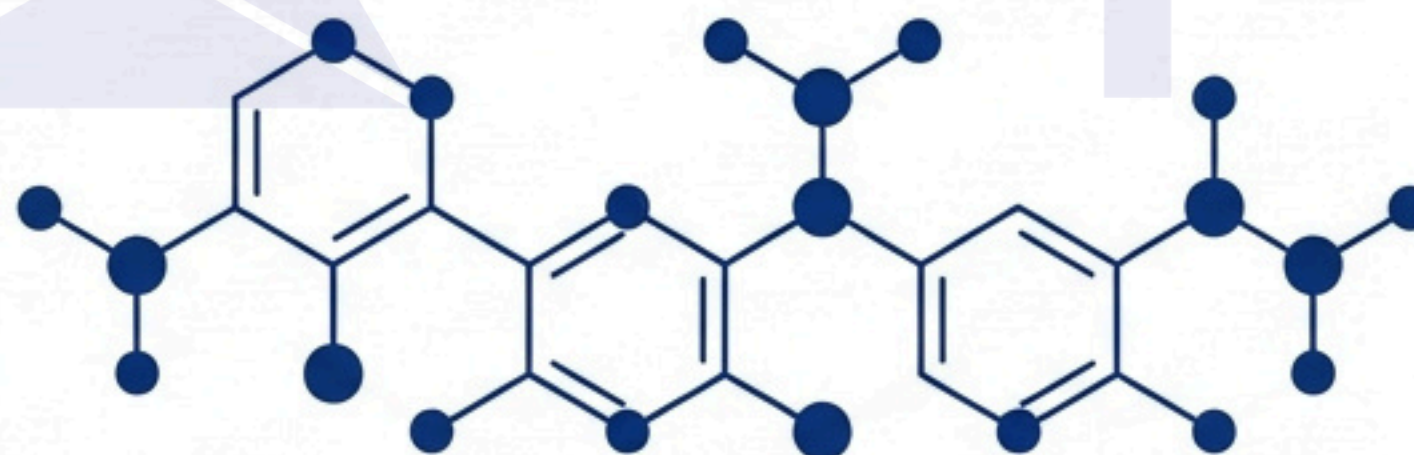


CHAPTER 8 • ORGANIC CHEMISTRY

Qualitative Analysis of Organic Compounds

A definitive guide to detecting Carbon, Hydrogen, and heteroatoms through elemental testing.



What Makes a Compound Organic?

Before analyzing a compound, we must understand its fundamental building blocks. Organic compounds share a universal baseline, occasionally modified by specific heteroatoms.

The Essential Elements

Universal Baseline

Organic compounds fundamentally contain **Carbon (C)** and **Hydrogen (H)**. These two elements form the ubiquitous covalent backbone of virtually all organic molecules.

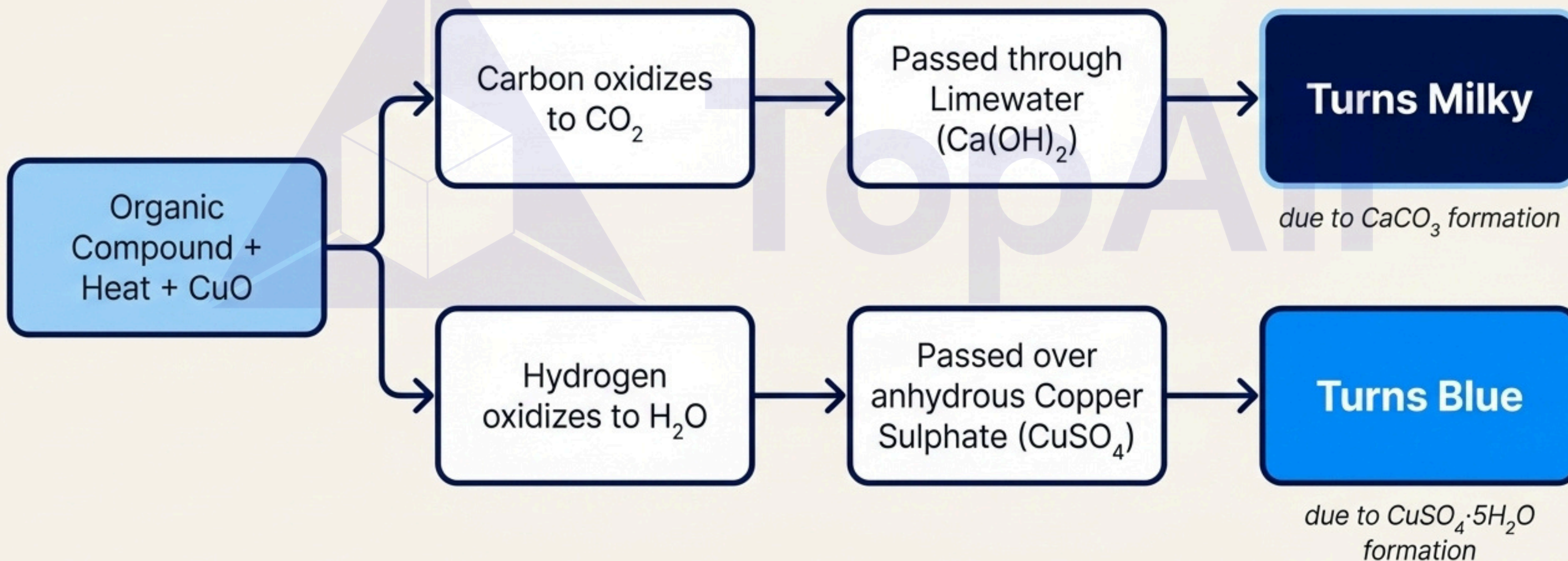
The Heteroatoms

Specific Identifiers

In addition to the C & H backbone, organic compounds may also contain specific modifying elements: **Oxygen (O)**, **Nitrogen (N)**, **Sulphur (S)**, **Halogens (X)**, and **Phosphorus (P)**.

Detecting the Core Elements: Carbon & Hydrogen

Both fundamental elements are detected simultaneously by heating the organic compound with Copper(II) oxide (CuO), oxidizing them into easily detectable states.





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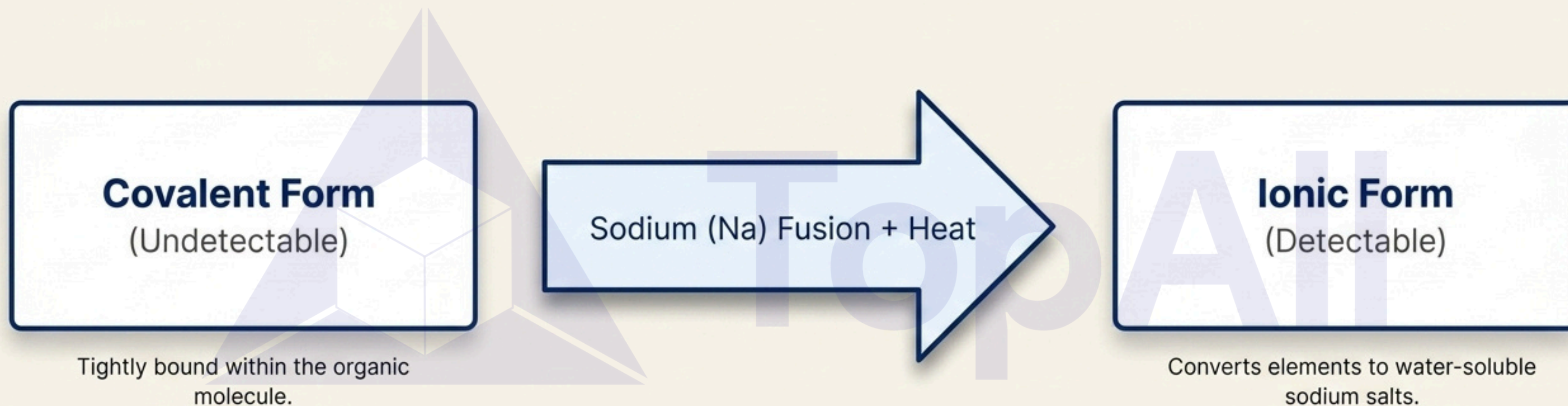
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Lassaigne's Extract: Breaking Covalent Bonds

Heteroatoms (N, S, X, P) exist in a covalent form within organic molecules. Standard ionic tests cannot detect them until they are converted into an ionic state using Sodium Fusion.



Nitrogen → Sodium Cyanide (NaCN)

Sulphur → Sodium Sulphide (Na_2S)

Halogens → Sodium Halide (NaX)

Diagnostic Grid: Detecting Other Elements

Once the Lassaigne's extract is prepared, specific reagents are added to trigger distinct, observable physical changes.

Target Element	Primary Reagents	Observable Result	Chemical Conclusion
Nitrogen (N)	FeSO_4 + conc. H_2SO_4	Prussian Blue Color	Iron(III) hexacyanoferrate(II) formed
Sulphur (S)	Sodium Nitroprusside	Violet Color	Thio-complex formed
Halogens (X)	HNO_3 + AgNO_3	White/Yellow Precipitate	AgCl (White), AgBr/AgI (Yellow)
Phosphorus (P)	HNO_3 + Ammonium Molybdate	Yellow Precipitate	Ammonium phosphomolybdate formed

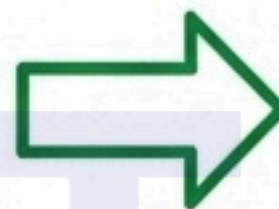
CHAPTER MASTERY

Essential Exam Takeaways



Base Elements

Organic compounds are fundamentally built on C and H. Both are detected simultaneously through oxidation with Copper(II) oxide (CuO).



The Fusion Mandate

Lassaigne's Test is absolutely mandatory for detecting N, S, and Halogens. It crucially converts undetectable covalent bonds into reactive ionic sodium salts.



Visual Indicators

Qualitative analysis relies heavily on precise visual markers:
Limewater (Milky) = Carbon.
Prussian Blue = Nitrogen.
Violet = Sulphur.



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