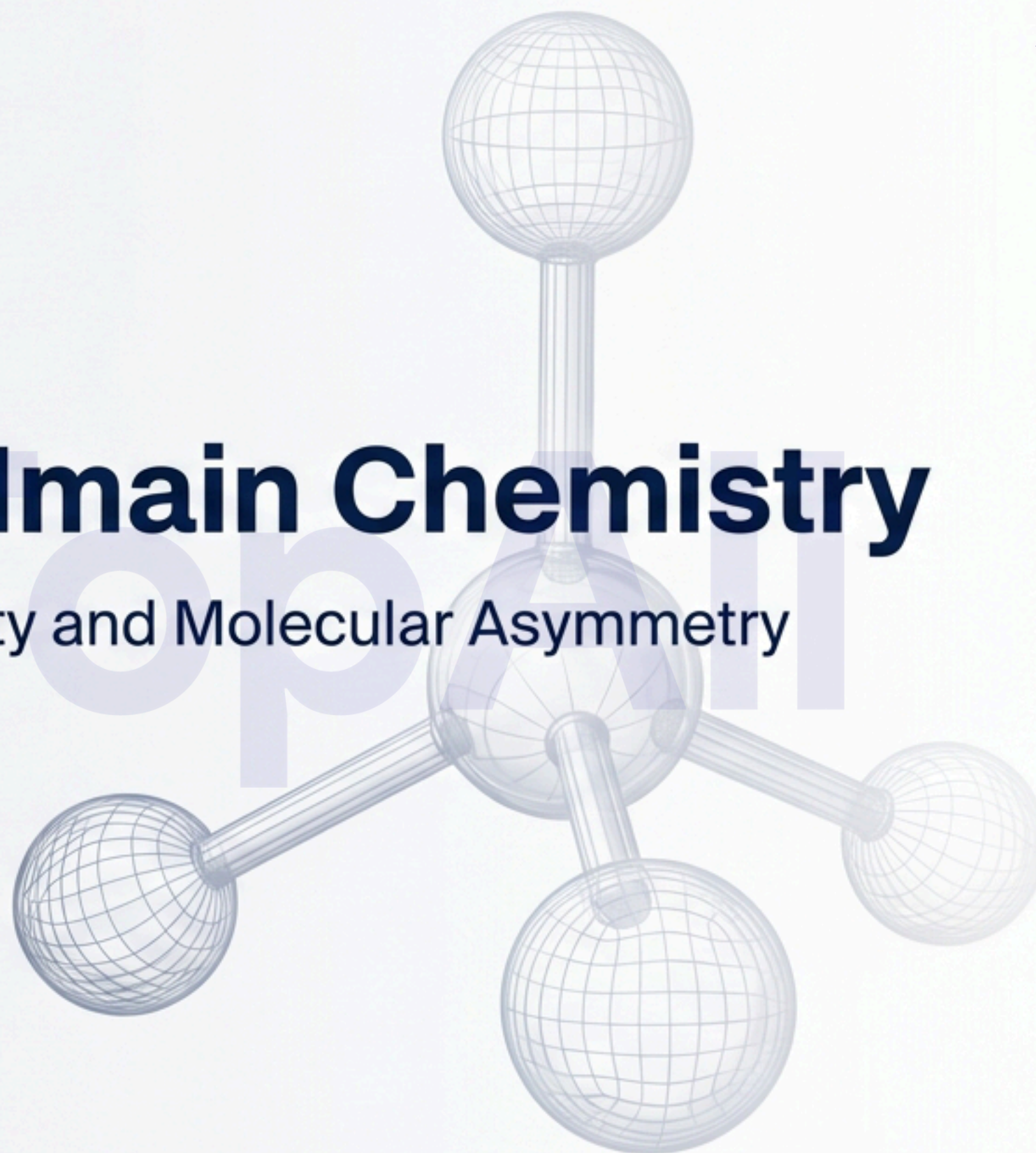
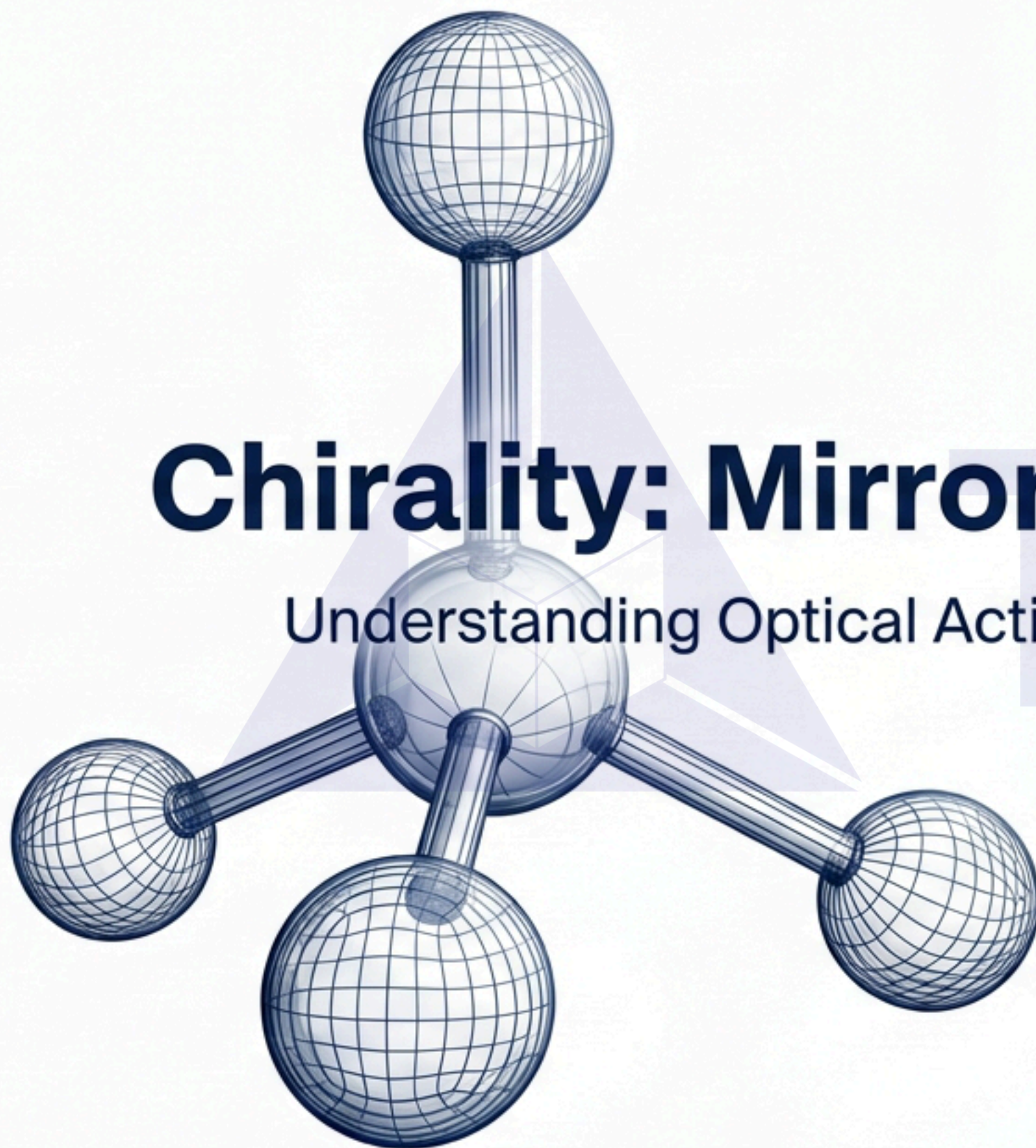
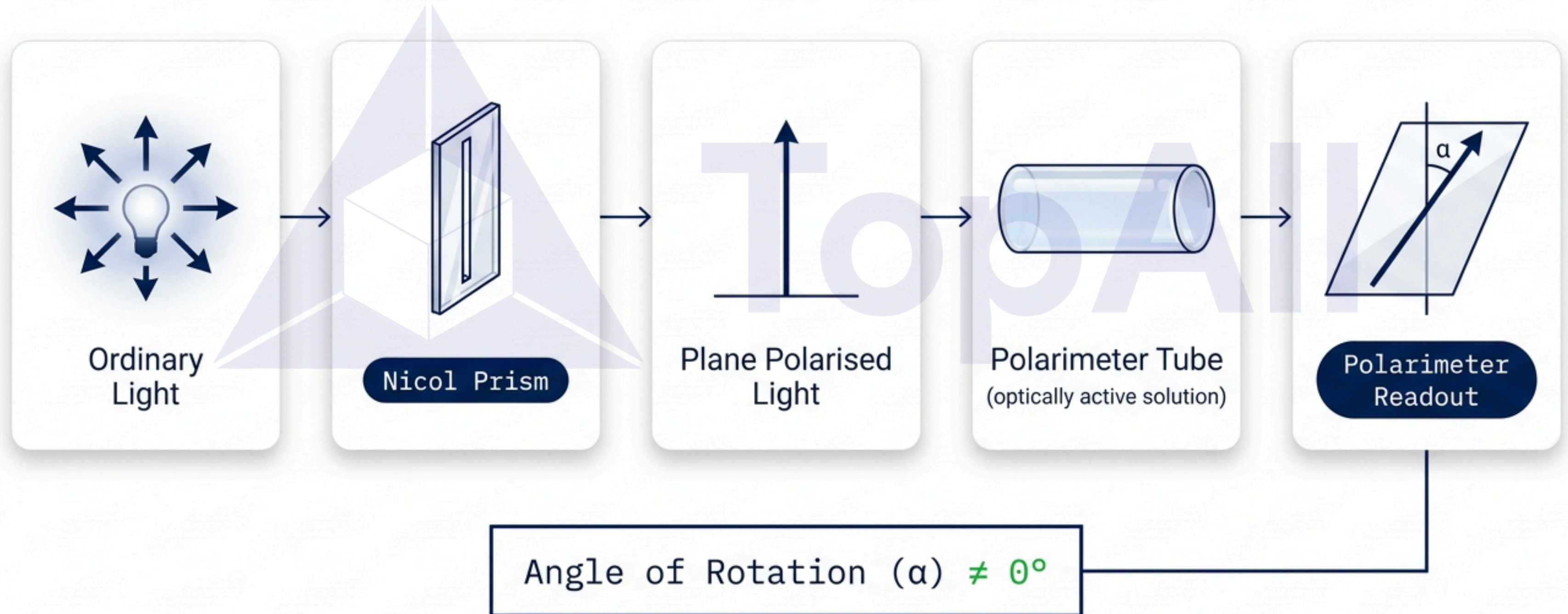


Chirality: Mirror Image Chemistry

Understanding Optical Activity and Molecular Asymmetry



The Polarimeter: Measuring Optical Activity



Direction of Rotation: Two Possible Outcomes



[d-form]

[(+)]

Dextrorotatory

Rotates the plane of polarised light to the right.

Clockwise



[l-form]

[(-)]

Laevorotatory

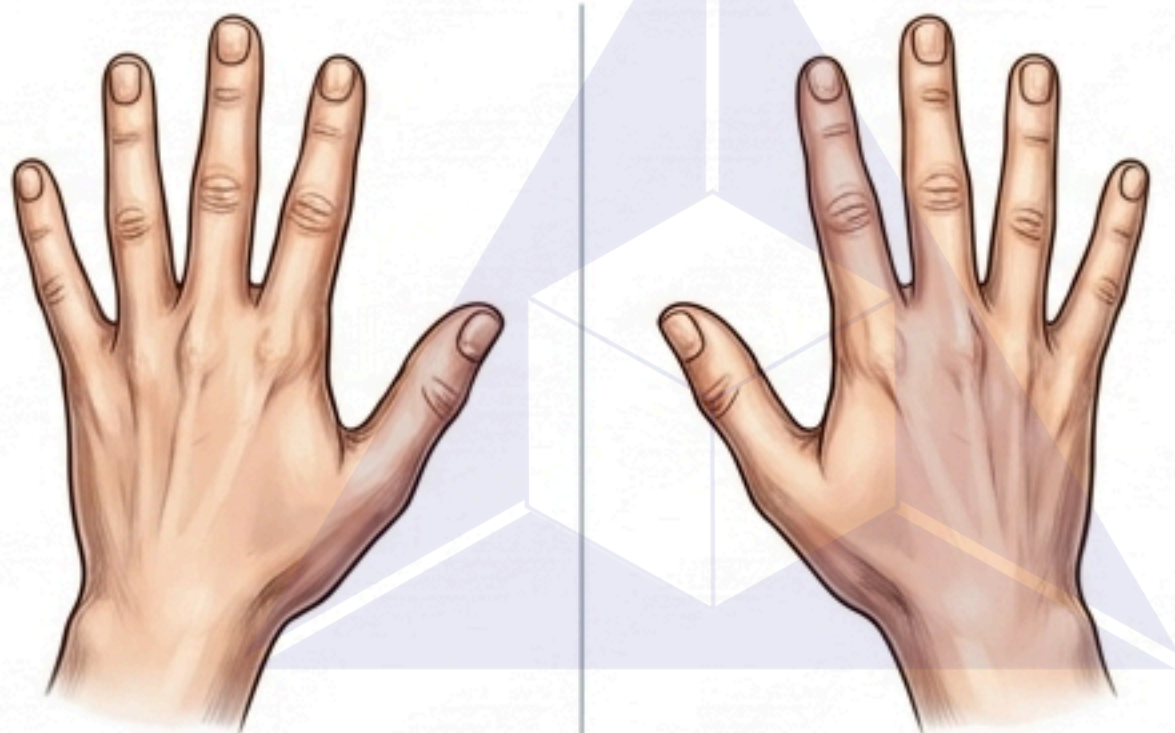
Rotates the plane of polarised light to the left.

Anticlockwise

Chirality in the Physical World

Mirror Line

[Chiral]



Non-superimposable mirror images.



Alert: A left hand cannot physically align over a right hand.

[Achiral]



Superimposable mirror images.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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Practice Now



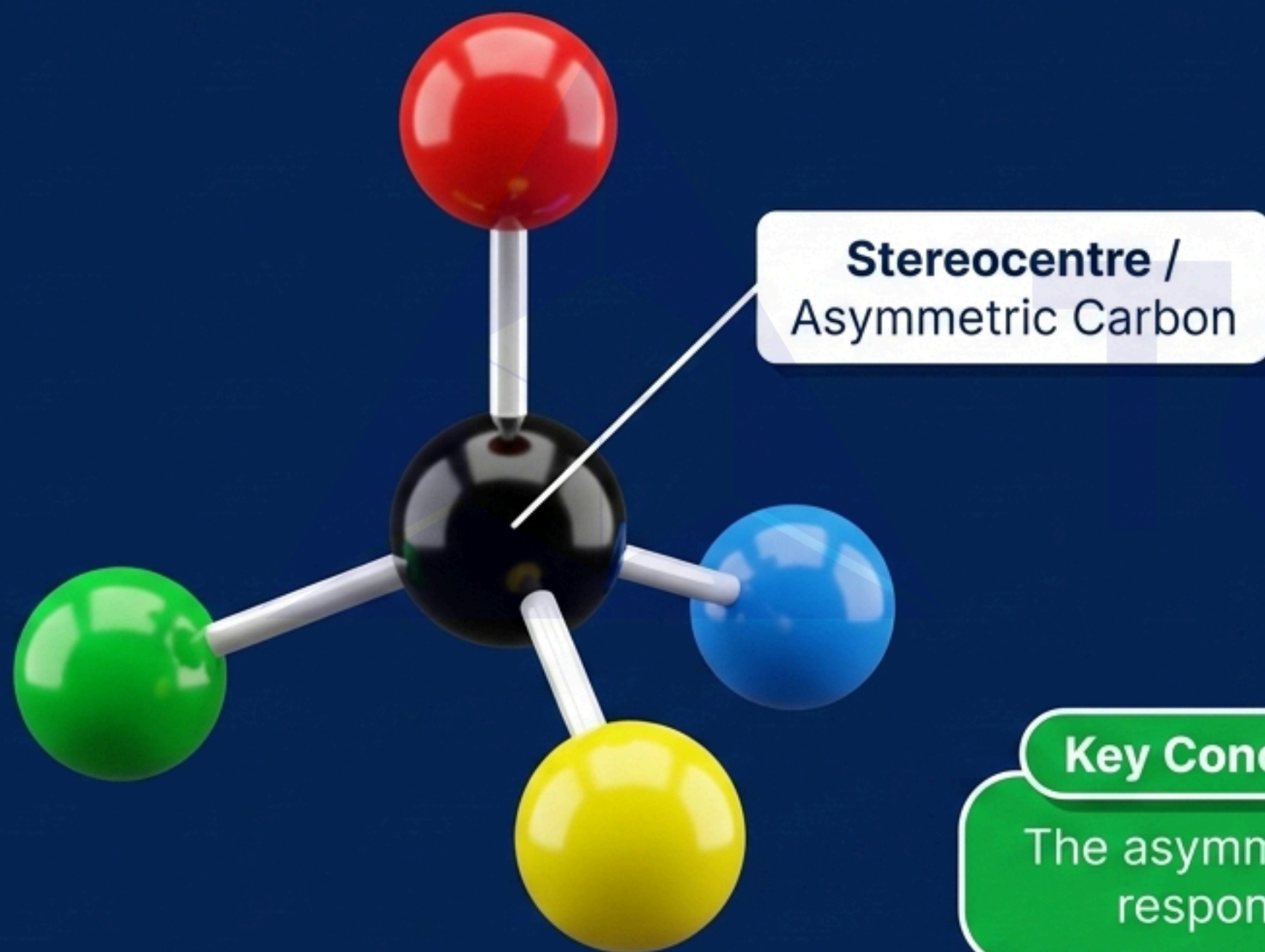
At prep.topall.app

Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The Stereocentre: The Root of Asymmetry



Key Concept

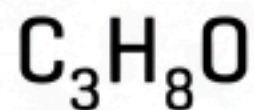
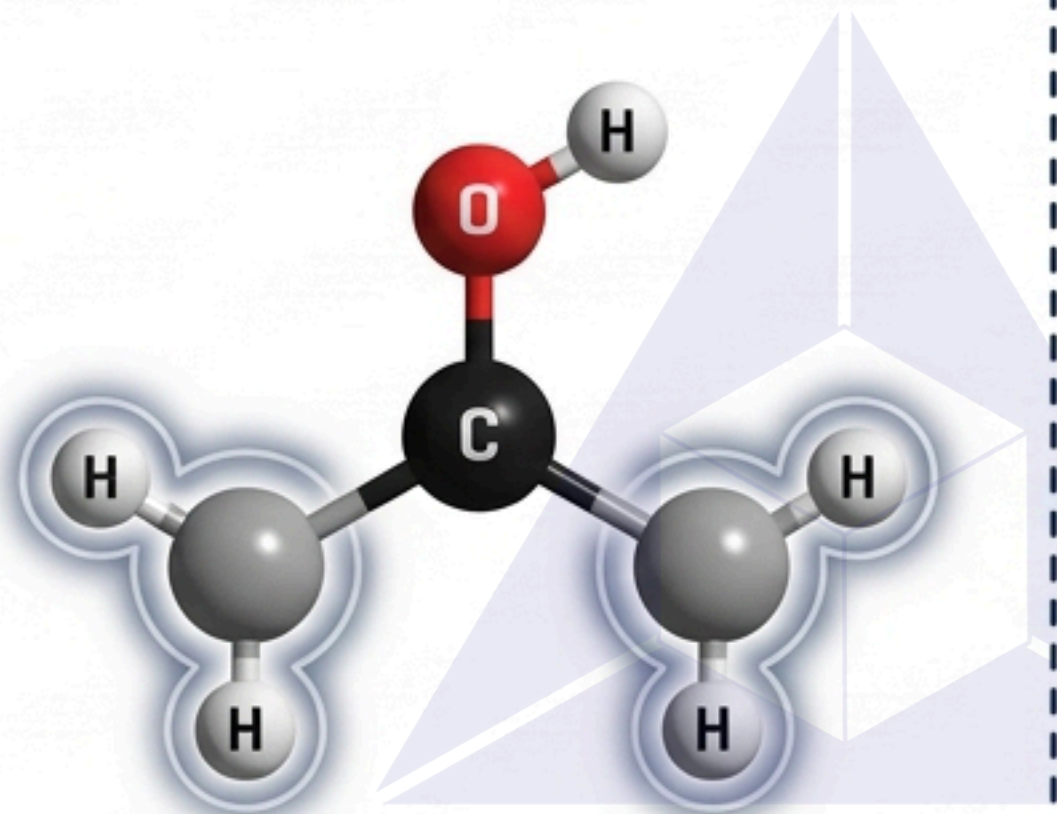
The asymmetry of the molecule is directly responsible for its optical activity.

Specimen Card

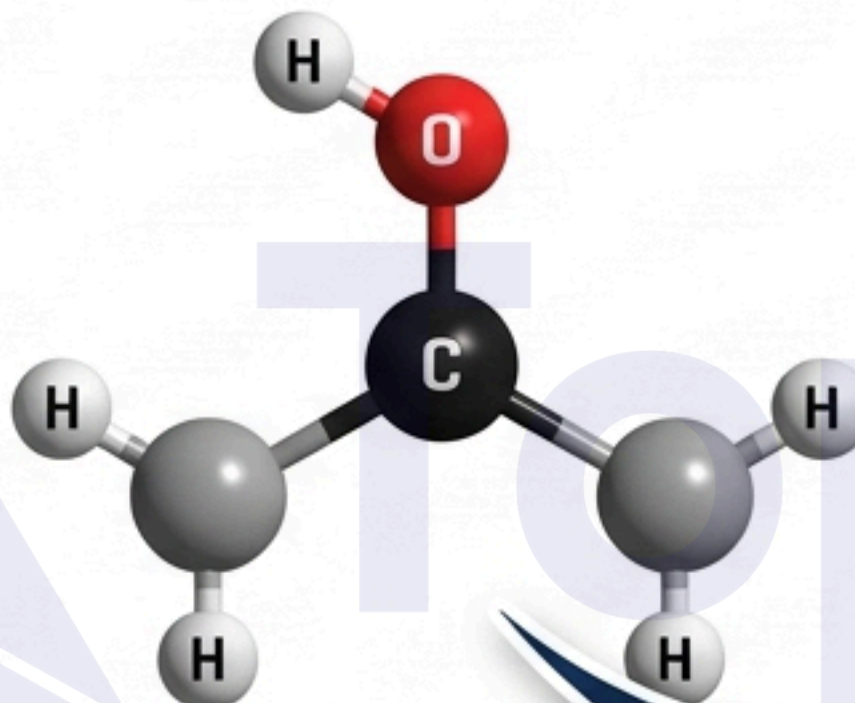
- ☒ 1. sp^3 hybridized (Tetrahedral geometry).
- ☒ 2. Attached to four **different** substituent groups.
- ☒ 3. Lacks any internal plane of symmetry.

Testing for Chirality: Propan-2-ol

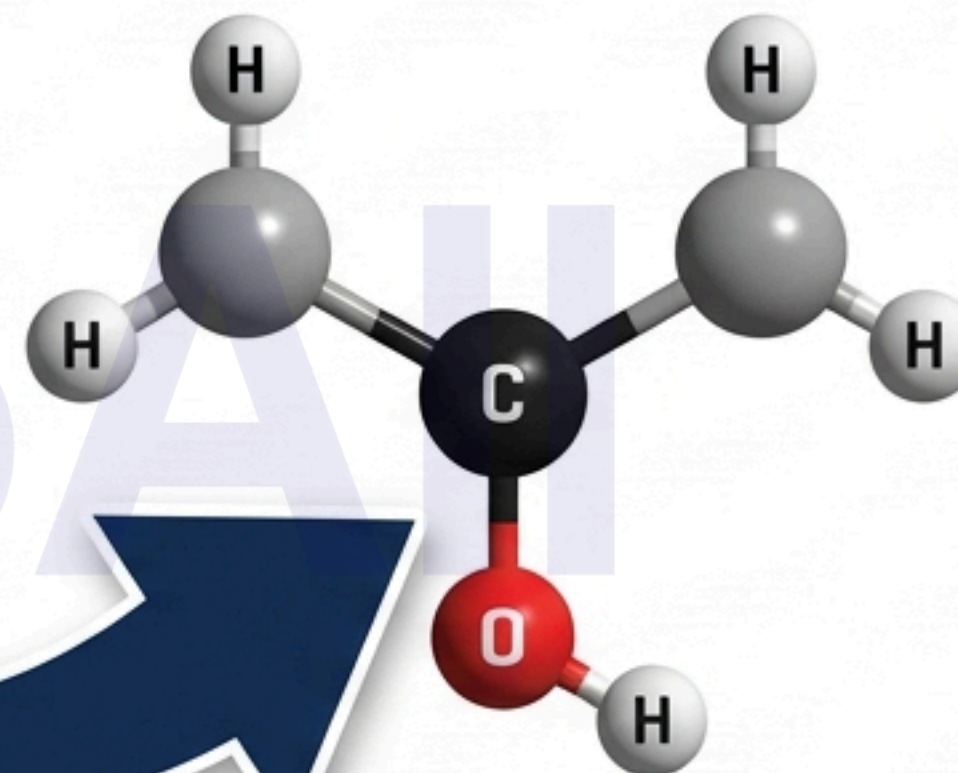
Structure A



Structure B
(Mirror Image)



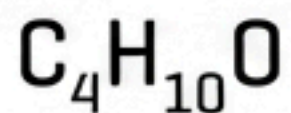
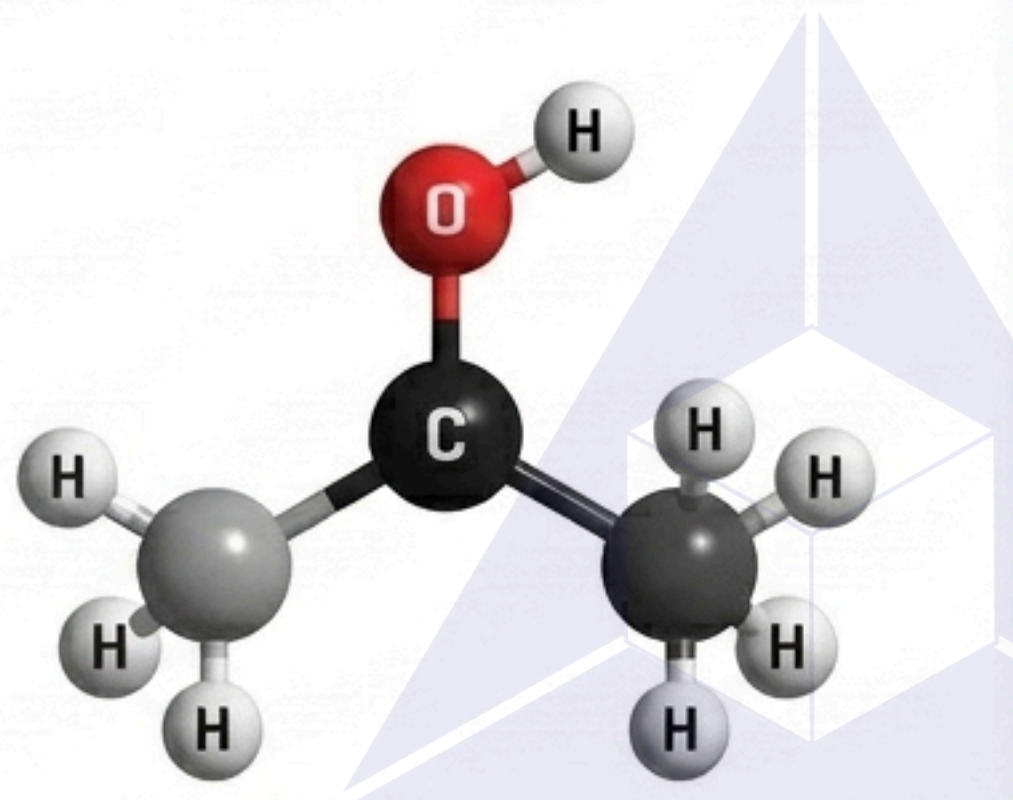
Structure C
(Rotated 180°)



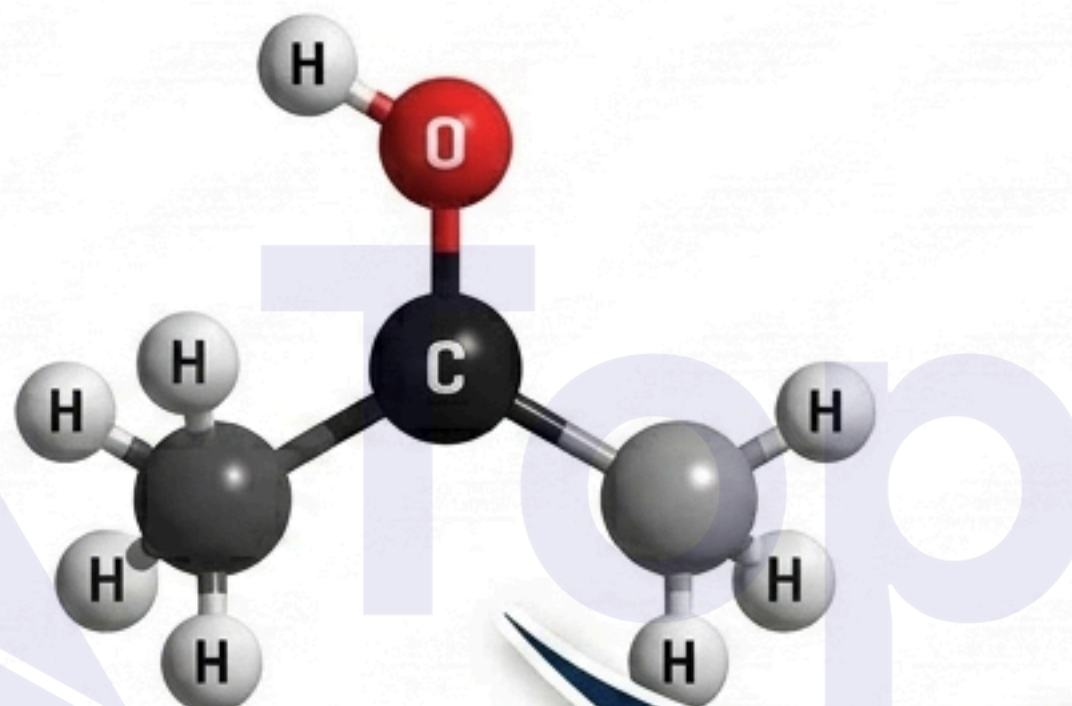
Key Concept Perfect Overlap. Achiral: Superimposable and Optically Inactive.

Testing for Chirality: Butan-2-ol

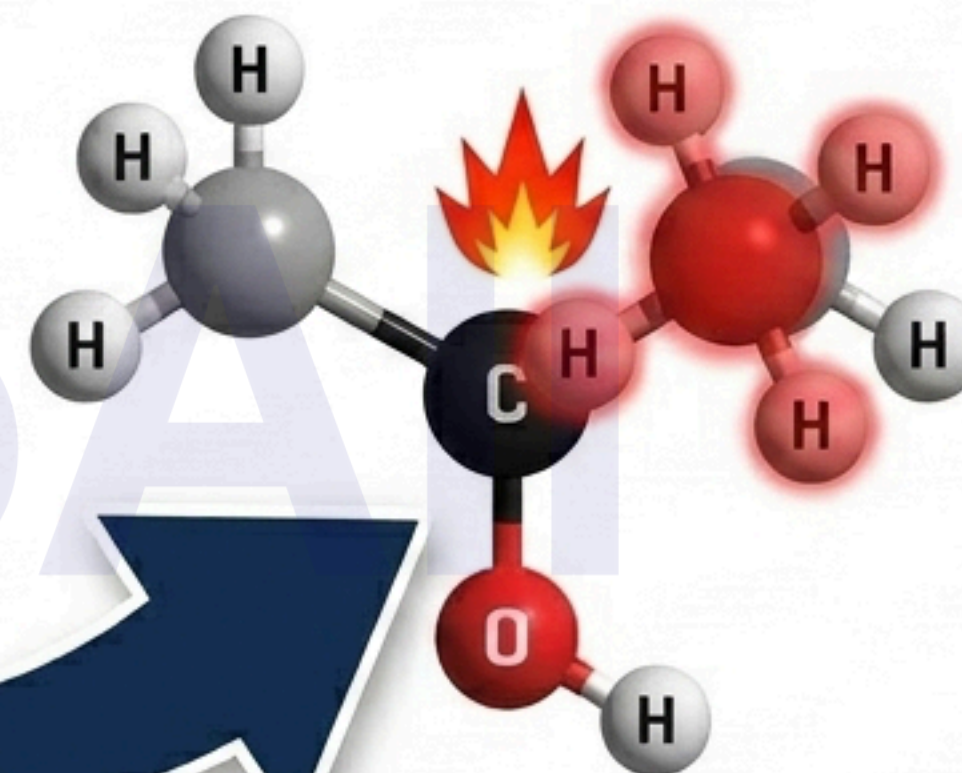
Structure D



Structure E
[Mirror Image]

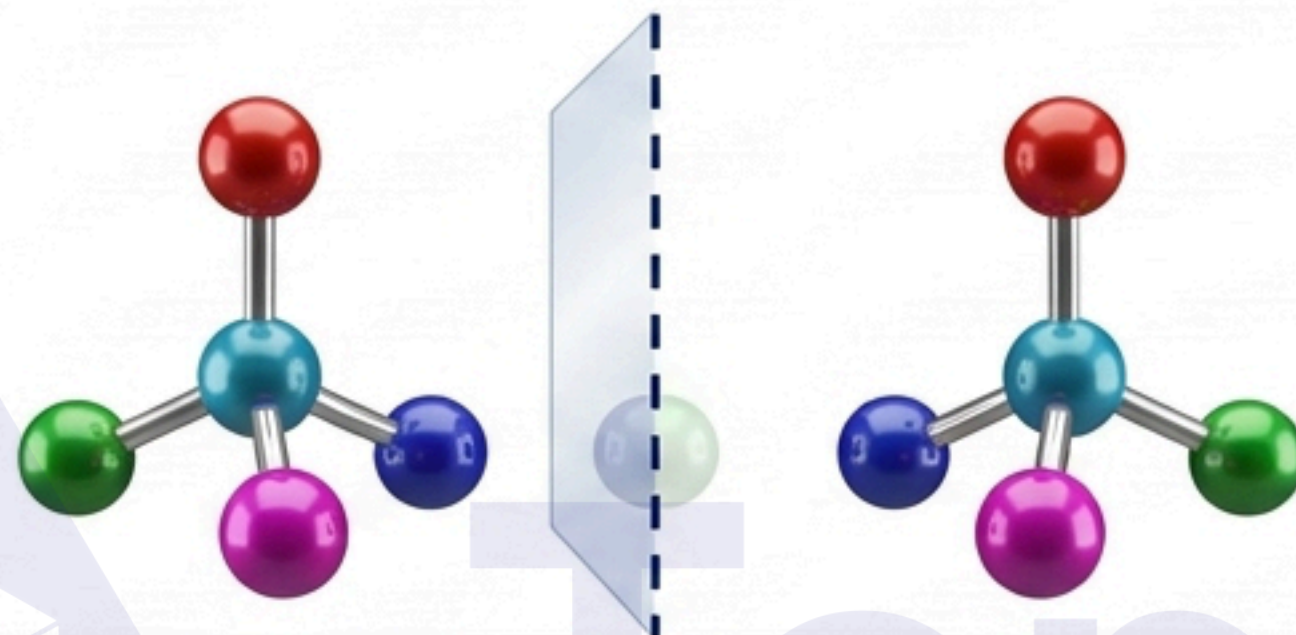


Structure F
[Rotated 180°]



Key Concept Overlap Failed. Chiral: Non-superimposable and Optically Active.

Enantiomers: Chemical Twins



Enantiomers: Stereoisomers related as non-superimposable mirror images.

Identical Properties	Different Properties
Melting point, boiling point, refractive index.	Direction of optical rotation (+ vs -).

The Racemic Mixture: Balancing the Scales

Racemisation – the conversion of an enantiomer into a racemic mixture.

50% Dextrorotatory (+)

50% Laevorotatory (-)

Result: The optical rotations cancel each other out completely.

Nomenclature:
Represented by the prefix ($\pm$) or *dl*

Net Optical Rotation = 0°



You've Learned the Theory.

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