SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai

Approved by Pharmacy Council of India, New Delhi.

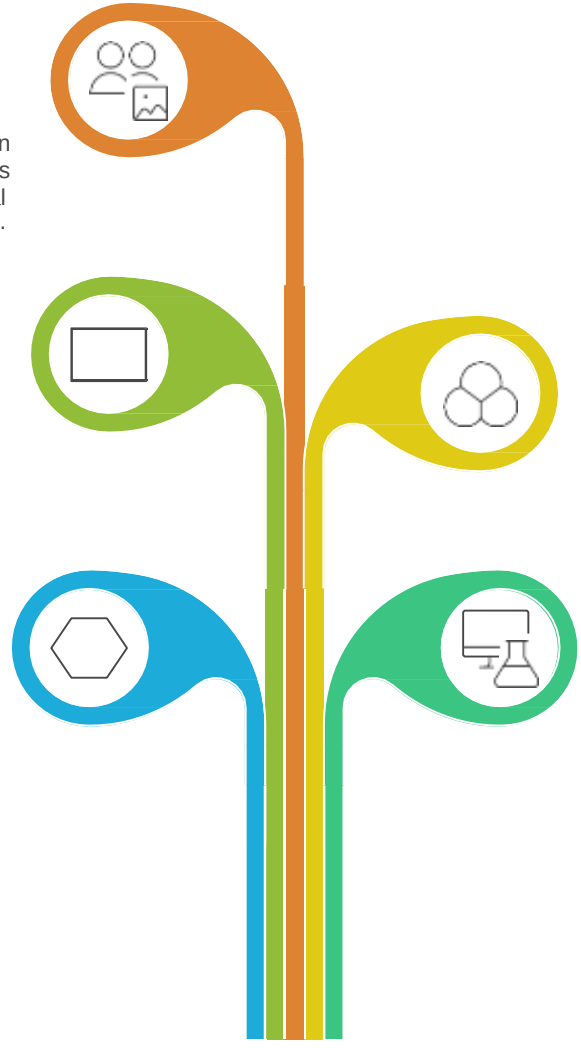
Coimbatore -641035

COURSE NAME : PHARMACEUTICAL ORGANIC CHEMISTRY-II

B.PHARM III SEM / II YEAR

TOPIC 1 : ORIENTATION AND REACTIVITY OF REACTIONS

Unveiling Orientation and Reactivity in Chemistry



Applications

Advances research in pharmaceuticals, materials science, and environmental chemistry.

Reaction Mechanisms

Provides deeper understanding of how reactions occur.

Orientation

Influences reaction pathways and product formation significantly.

Synthetic Routes

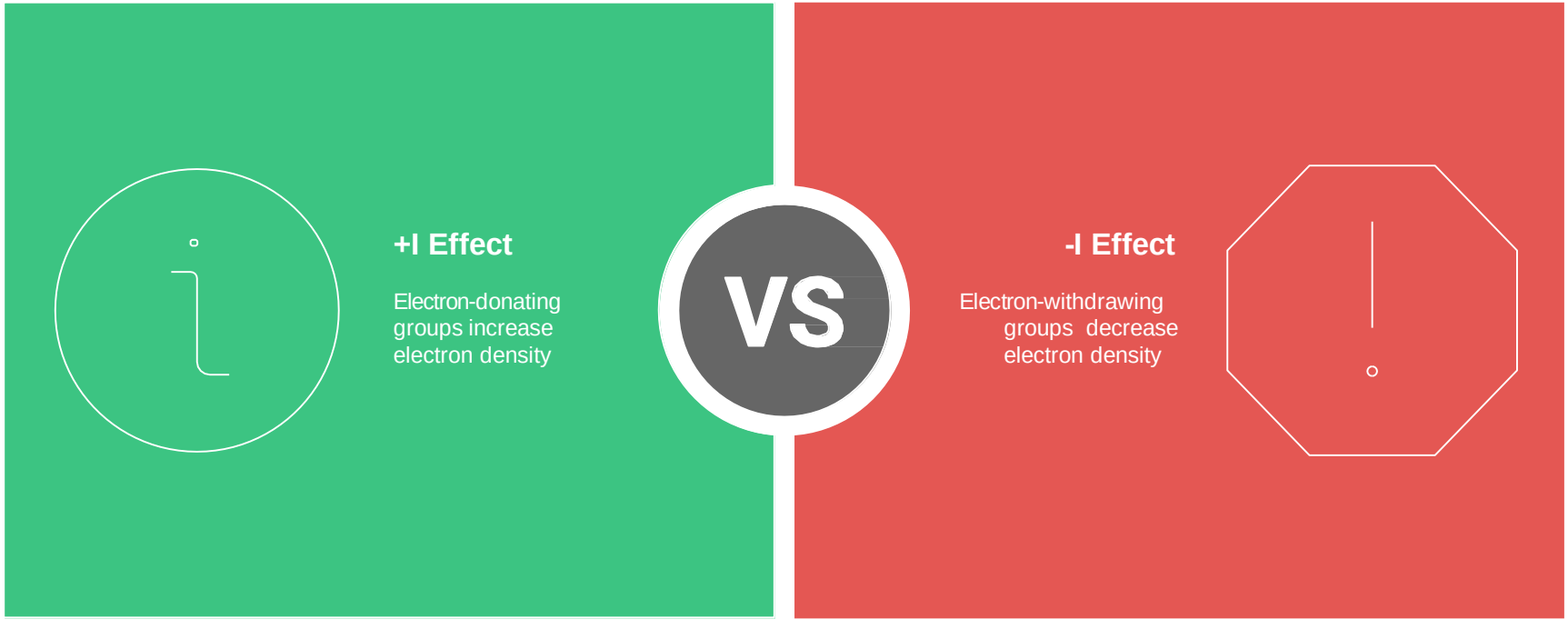
Enables design of more efficient chemical synthesis methods.

Reactivity

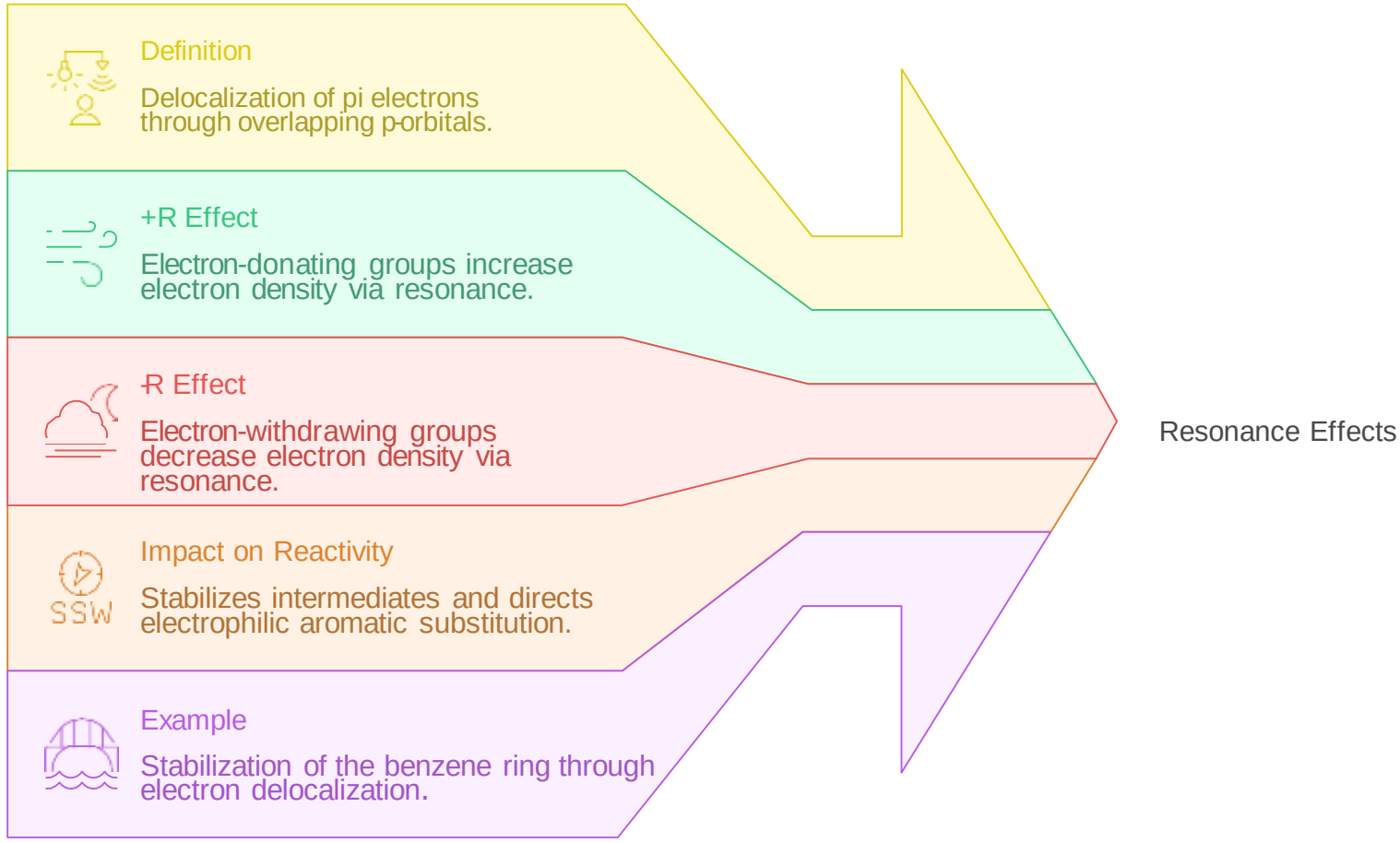
Determines a substance's tendency to undergo chemical changes.

What is the importance of reactivity and orientation in organic chemistry?

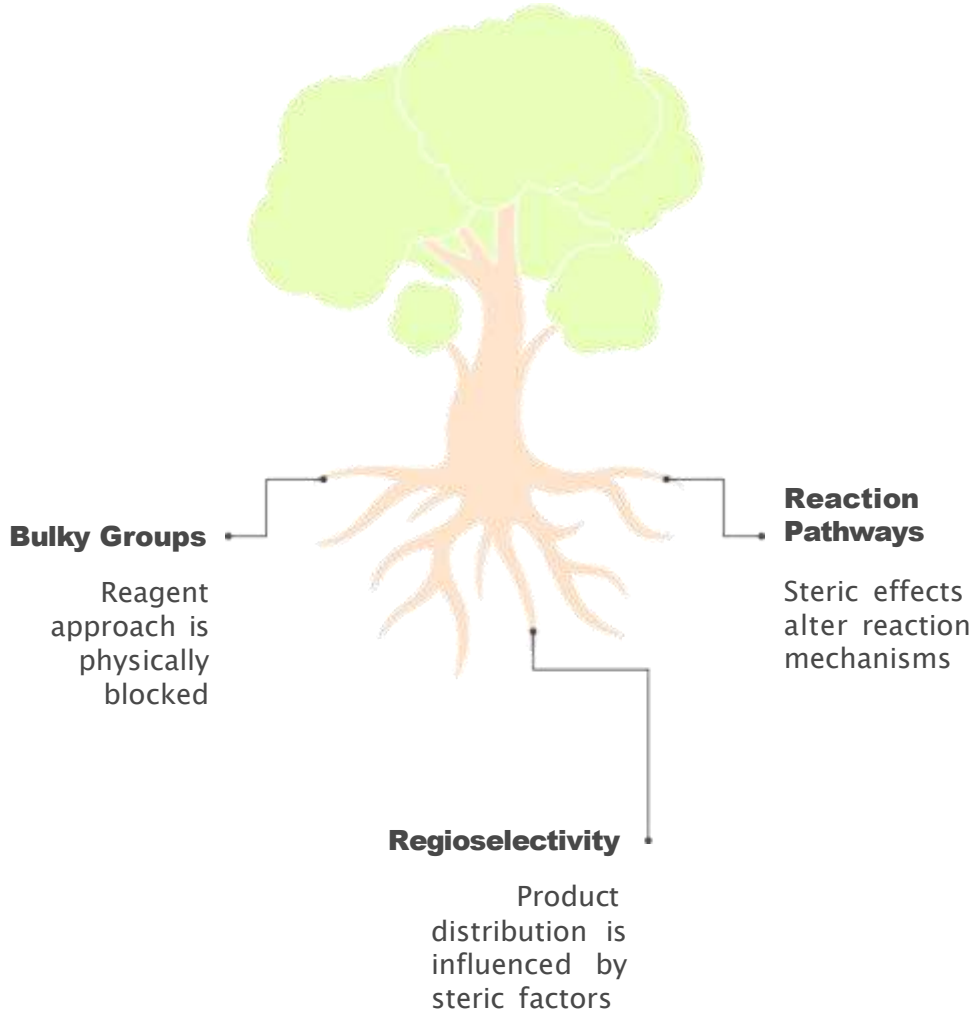
How do electronic effects influence reactivity in organic chemistry?



Understanding Resonance in Organic Chemistry



Steric Hindrance Impedes Chemical Reactions



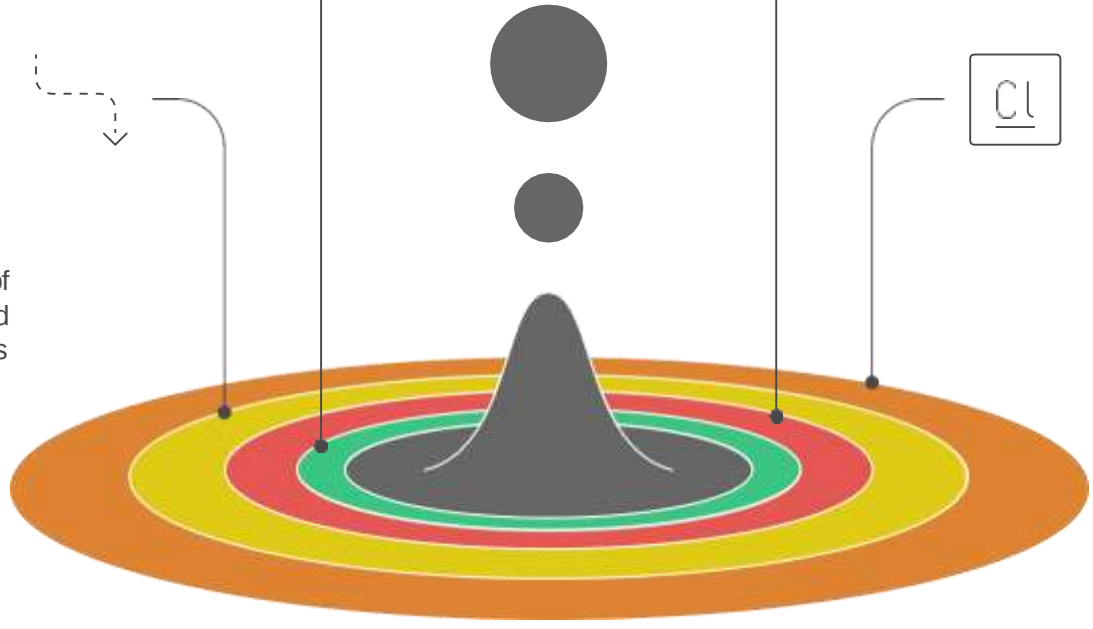
Leaving Group Ability

Good Leaving Groups

Weak bases that readily depart

Impact on Reactivity

Determines the rate of substitution and elimination reactions

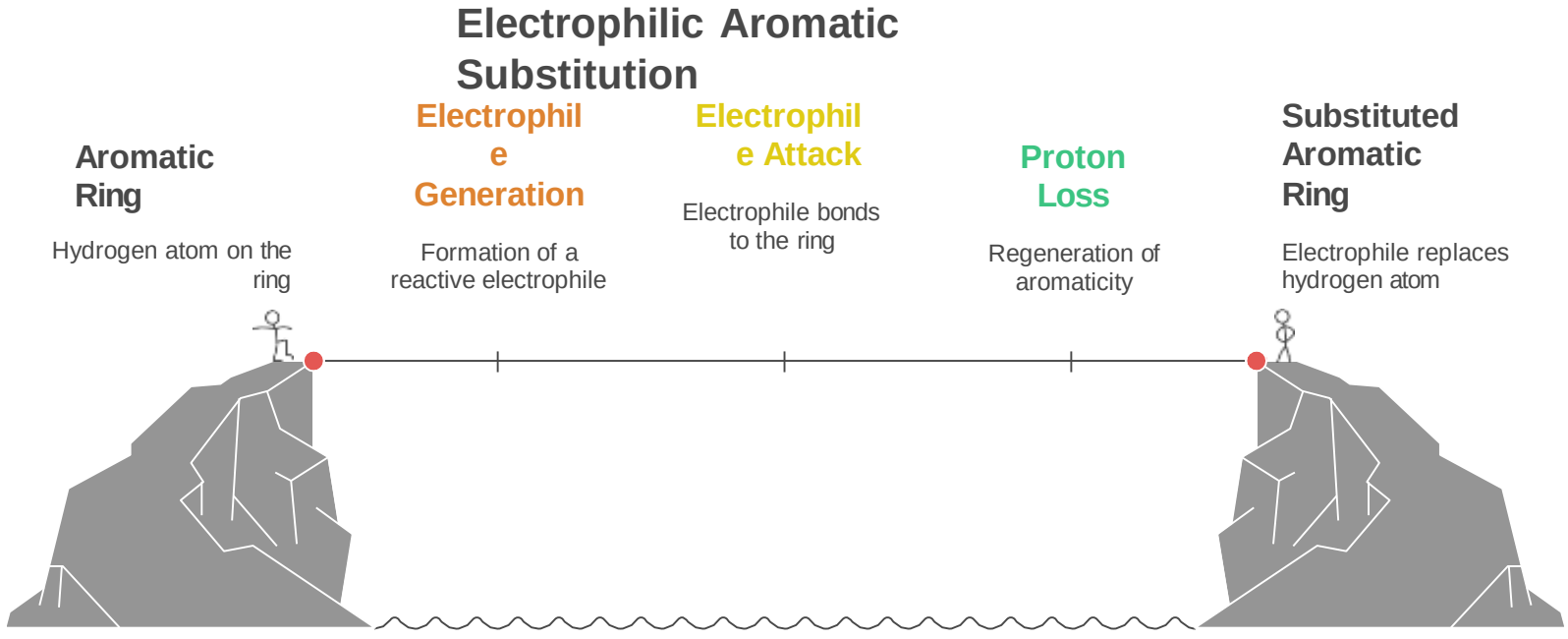


Poor Leaving Groups

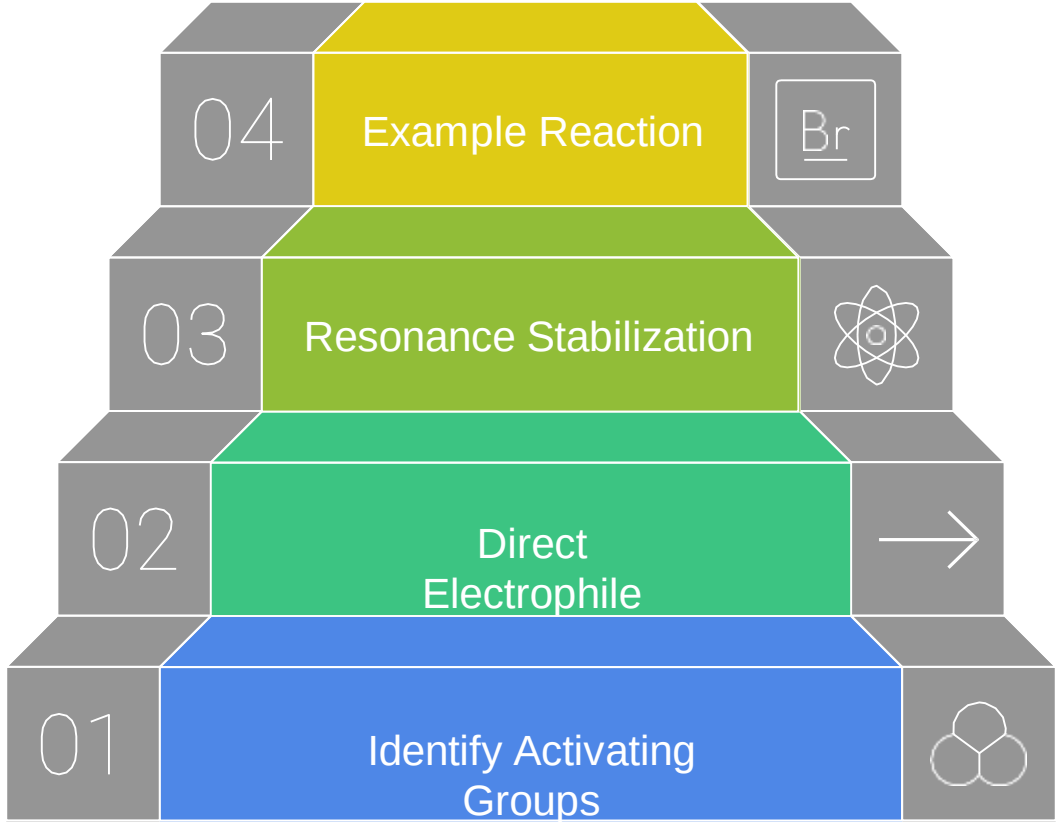
Strong bases that resist departure

Halides as Leaving Groups

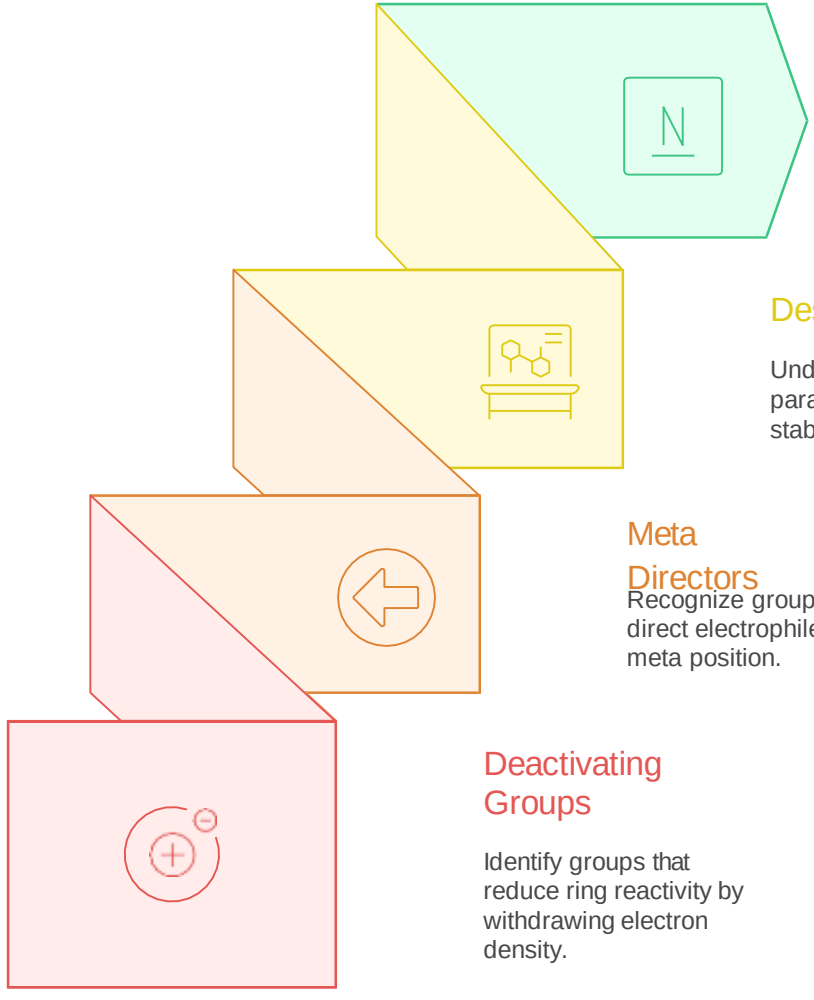
Common in SN1 and SN2 reactions


Electrophilic Aromatic Substitution
Aromatic Ring
Hydrogen atom on the ring
Electrophile Generation
Formation of a reactive electrophile
Electrophile Attack
Electrophile bonds to the ring
Proton Loss
Regeneration of aromaticity
Substituted Aromatic Ring
Electrophile replaces hydrogen atom

Understanding Activating Groups in EAS



Understanding Meta Directors in EAS



Nitrobenzene Nitration

Observe a specific example of meta direction.

Destabilization

Understand why ortho and para positions are less stable.

Meta Directors

Recognize groups that direct electrophiles to the meta position.

Deactivating Groups

Identify groups that reduce ring reactivity by withdrawing electron density.

Halogens in Electrophilic Aromatic Substitution

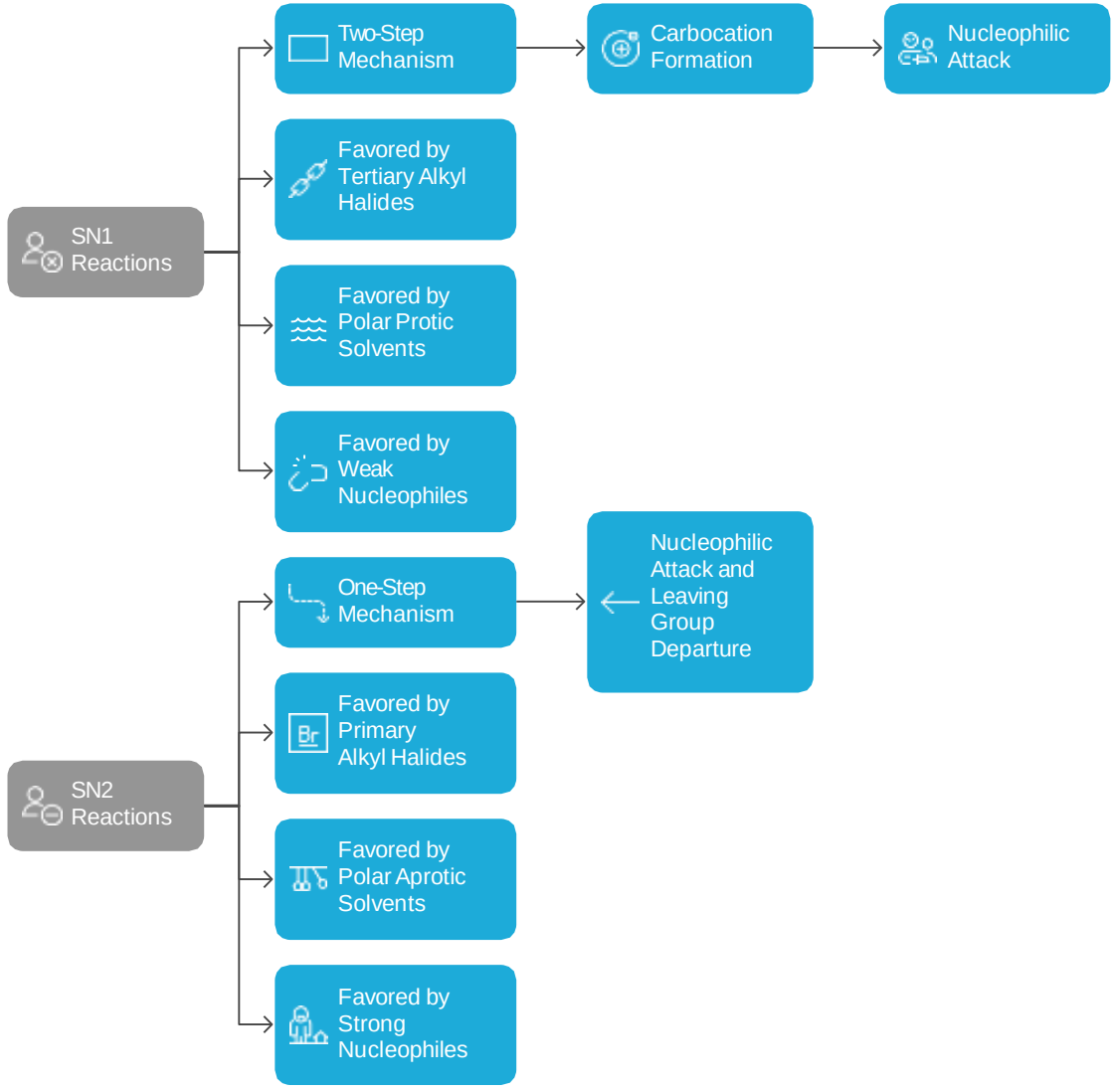
Why are halogens deactivating in EAS?

Due to their electronegativity (-I effect).

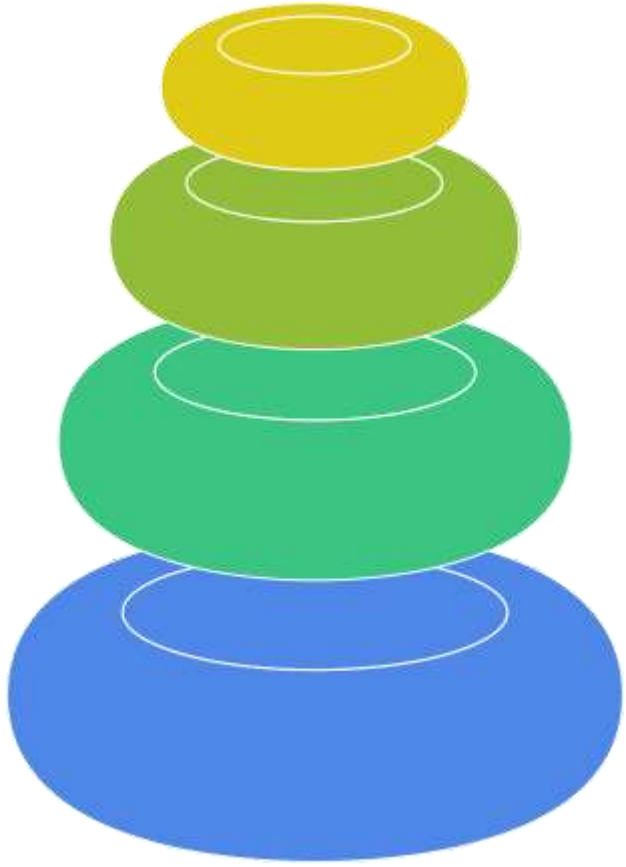
Why are halogens ortho/para directing?

Due to resonance (+R effect), which stabilizes the intermediate carbocation.

SN1 and SN2 Reaction Mechanisms

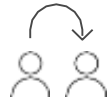


SN1 vs SN2 Reaction Factors



Solvent Effects

Polar protic for SN1, polar aprotic for SN2

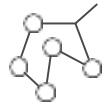


Leaving Group Ability

Good leaving group favors both

Nucleophile Strength

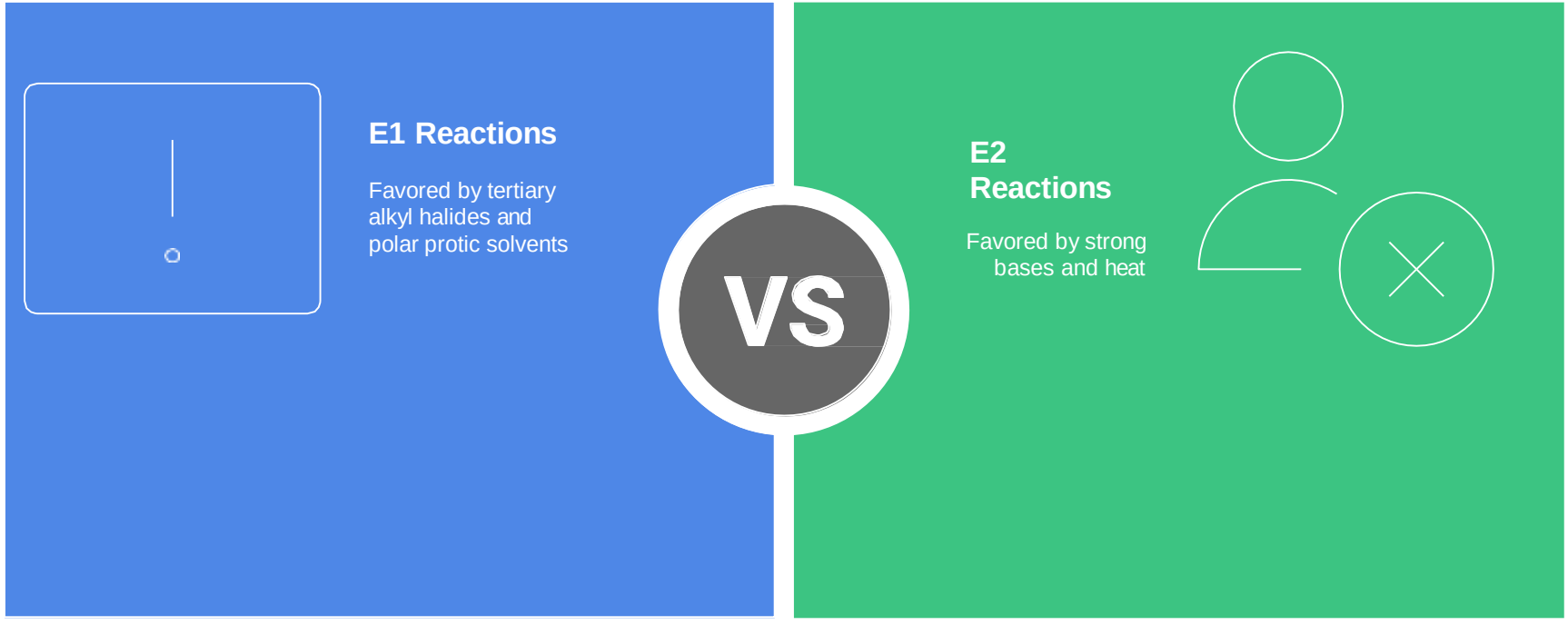
Weak for SN1, strong for SN2



Substrate Structure

Tertiary favors SN1, primary favors SN2

Choose the appropriate elimination reaction for a given substrate and conditions.



Zaitsev's Rule

What is the major product in an elimination reaction?

The major product is the more substituted alkene.

Why is that?

More substituted alkenes are generally more stable due to hyperconjugation.

Are there any exceptions?

Bulky bases can lead to the formation of the less substituted (Hoffman) product due to steric hindrance.

REFERENCES

1. Morrison, R.T., and Boyd, R.N.Organic Chemistry, 6th Edition, Prentice-Hall of India Pvt. Ltd.→Excellent for electrophilic aromatic substitution, mechanism arrows, and orientation effects.

2.Carey, F.A., and Sundberg, R.J. Advanced Organic Chemistry, Part A:Structure and Mechanisms, 5th Edition, Springer.→Covers detailed mechanistic explanations of orientation and substituent effects.

3.Solomons, T.W. Graham, Fryhle, C.B., and Snyder, S.A.Organic Chemistry, 12th Edition, Wiley.→Clear diagrams and conceptual explanations for directing effects.


THANK
YOU!