Welcome

Dr. Pallavi Kadam

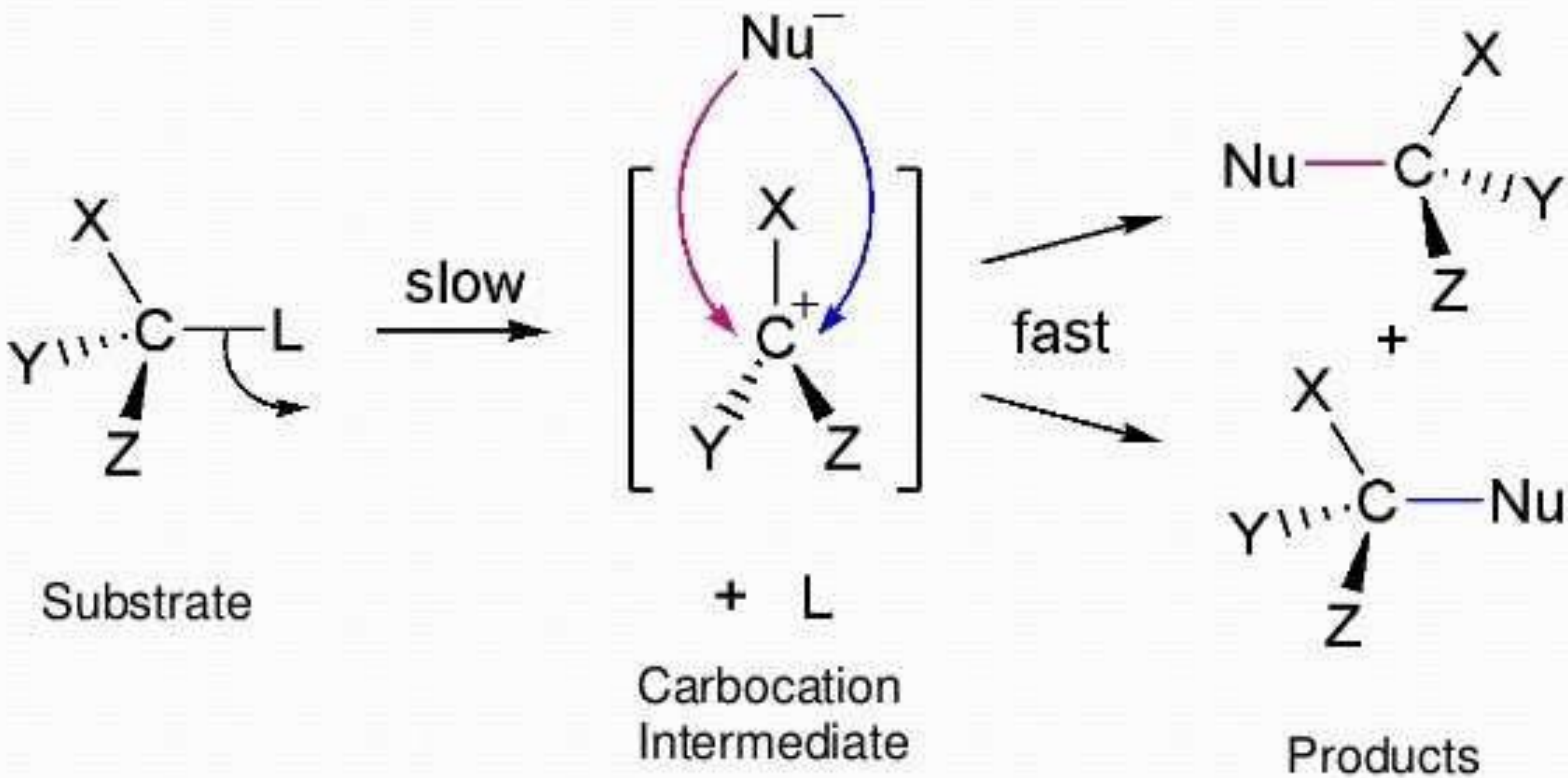
Content……

- SN1 Reaction
- SN2 Reaction

The S_N1 Reaction

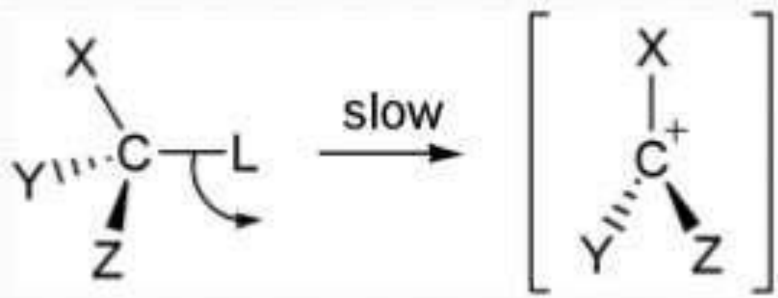
- Substitution
- Nucleophilic
- Unimolecular

The S_N1 Reaction



The S_N1 Reaction

1. The Slow Step:



First step of the SN1 reaction:

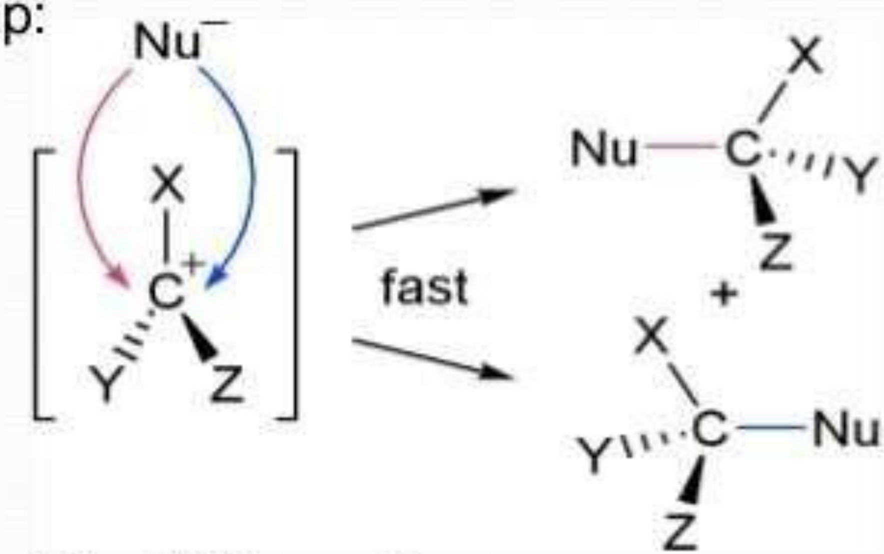
The leaving group leaves, and the substrate carbon now only has thre
- Carbocations are most stable when there are more atoms to distribute
- Carbocation stability:

$$3^\circ > 2^\circ >> 1^\circ$$

- Tip: study the difference between reaction intermediates and transition state

The S_N1Reaction

2. The Fast Step:



Second step of the SN1 reaction:

The nucleophile attacks the carbocation intermediate, bringing its ele

.The substrate loses any stereospecificity during the carbocation inter

The S_N2Reaction

Substitution

Nucleophilic

Bimolecular

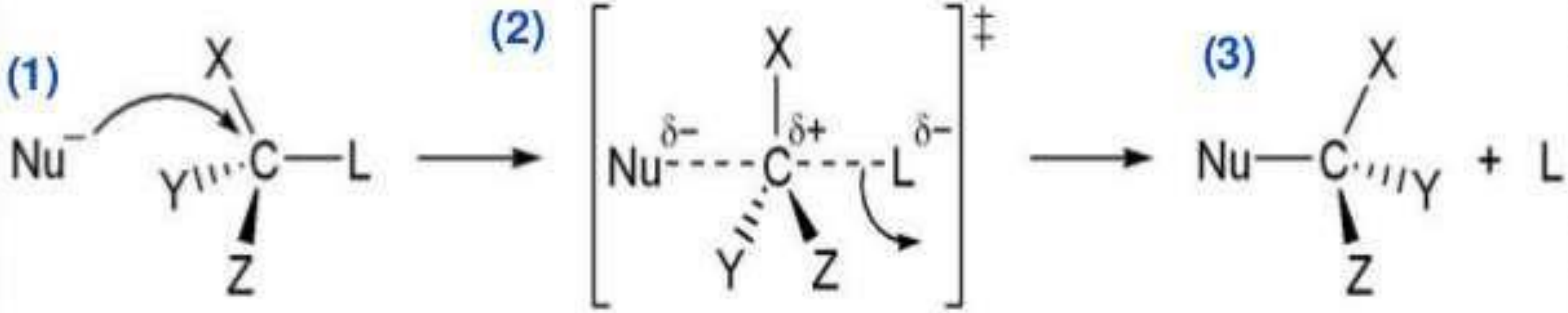
The S_N2 Reaction

Substitution: this reaction involves a *substitution* of players – two reactants produce two products, in which some things have been switched around:

$$AB + C \longrightarrow AC + B$$

- Tip: think of this if you get elimination (E1 and E2) reactions mixed up with substitution (SN1 and SN2) reactions.

The S_N2 Reaction



Transition State

SN2 summary:
(1) Nucleophile back-side attacks the δ+ carbon center.
(2) Transition state forms in which nucleophile is forming bo
(3) The leaving group leaves, forming the final product.

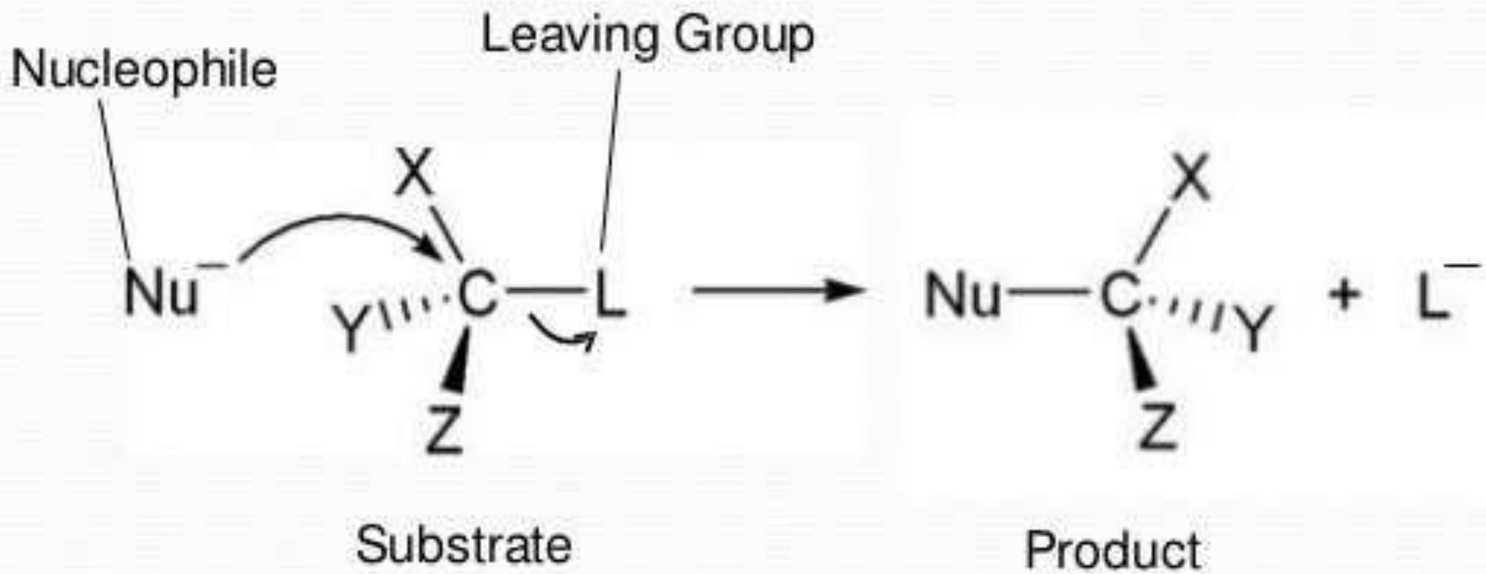
The S_N2 Reaction

Nucleophilic: these reactions involve a nucleophile (Nuc:$^-$) replacing a leaving group.

- Nucleophiles attack the substrate, donating an electron pair to the new bond, and replacing the leaving group (a substitution).

- Tip: Remember the role of a nucleophile by its Greek roots: **Nucleo**-(nucleus)-**phile**-(lover) – it is attracted to the nucleus, which is positively charged! Nucleophiles are therefore negatively charged or strongly δ-.

The S_N2 Reaction



The S_N2 Reaction

Bimolecular: A *bi*molecular reaction is one whose rate depends on the concentrations of *two* of its reactants.

- SN2 reactions happen in one step – the nucleophile attacks the substrate as the leaving group leaves the substrate.
- Tip: Recall that the rate of a reaction depends on the slowest step. In bimolecular reactions, therefore, the slow step involves two reactants. For SN2 reactions, there are only two reactants; this means that the slow step is the *only* step.

Thank You!