



Chapter- Organic chemistry some basic principle and techniques and halo alkanes and halo arenes

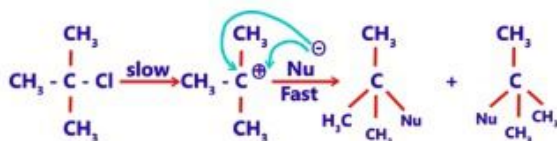
Topic- Reaction intermediate & attacking reagents and chemical properties of halo alkanes & halo arenes

CLASS – XI, XII

DESCRIPTION

The nucleophilic substitution reactions is very common in alkyl halides but these reactions can take place by these mechanisms based on Substrate and Solvents

1) S_N1 reactions (Substitution Nucleophilic Unimolecular Reactions)



In this mechanism carbocation is the intermediate.

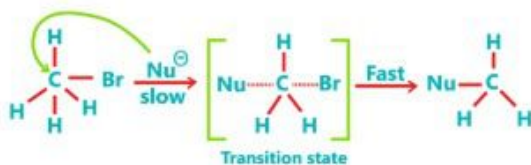
Reactivity order of alkylhalides - $3^\circ > 2^\circ > 1^\circ$

Stereo chemistry of products – Retention and Inversion

Solvent - Polar protic solvents (eg alcohols).

In S_N1 reaction since the slow step involves only on the substrate, So the molecularity of the reaction is one.

2) S_N2 Reactions (Substitution Nucleophilic Bimolecular Reactions)



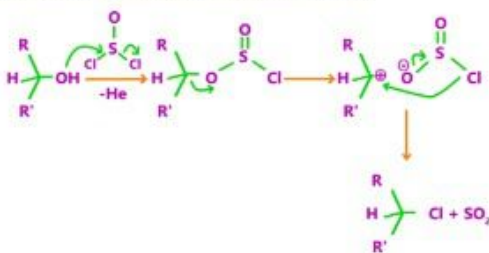
In this mechanism transition state is the intermediate.

Due to steric hindrance the nucleophilic attacks from the back side to the product have inversion of configuration.

Reactivity order alkylhalides - $1^\circ > 2^\circ > 3^\circ$.

Solvents – Polar aprotic solvents (DMSO, acetone etc).

3) S_Ni Reaction (Substitution Nucleophilic Internal)



The solvents used in S_Ni reaction is diethylether or THF.

During the S_Ni reaction there occurs an internal transformation through a cyclic transition state to which attack of chloride from front side leads to retention in configuration.

Note : If pyridine is used as a solvent it will react with thionyl chloride to form pyridinium chloride. Hence the chloride ion attacks the carbon atom from the back side. As a result inversion of configuration of product takes place. So the mechanism is not S_Ni but is actually S_N2 .

