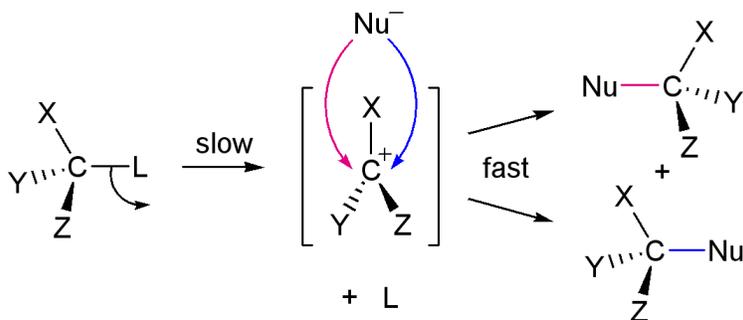


Question #57707, Chemistry / Organic Chemistry

How to sketch the mechanism of a halogenoalkane hydrolysis?

Answer:

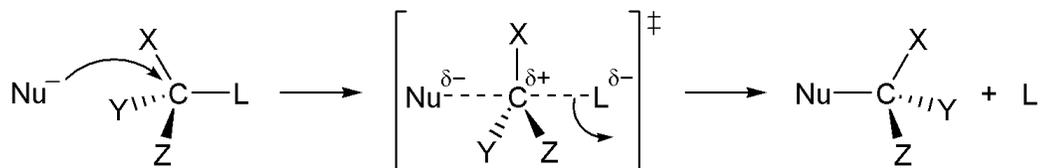
The halogenoalkane hydrolysis is a nucleophilic substitution reaction, which has two mechanisms. They differ from stereochemical and kinetic points of view, and depending from the substrate structure, only one of them will proceed. Therefore, in case of tertiary alkyl halides hydrolysis takes place by S_N1 mechanism:



Where Nu is the nucleophile, which is usually a hydroxyl-ion OH^- , L is the so-called "leaving group", which is the halogen ion. And X, Y, Z are the substituents of tertiary carbon atom.

As you can see, one obtains a racemic mixture of products without any control of the reaction stereoselectivity.

And when primary alkyl halides are hydrolyzed, it takes place via S_N2 mechanism:



Product of this reaction has stereoconfiguration opposite to the reacted substrate, but without any side enantiomers.

As an example, here is the mechanism of ethylbromide base-catalyzed hydrolysis:

