Elimination-Addition Mechanism

Transcript

Instructor: Jessie Key

00:00:00:00 - 00:00:18:62
Instructor: Hello again, Doctor Jessie Key here. In this video, you'll be exploring the elimination addition mechanism. Elimination addition reactions occur via a four-step reaction mechanism, proton transfer, loss of lemon group, nucleophilic attack, and a second proton transfer.

00:00:18:62 - 00:00:37:24
Instructor: Let's push some arrows and see how this mechanism occurs. In this example, our substrate is four chlorotoluene, and the nucleophile is amide ion. In the first step, a proton transfer occurs where the nucleophile acts as a base to remove a proton at the position ortho to the leaving group.

00:00:40:60 - 00:01:15:60
Instructor: The arrow starts at the lone pair of the amide ion nitrogen to extract the proton from the Ortho position. This causes the Sigma bond electrons to form a new lone pair and a formal negative charge on the carbon beside the leaving group. Next, the newly formed lone pair forms a pi bond between the Ortho carbon and the carbon bearing the leaving group, which causes the carbon Sigma bond to break and those electrons go onto the chlorine atom to eject it as the leaving group, chloride.

00:01:22:74 - 00:02:15:27
Instructor: The benzyne intermediate is now formed and can readily undergo nucleophilic attack from the amide ion at either of the two benzine carbons, one or two. Starting at the lone pair of the amide ion, an arrow is drawn to one of the benzine carbons, which causes one of the benzine Pi bonds to move to form a lone pair on the other benzine carbon. The final step features a proton transfer, starting at the newly formed lone pair, the arrow is drawn to form a new Sigma bond to one of the protons of ammonia.

00:02:15:27 - 00:02:34:59
Instructor: Then each Sigma bond breaks, and those electrons go the nitrogen atom as a lone pair. As a result of this elimination addition, both four methylaniline and three methylaniline are formed as products.