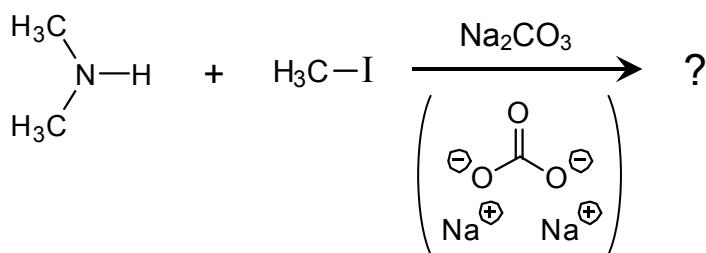


Chemistry 2301

Workshop 13 Multistep Reaction Mechanisms

Diethylamine $[(\text{CH}_3)_2\text{NH}]$ is a great nucleophile, and alkyl halides like methyl iodide (CH_3I) add to it readily via the $\text{S}_{\text{N}}2$ mechanism. One interesting characteristic of this reaction, though, is that it is impossible to make the reaction stop at just one addition; no matter how the reaction is run, a second molecule of CH_3I will add to nitrogen after the first.



Draw a multistep mechanism that shows how two molecules of CH_3I add successively to each molecule of $(\text{CH}_3)_2\text{NH}$. Because this reaction has the elements of both an $\text{S}_{\text{N}}2$ and an acid-base reaction, your mechanism will require a base. In a chemistry lab, this reaction would be run in the presence of a non-nucleophilic base (like the Na_2CO_3 shown above)—so use this base in your mechanism—but solvent or diethylamine itself could also act as the base.