Examples of E2 Reactions of Alkyl and Allylic Halides

I 41b

\[ \text{NaOEt, EtOH} \quad \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{Cl} \\
\end{array} \rightarrow \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{Cl} \\
\end{array} + \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{Cl} \\
\end{array} + \text{S_N2} \]

\[
\begin{array}{c}
22 \\
\end{array} : \begin{array}{c}
78 \\
\end{array}
\]

"Zaitsev's" rule

(equatorial Cl cannot undergo E2 elimination)

M 889

\[ \text{NaOEt, EtOH} \quad \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{Cl} \\
\end{array} \rightarrow \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{Cl} \\
\end{array} + \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{Cl} \\
\end{array} + \text{S_N2} \]

\[
\begin{array}{c}
> 99 \\
\end{array} : \begin{array}{c}
< 1 \\
\end{array}
\]

"Bredt's" rule

M 894

\[ \text{NaOEt, EtOH, 55°} \quad \begin{array}{c} \text{Br} \\
\end{array} \rightarrow \begin{array}{c} \text{Br} \\
\end{array} + \begin{array}{c} \text{OEt} \\
\end{array} \]

\[
\begin{array}{c}
4 \\
\end{array} : \begin{array}{c}
1 \\
\end{array}
\]

COS 508

\[ \text{Br} + \text{DBU} \rightarrow \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{C} \\
\end{array} \]

(91%)

V 5.13

\[ \text{Br} + 39 \text{ g quinoline} + \text{N} \rightarrow \begin{array}{c} \text{H} \\
\text{C} \\
\text{H} \\
\text{C} \\
\end{array} \]

\[
\begin{array}{c}
16 \text{ g} \\
\end{array} : \begin{array}{c}
5.4 \text{ g} \\
\end{array}
\]

(68%)
Examples of E1 Reactions of Alkyl Halides

I 41b

\[
\begin{align*}
\text{Cl} & \quad \xrightarrow{\text{H}_2\text{O}/\text{EtOH} \text{ heat}} \quad \text{H}_2\text{O}/\text{EtOH} \text{ heat} \\
\text{H} & \quad \xrightarrow{\text{etO H}} \\
\end{align*}
\]

1 : 99

"Zaitsev's" rule

I 41b

\[
\begin{align*}
\text{Cl} & \quad \xrightarrow{\text{H}_2\text{O}/\text{EtOH} \text{ heat}} \\
\text{H} & \quad \xrightarrow{\text{etO H}} \\
\end{align*}
\]

32 : 68

I 39d

\[
\begin{align*}
\text{Br} & \quad \xrightarrow{20\% \text{ H}_2\text{O}} \\
\text{H} & \quad \xrightarrow{80\% \text{ EtOH}} \quad \text{80 °C} \\
\end{align*}
\]

5 : 95

I 39d

\[
\begin{align*}
\text{Cl} & \quad \xrightarrow{20\% \text{ H}_2\text{O}} \\
\text{H} & \quad \xrightarrow{80\% \text{ EtOH}} \quad \text{65 °C} \\
\end{align*}
\]

36 : 64

COS: *Compendium of Organic Synthetic Methods*, 1971