(4-Tolylsulfonyl)hydrazones and aldehyde tosylhydrazones are versatile synthetic intermediates. They are used to make stereospecific alkenes, undergo synthetically useful fragmentations, and are used in C-C σ-bond formation. Furthermore, aldehyde tosylhydrazones are more stable than their parent aldehydes, because they do not undergo autoxidation, self-condensation, and hydration. 1

**Preparation:** Ketones and aldehydes condense readily with p-toluenesulfonyl hydrazide to form tosylhydrazones. 1-3

\[
\begin{align*}
\text{O} & \quad \text{C}_7\text{H}_7\text{SO}_2\text{NHNNH}_2 \\
\text{R}_1 & \quad \text{R}_2 \\
\text{NNH Ts} & \quad \text{R}_1' \text{R}_2'
\end{align*}
\]

**Abstracts**

Reaction of tosylhydrazones with n-butyllithium leads to olefinic products via carbene intermediates in the Bamford-Stevens reaction. 4 Deprotonation to make the dianion results in vinyl lithium intermediates, which give the less-substituted alkene in the Shapiro-Heath reaction. 1,5

Tosylhydrazones of certain α,β-epoxyketones undergo fragmentation to yield a ketone and acetylene. 6 This fragmentation can also be applied to the formation of medium-sized rings. 2

Silylated aldehyde tosylhydrazones can be induced to decompose by sigmatropic rearrangement of proposed allylic diazene intermediate to form alkenes. 3

C-C σ bonds can be constructed by the reductive coupling of aldehyde tosylhydrazones with alkyl lithium reagents. 7

**References**


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