Titanium-Mediated Cycloaddition

**Significance:** The authors describe a mild and efficient [3+2] cycloaddition of 2-(trifluoromethyl)-N-tosylaziridine to various nitriles using TiF$_4$ as a Lewis acid, to give the corresponding 4-(trifluoromethyl)-1,3-imidazolines in good yields and excellent regioselectivity.

**Comment:** From a mechanistic point of view, the authors assume that the aziridine is activated by TiF$_4$, which is then attacked by the nitrile to afford the betaine intermediate, which collapses to form the 1,3-imidazole.

Selected examples:

\[
\begin{align*}
\text{Ts} & \quad \text{F}_3\text{C} \\
\text{N} & \quad \text{N} \\
\text{R-CN} & \quad \text{TiF}_4 \quad \text{(5.0 equiv)} \\
\text{80 °C, DCE, 1–8 h} & \quad \text{one regiosomer up to 93% yield}
\end{align*}
\]

\[
\begin{align*}
\text{R} = \text{Alk, Bn, Ar, HetAr} \\
\text{(1.5 equiv)} & \quad \text{Ts} \\
\text{N} & \quad \text{F}_3\text{C} \\
\text{Tsay} & \quad \text{one regiosomer up to 93% yield}
\end{align*}
\]

<table>
<thead>
<tr>
<th>R = Alk, Bn, Ar, HetAr</th>
<th>Yield</th>
<th>Yield</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% yield</td>
<td>81%</td>
<td>91%</td>
<td>69%</td>
</tr>
<tr>
<td>85% yield</td>
<td>93%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>93% yield</td>
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