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Regio- and Diastereoselective Iron-Catalyzed [4+4]-Cycloaddition of 1,3-Dienes


Diastereoselective [4+4] Cycloadditions

\[
\begin{align*}
\text{Selected examples:} & \\
R = \text{Alk} & & & \\
\begin{array}{c}
\text{89% yield} \\
\text{A:B = 93:7}
\end{array} & & & \\
\begin{array}{c}
\text{100% yield} \\
\text{A:B = 1:99}
\end{array} & & & \\
\begin{array}{c}
\text{81% yield} \\
\text{A:B = 89:11}
\end{array} & & & \\
\begin{array}{c}
\text{65% yield} \\
\text{A:B = 2:98}
\end{array}
\end{align*}
\]

Significance: Chirik and co-workers report a regio- and diastereoselective iron-catalyzed [4+4] cycloaddition of 1,3-dienes, leading to various substituted cyclooctadienes in excellent yields.

Comment: Remarkably, with the choice of the iron catalyst, the cyclodimerization can be controlled in a diastereoselective fashion. Extensive mechanistic studies were performed and catalytically relevant iron complexes were isolated and characterized.

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