Diastereoselective [4+4] Cycloadditions

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.

Selected examples:

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\begin{align*}
\text{A:} & \quad \text{B} = 93:7, \quad \text{89% yield} \\
\text{B:} & \quad \text{C} = 99:1, \quad \text{100% yield} \\
\text{C:} & \quad \text{D} = 91:9, \quad \text{81% yield} \\
\text{D:} & \quad \text{E} = 98:2, \quad \text{65% yield}
\end{align*}
\]