Expanding the Scope of the Diels-Alder Reaction: Development of Cationic Dienophiles Stabilized by Cobalt-Complexed Alkynes

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$$\begin{array}{c} \text{(CO)}_3\\ \text{Co}\\ \text{SiMe}_3 \end{array} \xrightarrow{\text{BF}_3^{\bullet} \text{OEt}_2} \\ \text{F}_3 \\ \text{B} \\ \text{SiMe}_3 \end{array} \xrightarrow{\text{SiMe}_3} \begin{array}{c} \text{(CO)}_3\\ \text{(CO)}_3\\ \text{Co}\\ \text{SiMe}_3 \end{array} \xrightarrow{\text{OCO}} \\ \text{SiMe}_3 \end{array} \xrightarrow{\text{OCO}} \\ \text{SiMe}_3 \\$$

Diels-Alder reactions of cationic dienophiles stabilized by cobalt-complexed alkynes show greatly enhanced reactivity versus the corresponding substrates lacking cobalt complexation. Studies are currently underway to determine the regio- and stereoselectivity of these novel dienophiles. Upon completion of these studies, we plan to expand our investigations to dienophiles that will enable [4+3] cycloadditions and tandem reactions incorporating Diels-Alder and Pauson-Khand reactions.

$$\begin{array}{c|c} \text{SiMe}_3 \\ \hline \\ \text{O} \\ \hline \end{array} \begin{array}{c} \text{SiMe}_3 \\ \hline \\ \text{F}_3 \\ \hline \end{array} \begin{array}{c} \text{SiMe}_3 \\ \hline \end{array} \begin{array}{c} \text{No Reaction} \\ \hline \end{array}$$

