- External Attack by Ligand
- Reductive Couplings
External Attack by Ligand.

Activation of ligands towards attack by external nucleophile.

\[
\text{M}^+ - \text{H}^+ \rightarrow \text{Nu} \rightarrow \text{M} - \text{Nu}
\]

olefin cationic
Example

\[
\text{Fe} \quad \text{Cp}^+ \quad \text{MeO} \quad \text{Cp}
\]

\[
\text{OC} \quad \text{CO} \quad \text{OC} \quad \text{CO}
\]

18e−
The image depicts a chemical reaction. The initial structure is labeled as \( \text{C}_{12} (\text{CO})_3 \) with a metal \( M \) and a ligand \( N_u \). The reaction is shown to proceed through a nucleophilic substitution, indicated by the arrow and the notation \( tBuLi \). The reaction is described as "very reactive."
Reductive Coupling: Oxidative Cyclization

$4_n M \rightarrow \text{[diagram]} \rightarrow \text{[diagram]} \rightarrow \text{[diagram]} \rightarrow \text{[diagram]} \rightarrow \text{[diagram]}$

$\beta - \text{Michael}$