**Palladium-Catalyzed Dicarbonylation of 1,3-Dienes for the Synthesis of Adipic Acid Esters**

**Significance:** The authors describe a palladium-catalyzed dicarbonylation of 1,3-dienes using carbon monoxide. Various adipate diesters were produced in good to excellent yield with high selectivity.

**Comment:** The authors used kinetic experiments to support the proposed mechanism. Scaling up the reaction to over 200 g with a lower catalyst loading gave the product in excellent yield and selectivity.

\[
\text{Pd}^{0} + 2\text{CO} \rightarrow \text{Pd}^{	ext{II}} + 2\text{CO}_{2}
\]

**Selected examples:**

- **n-BuO-**
  - 81% yield, 92:8 selectivity
- **Cl**
  - 81% yield, 98:2 selectivity
- **72% yield, 92:8 selectivity**

**Scale up:**

- **n-BuO-**
  - 95% yield, 97:3 selectivity

**Proposed mechanism:**

\[
\begin{align*}
\text{Pd}^{0} + 2\text{CO} & \rightarrow \text{Pd}^{	ext{II}} + 2\text{CO}_{2} \\
\text{Pd}^{	ext{II}} + \text{L} & \rightarrow \text{Pd}^{0} + \text{L}^{0}
\end{align*}
\]