Catellani Reaction: Synthesis of $o,o'$-Disubstituted Vinylarenes

**Significance:** Catellani and co-workers reported a highly regioselective multiple functionalization of iodoarenes via a complex palladium-catalyzed cycle.

**Comment:** The proposed mechanism proceeds through a palladacycle, which is formed from the iodoarene, norbornene, and the palladium catalyst.

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\begin{align*}
R^1 = H, \text{Me, CO}_2\text{Me} & ; R^2 = \text{Alk} \; ; R^3 = \text{CO}_2\text{Me, Ph, n-Hex} \\
\text{PNP}_2 = \text{cis,exo-2-phenyl} & \text{norbornylpalladium chloride dimer}
\end{align*}
\]

\[
\begin{align*}
R^1 & + R^2 I + H R^3 \rightarrow R^1 \text{Pd}^0 \text{Pd}^II \text{Cl} R^2 R^3 H \\
& \text{oxidative addition} \quad \text{palladacycle formation} \\
& \text{reductive elimination from palladacycle} \\
& \text{norbornene extrusion} \\
& \text{termination (here via Heck coupling)} \\
& \text{carbopalladation of norbornene}
\end{align*}
\]

**Selected examples:**

- 84% yield
- 44% yield
- 31% yield