Catalytic hydrogenation of an alkyne using a typical transition-metal catalyst, such as Pt, Pd, of Ni, yields an alkane.

eg:

\[
\text{CH}_3\text{C}=\text{C}\text{CH}_3 + 2\text{H}_2 \overset{\text{catalyst}}{\text{Pt}} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_3
\]

The reaction occurs in two stages.

\[
\text{CH}_3\text{C}=\text{C}\text{CH}_3 + 2\text{H}_2 \overset{\text{catalyst}}{\text{Pt}} \rightarrow \text{CH}_3\text{C}=\text{C}\text{H}_2 \overset{\text{catalyst}}{\text{Pt}} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_3
\]

Hydrogenation of the alkene can not be prevented by using one molar equivalent of H₂. (If one molar equivalent of H₂ is used, some alkene and some alkyne are obtained as products, and, since there are not enough H₂ molecules to react with all the alkyne molecules, some unreacted alkyne is recovered.) To prevent hydrogenation of the alkene, a less active catalyst must be employed. Lindlar catalyst, which is a mixture of Pd, CaCO₃, and lead salts, is the catalyst of choice in catalytic hydrogenation of alkynes to give alkenes.

eg:

\[
\text{CH}_3\text{C}=\text{C}\text{CH}_3 \overset{\text{Lindlar catalyst}}{1 \text{ molar eq. \text{H}_2}} \rightarrow \text{CH}_3\text{C}=\text{C}\text{CH}_3
\]

see also dissolving-metal reduction

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**Contributors**

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