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

eg:

\[
\text{CH}_3\text{C≡CCH}_3 + 2\text{H}_2 \xrightarrow{\text{catalyst: Pt}} \text{CH}_3\text{CH}_2\text{CH}_3
\]

The reaction occurs in two stages.

Hydrogenation of the alkene can not be prevented by using one molar equivalent of H\(_2\). (If one molar equivalent of H\(_2\) is used, some alkene and some alkyne are obtained as products, and, since there are not enough H\(_2\) 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, CaCO\(_3\), and lead salts, is the catalyst of choice in catalytic hydrogenation of alkynes to give alkenes.

eg:

\[
\text{CH}_3\text{C≡CCH}_3 \xrightarrow{\text{Lindlar catalyst}} \text{CH}_3\text{CH}≡\text{CH}_3
\]

see also dissolving-metal reduction

Contributors

- Gamini Gunawardena from the OChemPal site (Utah Valley University)