Alkenes do not undergo hydration upon treatment with water even at very high temperatures. There are two approaches to hydrating alkenes:

1. Reaction of the alkene with water in the presence of a strong-acid catalyst.
2. Using an indirect method

Hydroboration-oxidation, sometimes casually called hydroboration for convenience, is a common indirect method used to hydrate alkenes.

\[
\text{alkene} \quad \xrightarrow{\text{hydroboration-oxidation}} \quad \text{alcohol}
\]

**net reaction:**

\[
\text{alkene} \quad \xrightarrow{\text{H}_2\text{O}} \quad \text{alcohol}
\]

The protocol is carried out in two stages:

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**Stage 1: Hydroboration**

The alkene is treated with a source of borane (diborane or borane-THF complex), which converts the alkene into a trialkylborane.

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**Stage 2: Oxidation**

The trialkylborane is treated with \(\text{H}_2\text{O}_2\) and a strong base, usually \(\text{NaOH}\), in aqueous medium, which converts the trialkylborane into an alcohol.

eg:

**Stage 1:**

This reaction is an anti-Markovnikov addition and a syn addition.

**Stage 2:**
Stage 1 + Stage 2 =

The net reaction is an anti-Markovnikov addition:

see also oxymercuration-reduction

Contributors

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