https://www.youtube.com/watch?v=iKLXEAPjwAw&t=10s

Brain cancer patient wins Gusher Marathon

By **Avi Zaleon**
Updated March 11, 2013 11:27 a.m.

Iram Leon and daughter Kiana Leon finish the Gusher Marathon in 3 hours 7 minutes and 35 seconds taking first place in the full marathon on Saturday, March 9, 2013. Photo taken: Randy Edwards/The Enterprise

A man racing against time crossed the finish line. His daughter, snugly sitting in a stroller he had been pushing for just over 26 miles, gained a memory that may live longer than her father.

"This is supposed to eat away at my memory in the end," Iram Leon said of the cancer in his left temporal lobe. "But I hope this memory is one of the last things to go and one she never loses."

Leon is 32 years old. He said his doctors have told him, "we're probably not going to beat this. We're just hoping to get you to 40."

Hello Dr. Iverson,
You may not remember me, but I was in your organic chemistry class last semester.

This past summer I was diagnosed with lymphoma cancer. Initially I had lost all hope, I kept asking myself "why me?" and kept thinking of all things I hadn't accomplished in my lifetime. Nevertheless, I soon got over that fact and started my chemotherapy treatments. Each treatment got worse and worse as I experienced more and more of the side effects. At night I couldn't fall asleep from all psychological and financial stress, couldn't eat because of mouth sores, and when I did eat I would feel sick and nauseated. It wasn't until my third treatment that I remembered the many times you told the class that running could help quality of life. It took a couple of weeks for me to convince myself to start running but I eventually started slowly.I never thought how great of an affect physical activity could have. I was never obese so I never gave running or cardio any thought. As I started running on a regular basis I started seeing my symptoms disappear slowly. Soon when I would come back from running I suddenly had an appetite, regardless of the mouth sores I was hungry enough to eat. My sleeping schedule was started falling into place because I was so tired after running. My stress levels decreased enough that I could see the difference. Best of all it gave me something to do during my days at home, saving me from depression.

Running saved my life Dr. Iverson.

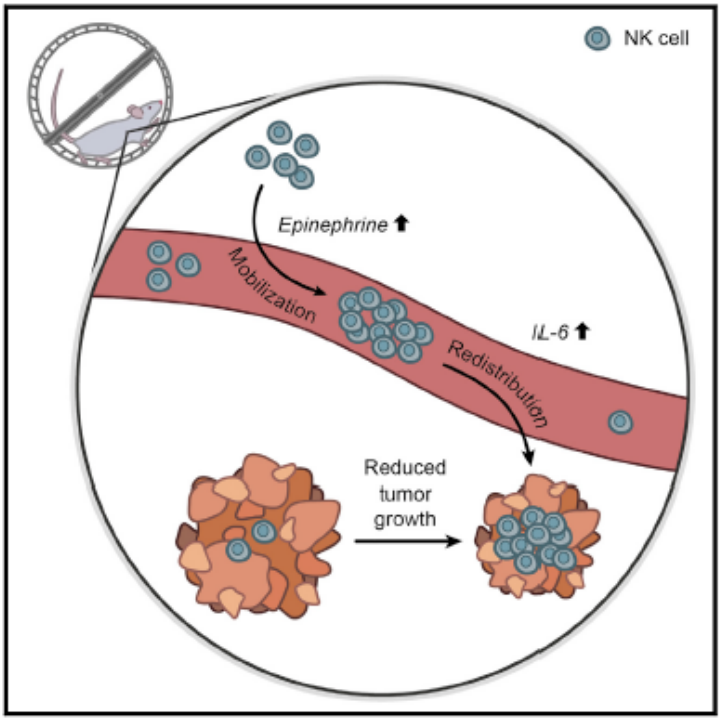
Thanks again,

Short Article

Cell Metabolism

Voluntary Running Suppresses Tumor Growth through Epinephrine- and IL-6-Dependent NK Cell Mobilization and Redistribution

Graphical Abstract



Authors

Line Pedersen, Manja Idorn, Gitte H. Olofsson, ..., Bente K. Pedersen, Per thor Straten, Pernille Hojman

Correspondence

phojman@inflammation-metabolism.dk

In Brief

The beneficial effects of exercise are countless. Pedersen et al. now link exercise, cancer, and immunity and reveal that exercise decreases tumor incidence and growth by over 60% across several mouse tumor models through a direct regulation of NK cell mobilization and trafficking in an epinephrine- and IL-6-dependent manner.

Highlights

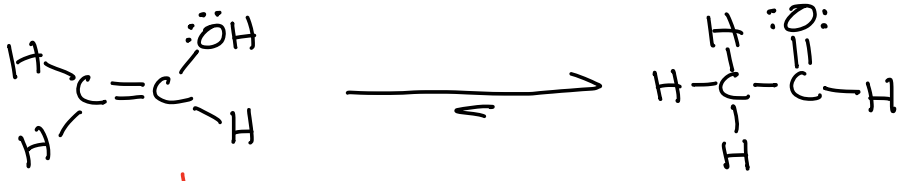
- Exercise reduces tumor incidence and growth in several mouse models
- Exercise increases NK cell infiltration, thereby controlling tumor growth
- Epinephrine mobilizes NK cells and β-blockade blunts the tumor suppression
- Exercise-induced muscle-derived IL-6 is involved in NK cell redistribution

Accession Numbers

GSE62628

Pedersen et al., 2016, Cell Metabolism 23, 1–9
March 8, 2016 ©2016 Elsevier Inc.
http://dx.doi.org/10.1016/j.cmet.2016.01.011

New Concept → The following species are in equilibrium, and the more stable species is the "keto" form



enol form

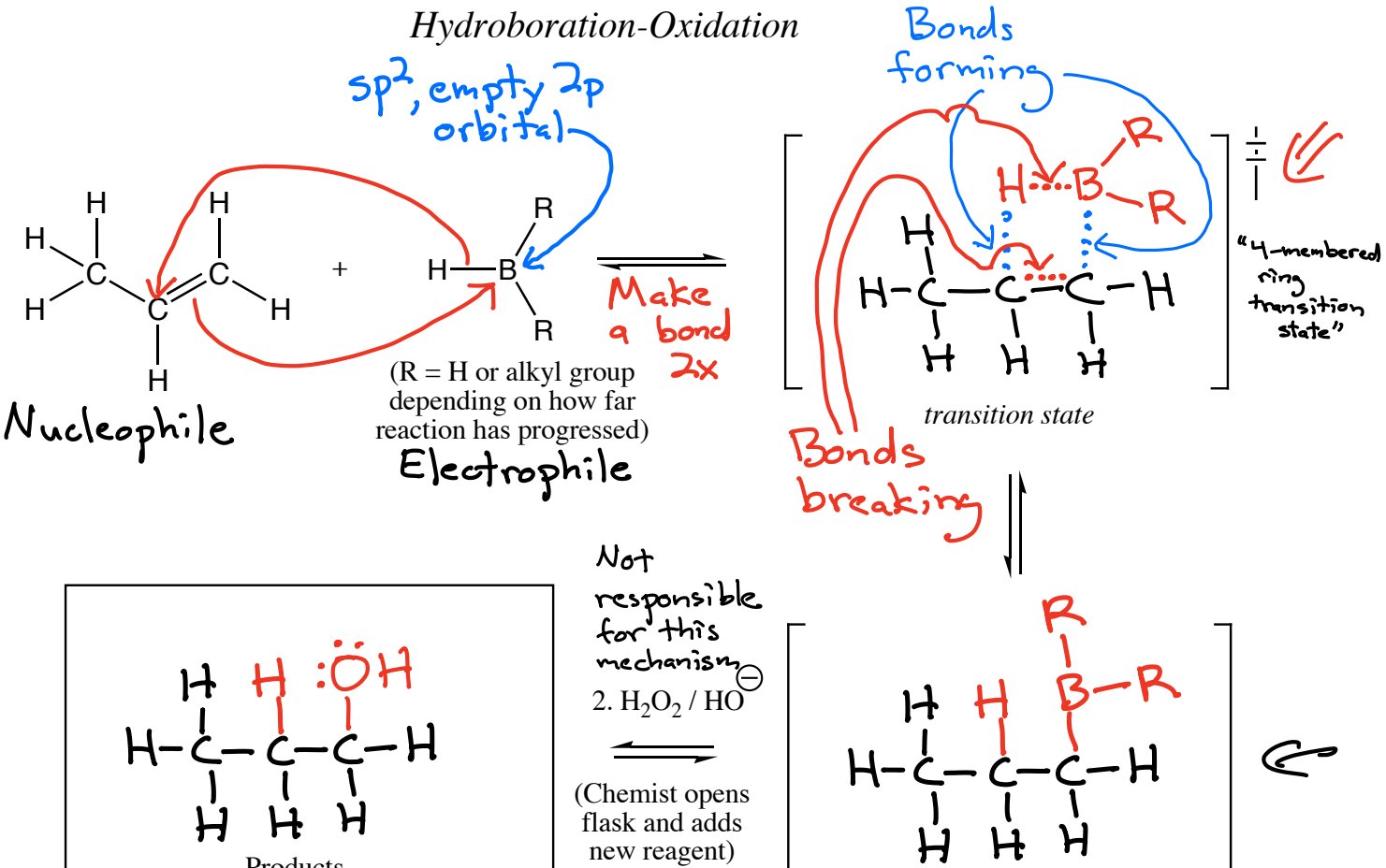
keto form

Favored

(a C=O pi bond is stronger than a C=C pi bond)

This process is called "tautomerization" as in "keto-enol tautomerization"

Hydroboration-Oxidation



H → More substituted C atom
OH → Less substituted C atom
} Steric strain in the first transition state

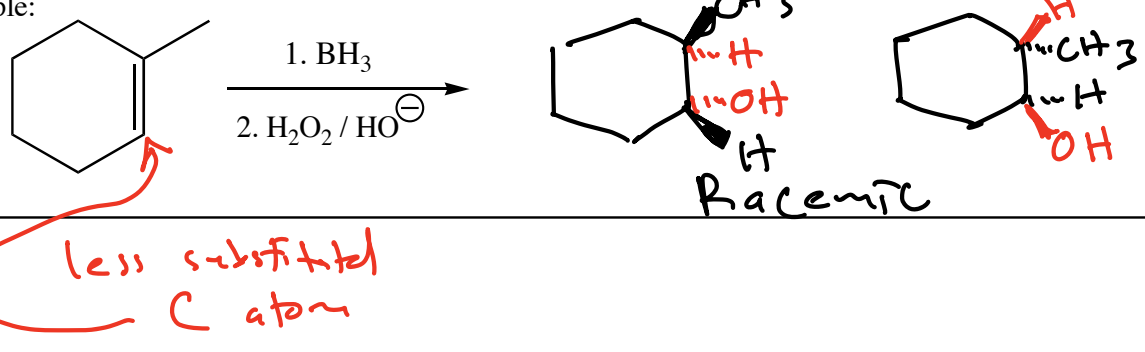
H and OH are syn

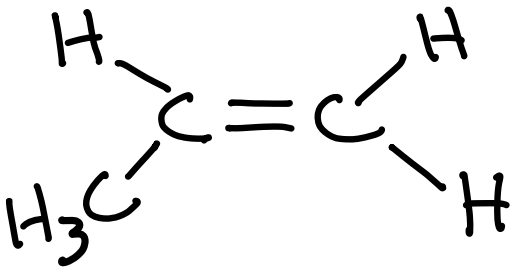
Summary: The pi bond of the alkene attacks the Lewis acid (electrophile) B atom at the same time a new bond forms between C and H. In 2nd step OH replaces B(R)2. "4-membered ring transition state"

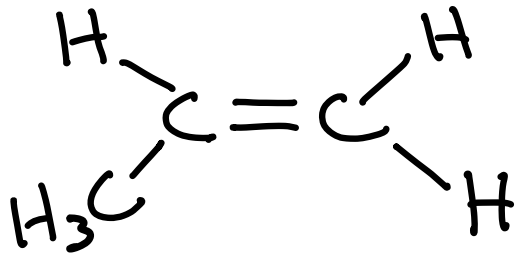
Regiochemistry: Non-Markovnikov

Stereochemistry: Syn

Example:





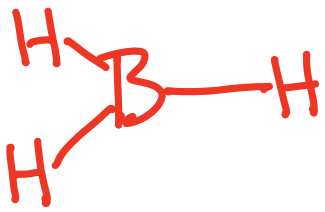


$H_3C-C\equiv C-H$

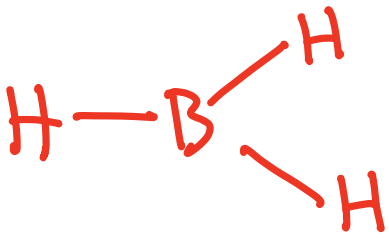
$H_3C-C\equiv C-H$

$H_3C-C\equiv C-H$

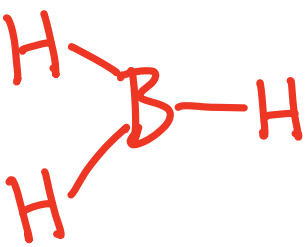
$H_3C-C\equiv C-H$

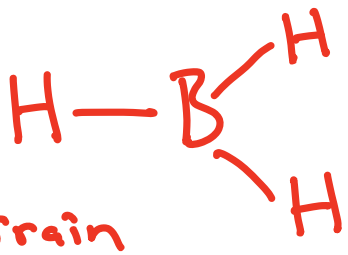


Steric Strain

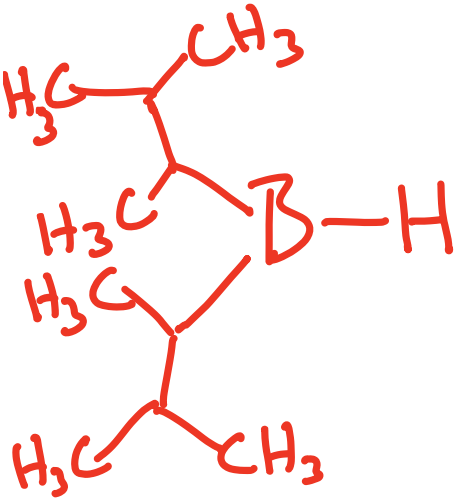


Much less Steric Strain

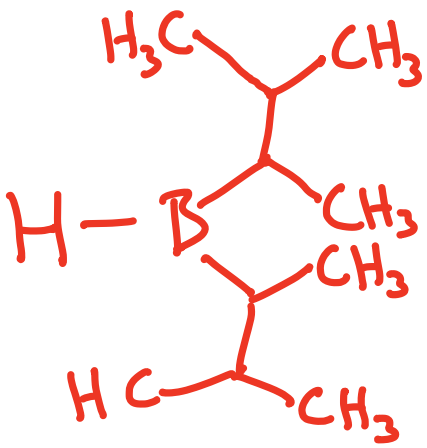




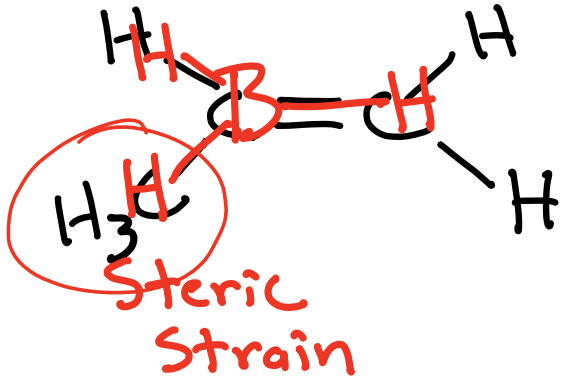
No steric strain
No real preference



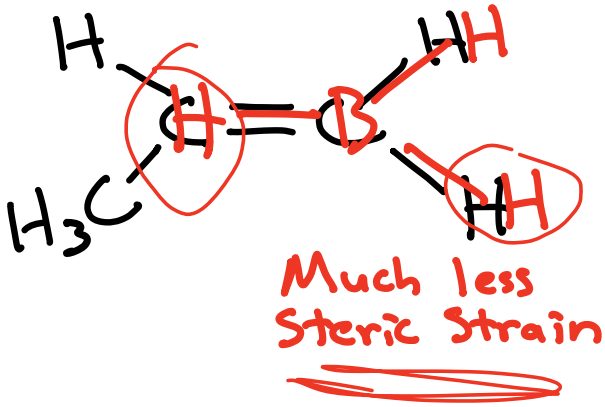
Significant Steric Strain



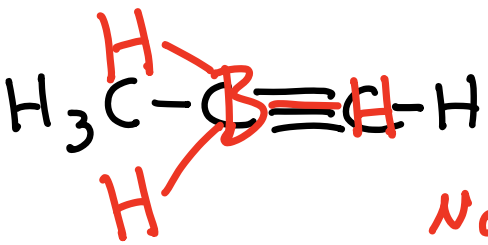
Highly Preferred

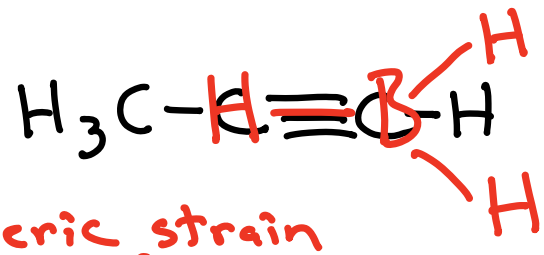


Steric Strain

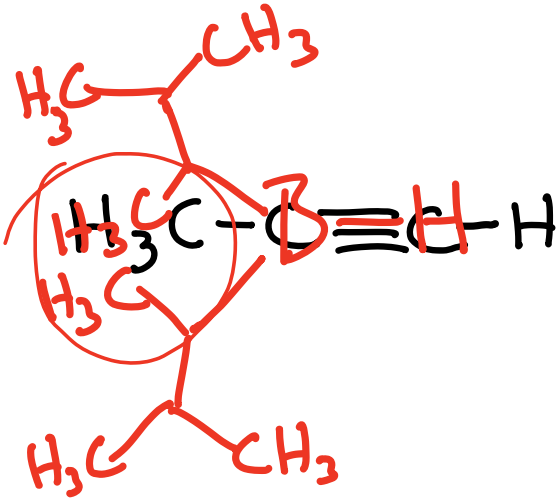


Much less Steric Strain

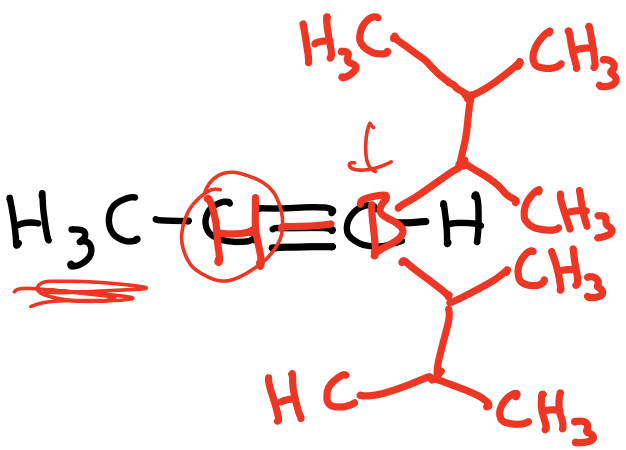




No steric strain
No real preference

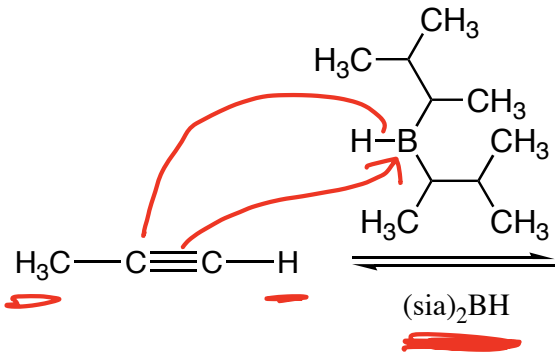


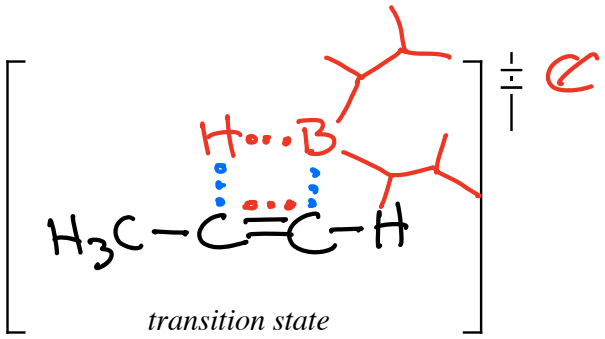
Significant Steric Strain

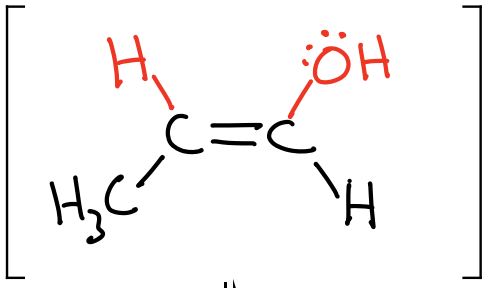


Highly Preferred

Terminal Alkyne Hydroboration

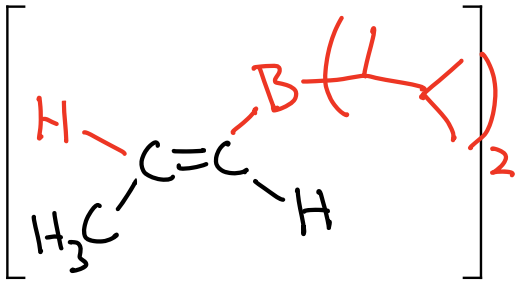




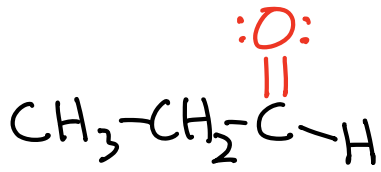


2. H_2O_2 / $HO^{\ominus}$

(Chemist opens flask and adds new reagent)



Keto-enol tautomerization



Products

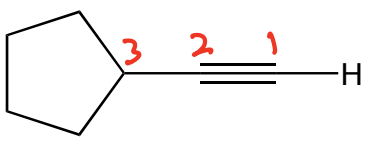
⇐ The C=O is on the C on the end → "non-Markovnikov"

Summary: The $(sia)_2BH$ reacts so the B atom attaches to the C atom on the end. The four-membered ring transition state makes both bonds simultaneously. 2. $H_2O_2/HO^{\ominus}$ → enol → keto

Regiochemistry: non-Markovnikov

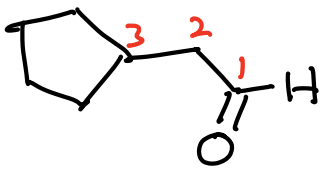
Stereochemistry: N/A

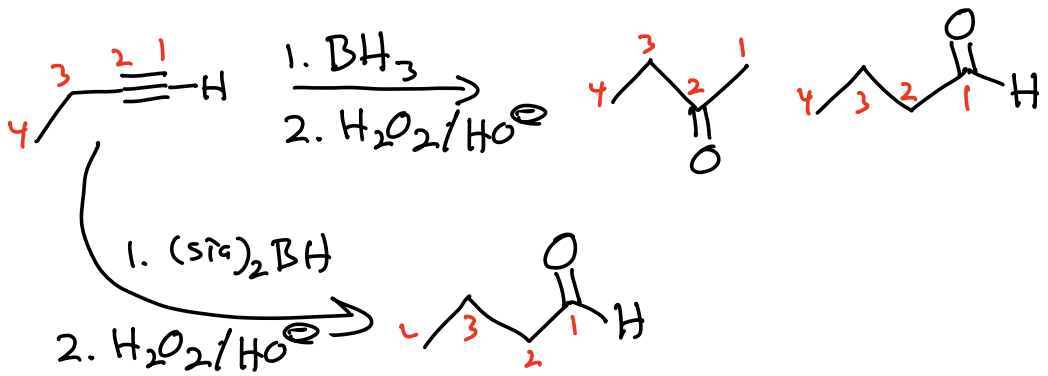
Example:



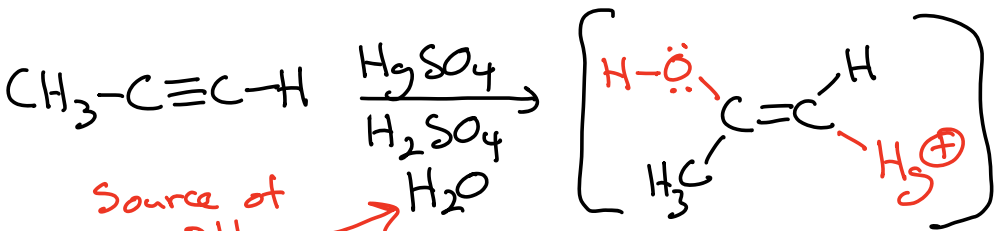
1. $(sia)_2BH$

2. H_2O_2 / $HO^{\ominus}$



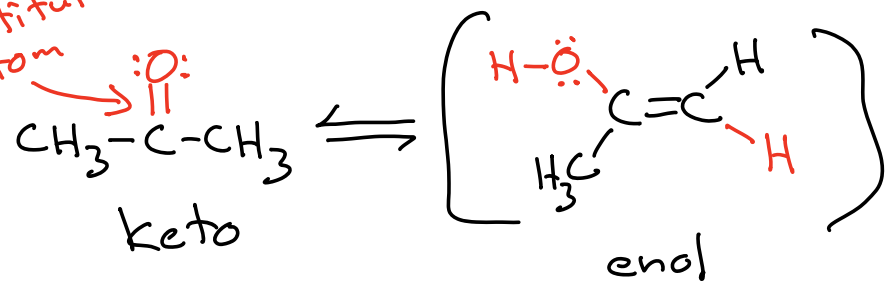

1. BH_3
2. $H_2O_2/HO^{\ominus}$
1. $(sia)_2BH$
2. $H_2O_2/HO^{\ominus}$

Hydration of an alkyne using $HgSO_4$, H_2SO_4, H_2O



Hg atom departs

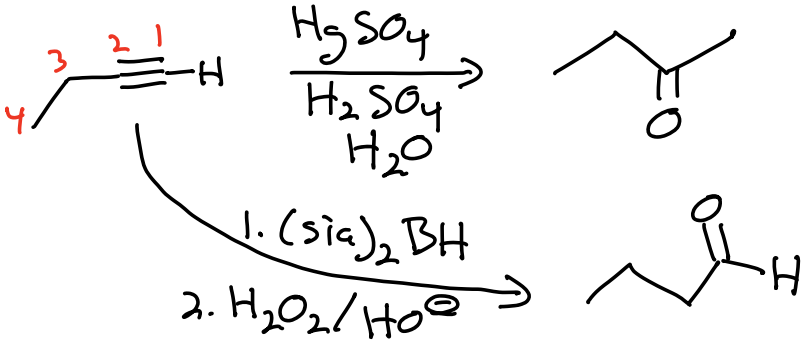
on the more substituted C atom



keto

enol

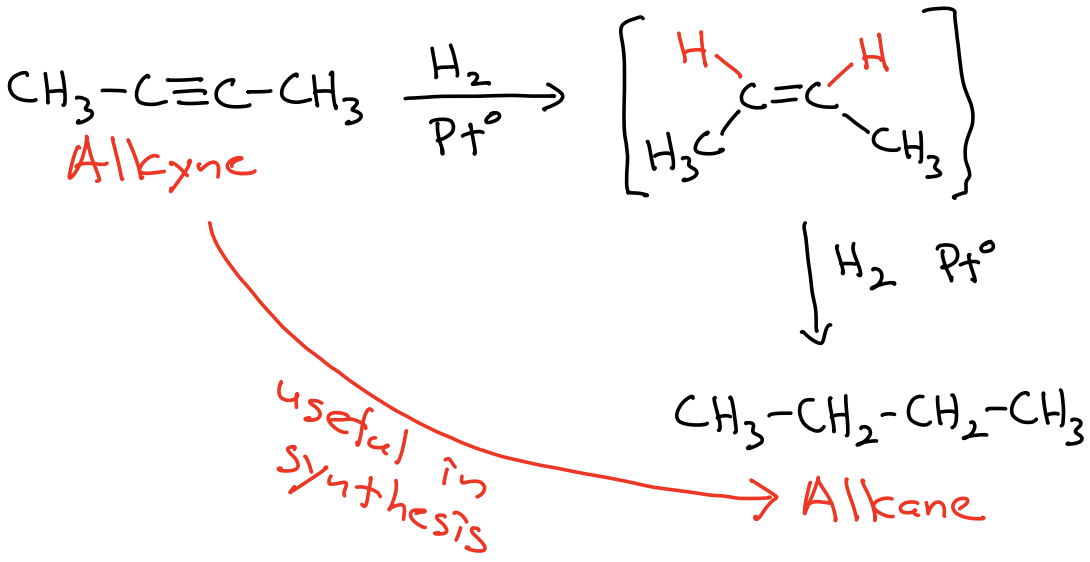
Markovnikov



Reduction of Alkynes

1) Hydrogenation H_2 Pt°, Pd°, Ni°

Hydrogenation does not ordinarily stop at the alkene

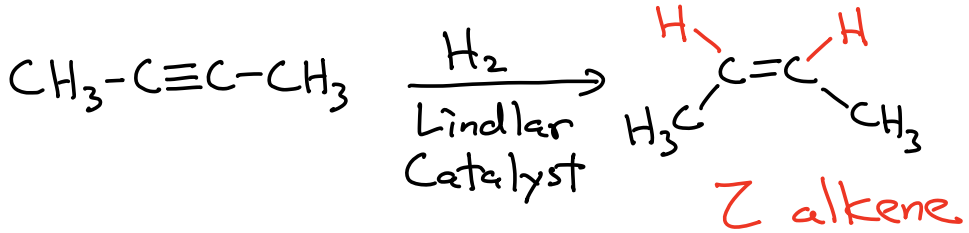


Lindlar Catalyst → special catalyst that stops the hydrogenation at the cis-alkene

syn addition

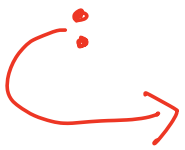
Found by experiment not designe

Pd° on $CaCO_3$, Pb salts quinoline



Time Out:

Regular Arrows



used to show movement of a pair of electrons

"Fish hook" Arrows

"fish hook" arrows are used to show movement of single electrons

Radical → a species with an unpaired electron → unstable so we encounter radicals as reaction intermediates

Time In:

2) Dissolving metal reductions of alkynes

Na^0 in NH_3

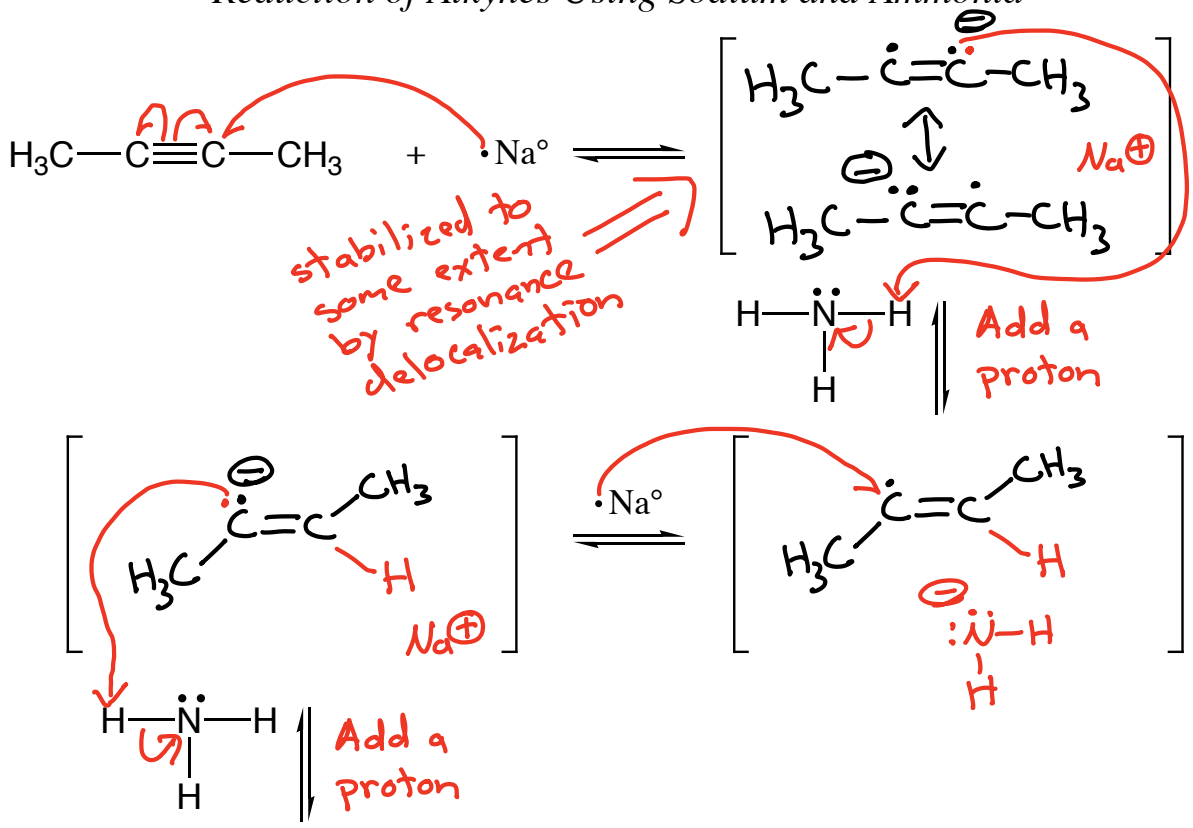
Sodium $\longrightarrow$ (Na^0) is a very strong one electron reducing agent because $Na^{\oplus}$ has a filled octet in its valence shell

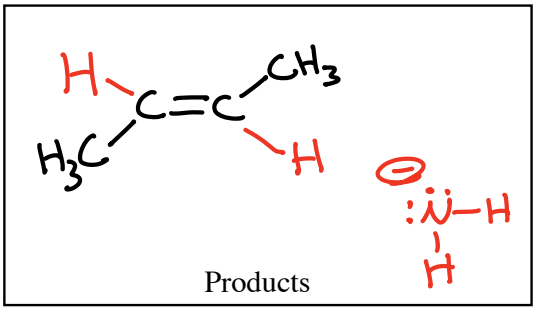
Formation of a filled octet for $Na^{\oplus}$ gives a strong motive for $\cdot Na^0$ to transfer its unpaired electron

NH_3 $\longrightarrow$ used as solvent and the source of protons

$\longrightarrow$ other solvents like H_2O react violently with Na^0

Reduction of Alkynes Using Sodium and Ammonia





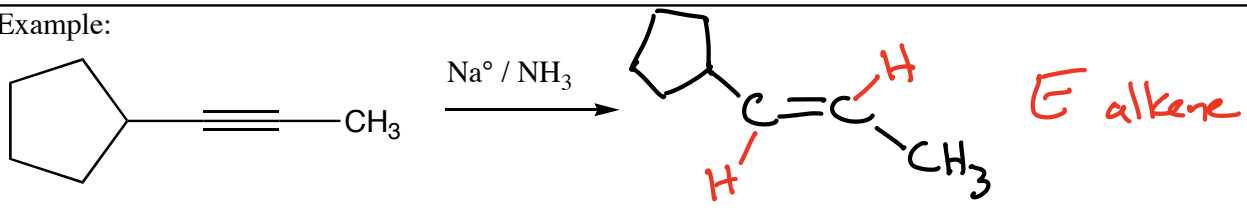
This reaction makes the more stable E alkene

Summary: Alkynes are reduced to E alkenes by Na° in NH_3 via two one-electron reductions by Na°, each of which is followed by adding a proton from the NH_3 solvent

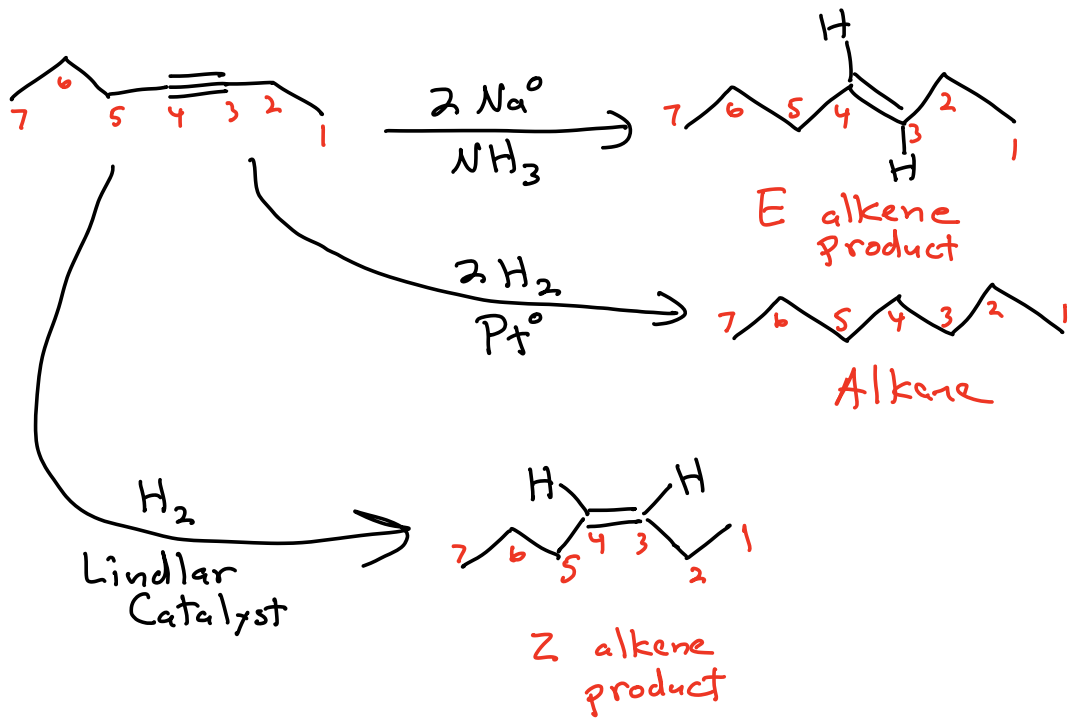
Regiochemistry: N/A

Stereochemistry: Anti → E products

Example:

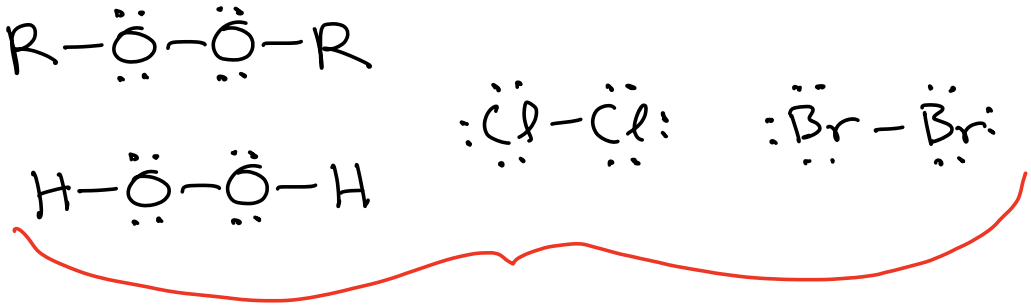


Reductions of alkynes → 3 choices




Energizer
©2015 Eveready Battery Company, Inc. Energizer and the Energizer Bunny design are trademarks of Energizer Brands, LLC.

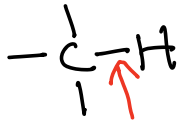
Bonds between atoms with multiple lone pairs are generally weaker bonds → Lone pairs regel each other



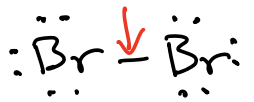
These bonds can be broken by light or heat

$h\nu$

Reference Bond Strengths



BDE ~100 kcal/mol



BDE ~46 kcal/mol

Bond Dissociation Enthalpy → amount of energy required to break a bond and create two radicals