02 SEP 2020

SYNTHETIC REAGENTS

LECTURE-16 , D-III (H)

ORGANIC CHEMISTRY , PAPER-VII

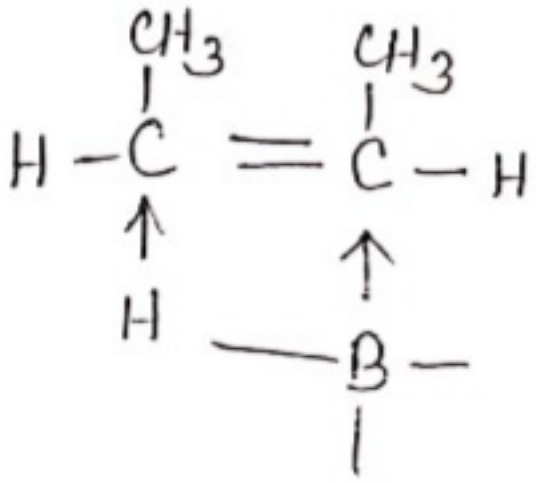
TOPIC :-DIBORANE CONTINUED..

STEREOCHEMISTRY

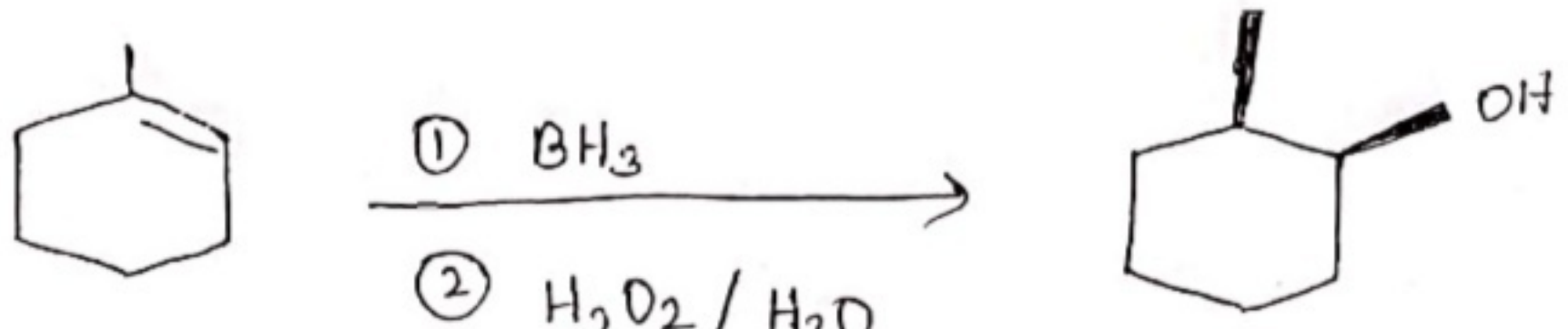
By-Dr.Rinky

* The boron attacks from the less hindered side and overall addition is syn and is stereospecific.

* For example: 1-methylcyclohexene, on hydroboration and oxidation yields trans-2-methylcyclohexanol in high yield.



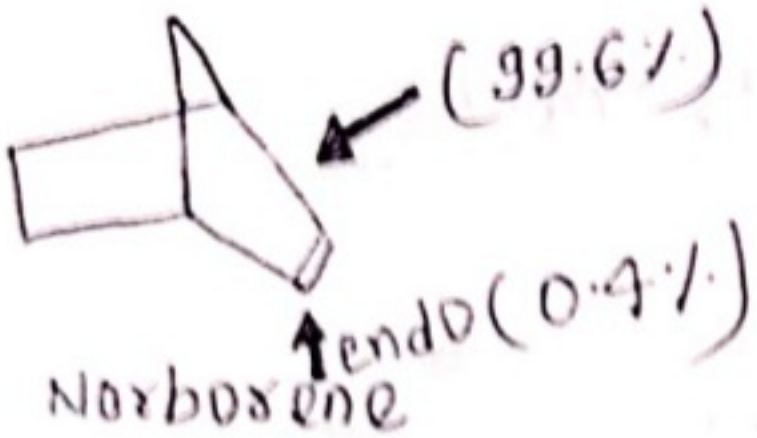
syn addition



1-methylcyclohexene

trans-2-methylcyclohexanol

* The hydroboration of norborene, followed by oxidation gives exo-norborneol in 99.6% yield.

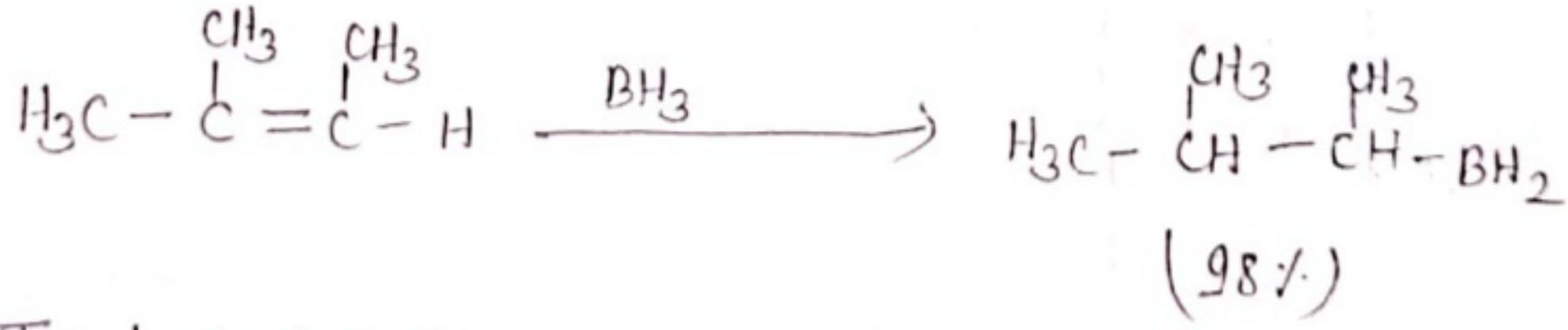


exo-norborneol

ORIENTATION

Hydroboration is regioselective. The addition of H-B to alkene follows Markownikoff's addition rule.

Since boron is more electropositive than hydrogen therefore attachment of boron takes place readily to the less substituted carbon of the double bond.



* The hydroboration can be performed on alkenes with one to four substituents.

* Terminal alkenes, such as 1-hexene undergo hydroborati on to place 94% of the boron on the terminal

position with 6% at the 2-position.

$$CH_3-CH_2-CH_2-CH_2-\underset{\uparrow}{CH}=\underset{\uparrow}{CH_2}$$

6%. 94%.

Internal olefins such as 2-hexene and 4,4-dimethyl-2-pentene, show no significant discrimination between the two position.

$$CH_3-CH_2-CH_2-\underset{\downarrow}{CH}=\underset{|}{CH}-CH_3$$

43%. 57%.

$$CH_3-\underset{\uparrow}{CH}=\underset{\uparrow}{CH}-C(CH_3)_3$$

58%. 42%.

To be continued in next lecture..