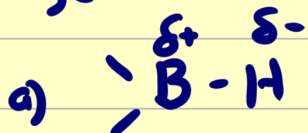
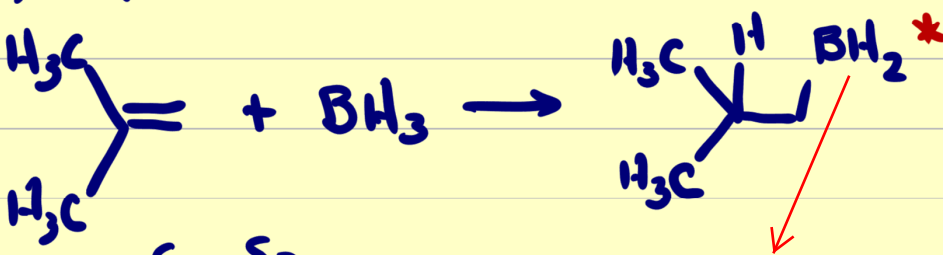


i) CONCERTED, SO ADDN IS CIS.

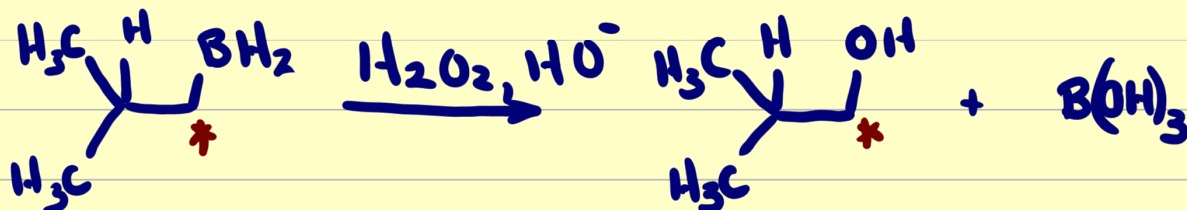
ii) ANTI-MARKOVNIKOV



b) "BH₂" LARGER THAN H
 \therefore BH₂ AVOIDS THE SUBSTITUTED END. more

iii) - DON'T ISOLATE THE ORGANOBORON PRODUCTS. - ADD HO⁻ + H₂O₂

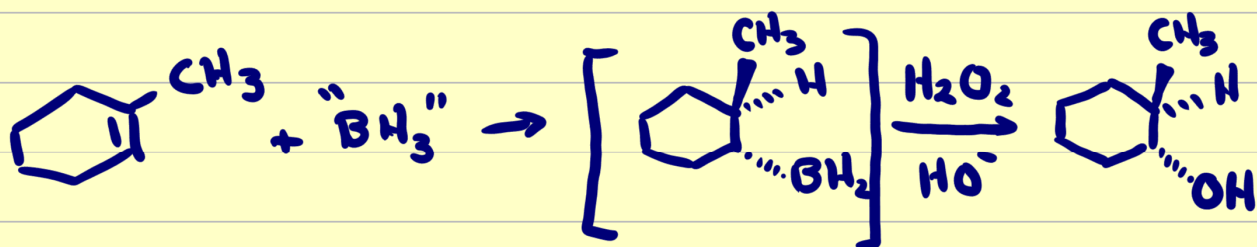
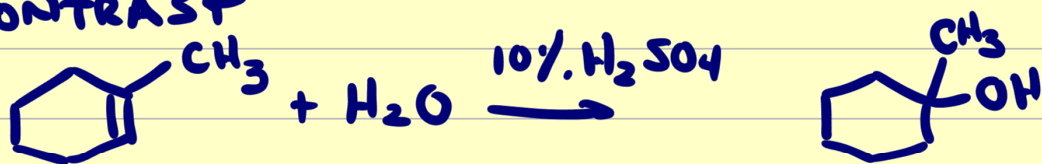
- REPLACES $\begin{array}{c} \text{H} \\ | \\ \text{B} - \text{H} \end{array}$ BY AN ALCOHOL.



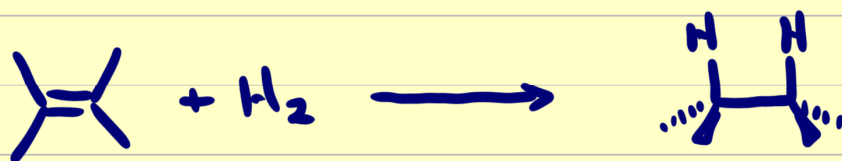
- ANY STEREOCHEMICAL INFO * IS RETAINED

Usefulness: can get complementary product to acid catalyzed water addn reaction

CONTRAST



CATALYTIC HYDROGENATION



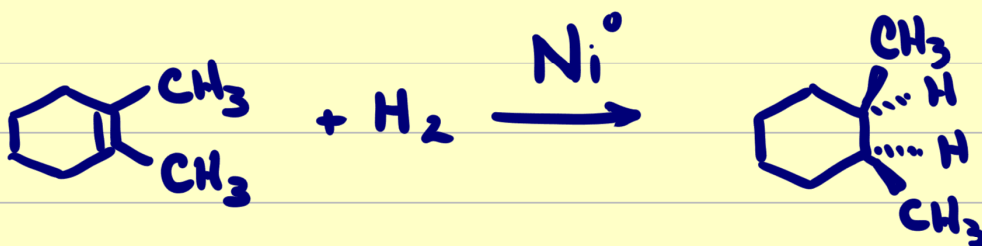
SLOW AS IS.

- BUT IF YOU ADD A SMALL AMOUNT OF A FINELY DIVIDED METAL POWDER (Ni, Pd, Pt); THIS REACTION GOES RAPIDLY AT ROOM TEMPERATURE, NORMAL H₂ PRESSURES

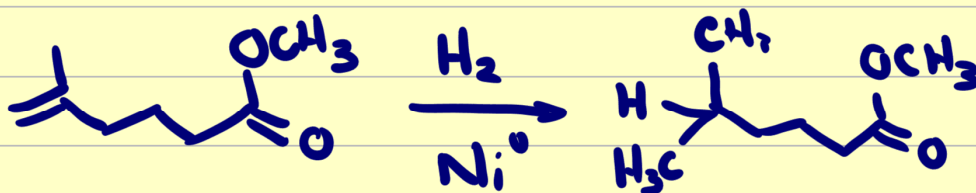
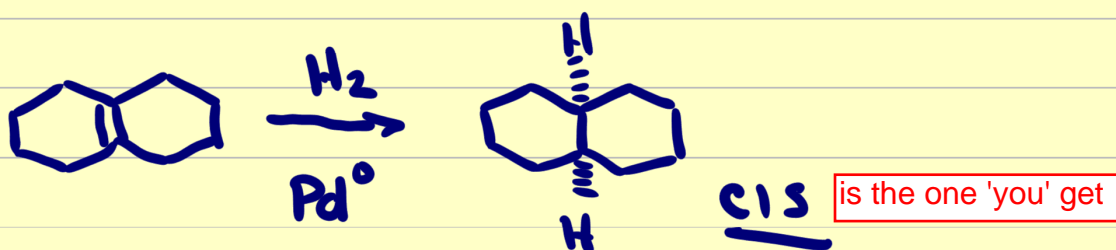
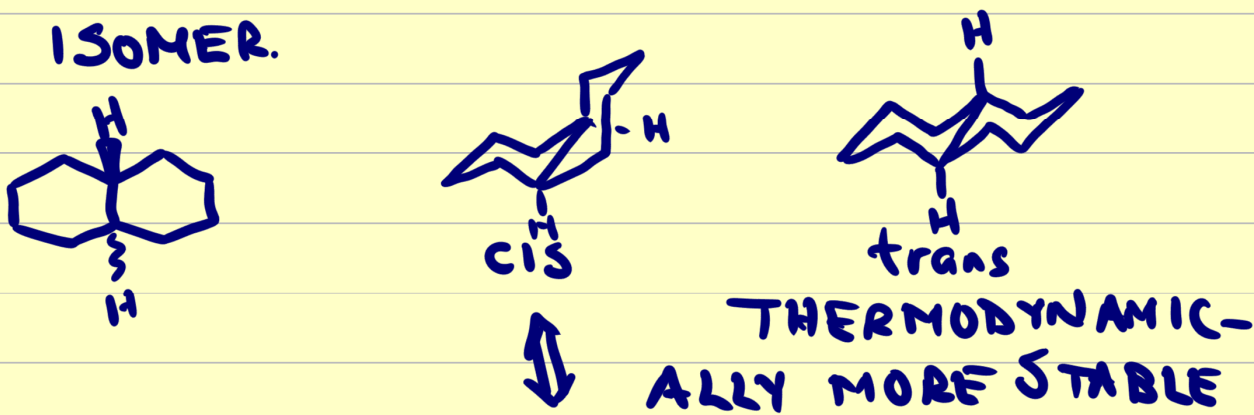
- CALLED CATALYTIC HYDROGENATION

- CONSIDERED A REDUCTION OR AN ADDITION REACTION

REDUCTION - DEFINITION - ADDN OF H ATOMS, OR LOSS OF OXYGEN ATOMS



H₂ ADDN IS CIS, EVEN IF THE PRODUCT ISN'T THE MOST STABLE ISOMER.



ALKENES REACT BEFORE MOST OTHER

GROUPS.

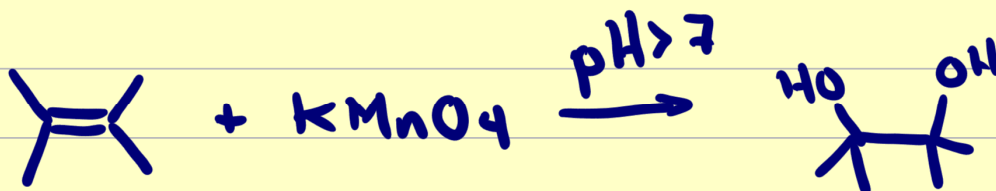
ketones, acids, esters, amides, all less reactive to catalytic hydrogenation

OXIDATION OF ALKENES.

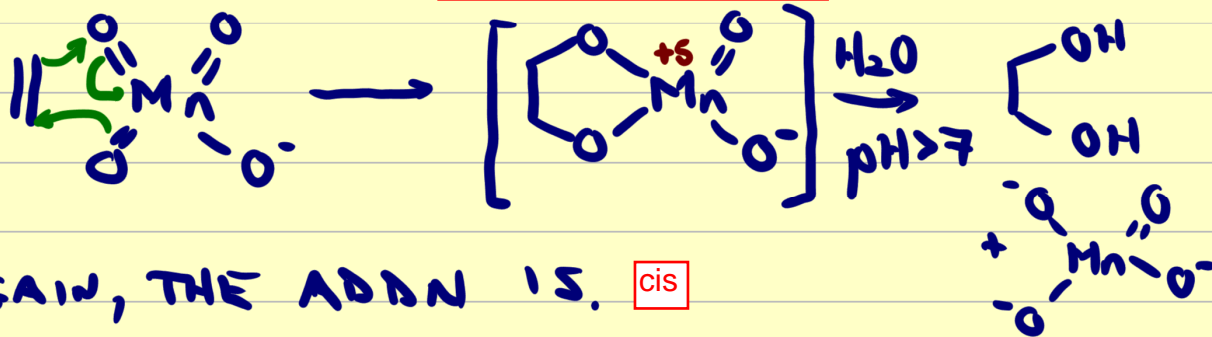
DEFN - ADDITION OF OXYGEN ATOMS, OR LOSS OF H ATOMS

COMMON REAGENT KMnO_4 (Mn^{+7})

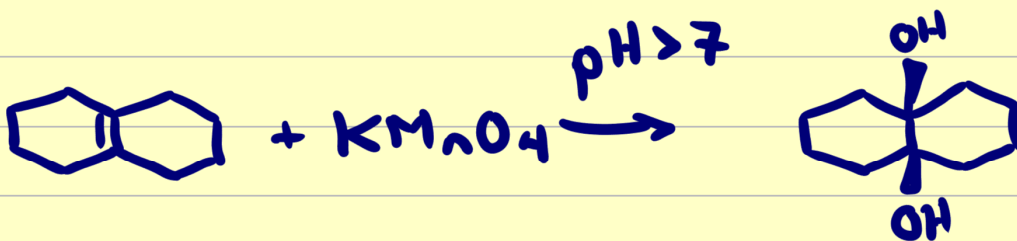
i) IF SOLUTION IS BASIC $\text{pH} > 7$



Mn now +5 oxidation state



AGAIN, THE ADDN IS. cis



ii) IF $\text{pH} \leq 7$, REACTION GOES FURTHER

- C BOND ALSO GETS CLEAVED

