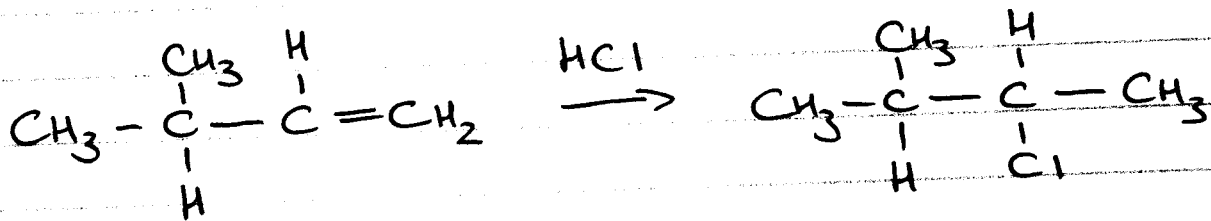


- ① CARBOCATION REARRANGEMENT
- ② ADDITION OF Br_2 / Cl_2
- ③ ADDITION OF $HOCl / HOBr$
- ④ OXYMERCURATION
- ⑤ HYDROBORATION

READ: 6.3-6.7

PROBLEMS: 6.9-6.11, 6.17-6.38

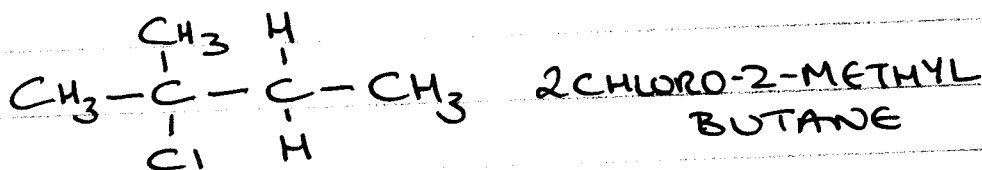
① CARBOCATION REARRANGEMENT



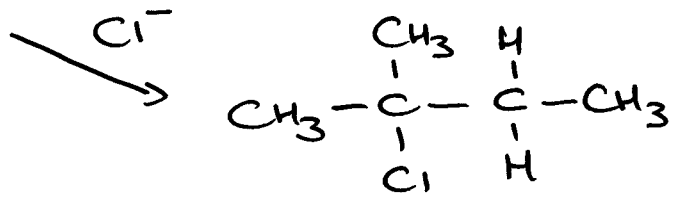
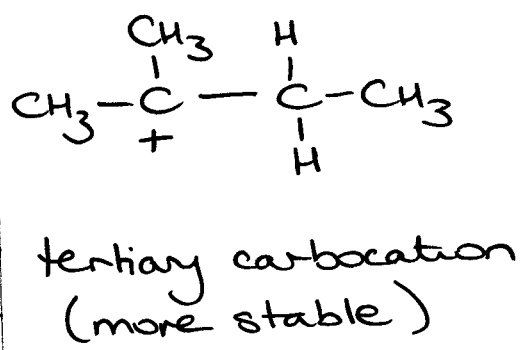
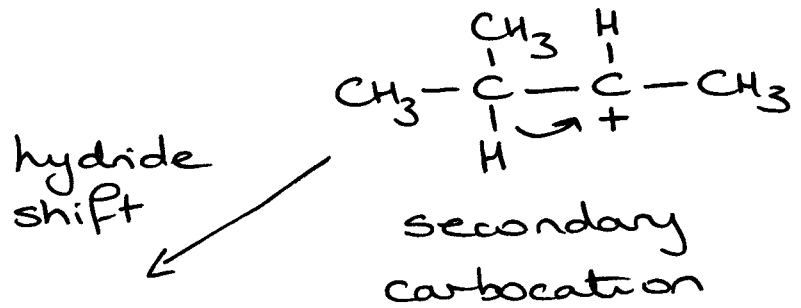
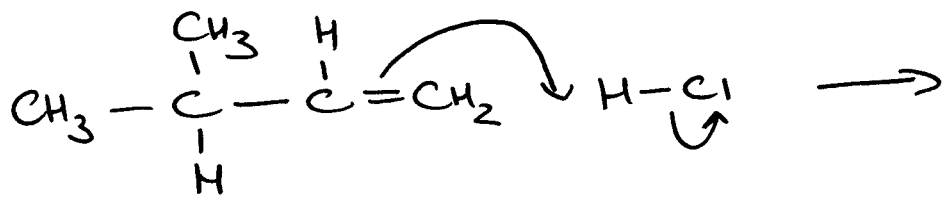
expected MARKOVNIKOV product

2-CHLORO-3-METHYL BUTANE
~40%

WHAT'S THE OTHER 60% ?



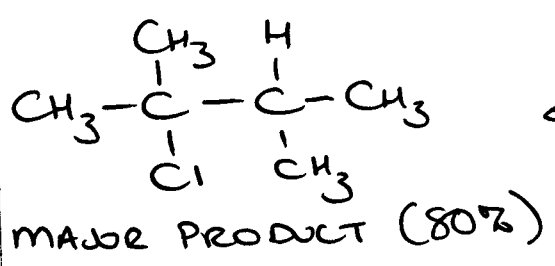
WHY? -
consider mechanism:



(ACID-CATALYSED HYDRATION ALSO GOES THROUGH A CARBOCATION, SO REARRANGEMENT CAN ALSO HAPPEN IN THAT PROCESS)



MINOR PRODUCT (20%)



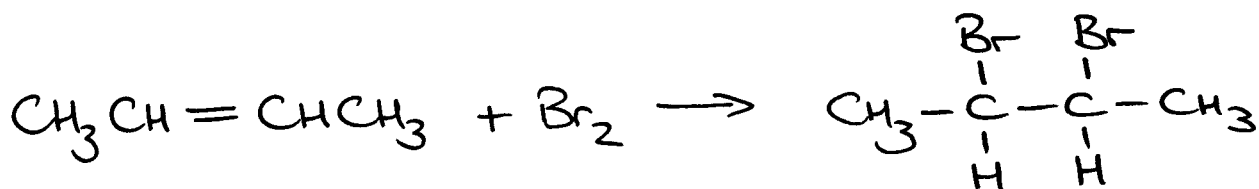
INVOLVES A 1,2 METHYL SHIFT
(SHOW HOW THIS HAPPENS...)

3

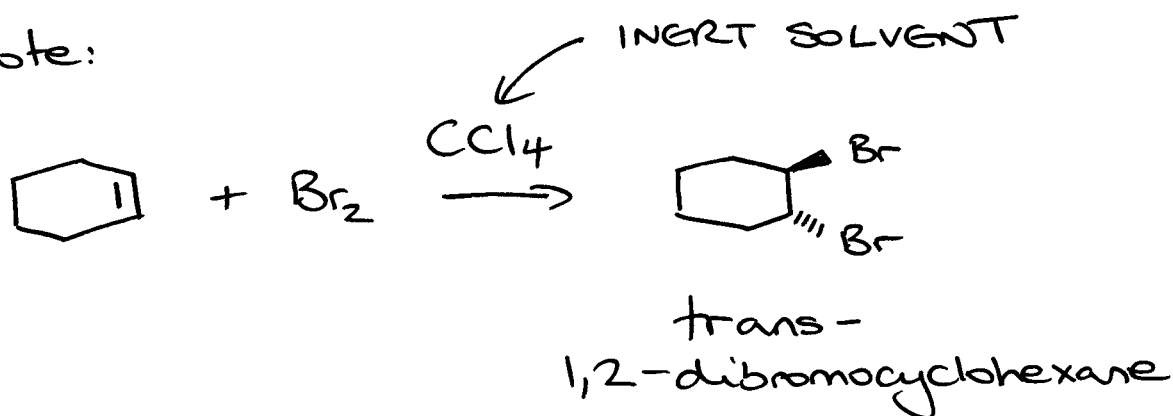
So $2^\circ C^+$ REARRANGE TO $3^\circ C^+$
(RARELY GO IN OPPOSITE DIRECTION)

$1^\circ C^+$ NOT formed in reactions in solution
(TOO UNSTABLE)

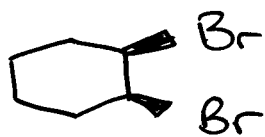
② ADDITION OF Br_2/Cl_2



note:



AN EXAMPLE OF A STEREOSPECIFIC RXN



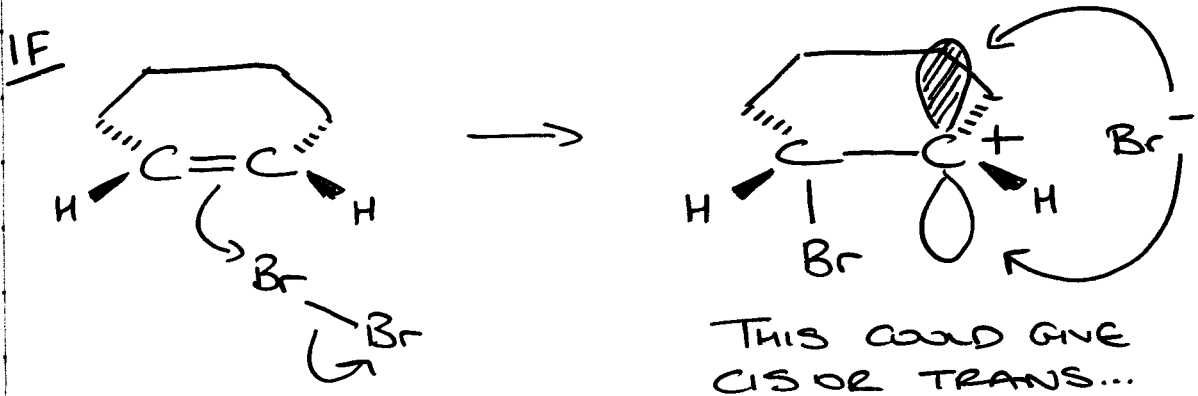
cis STEREOISOMER IS
NOT FORMED

NOTE

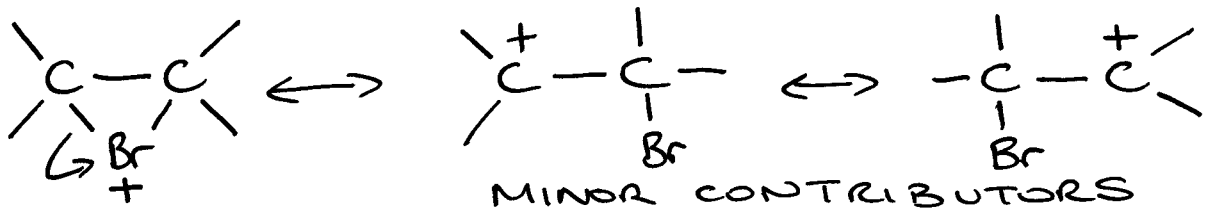
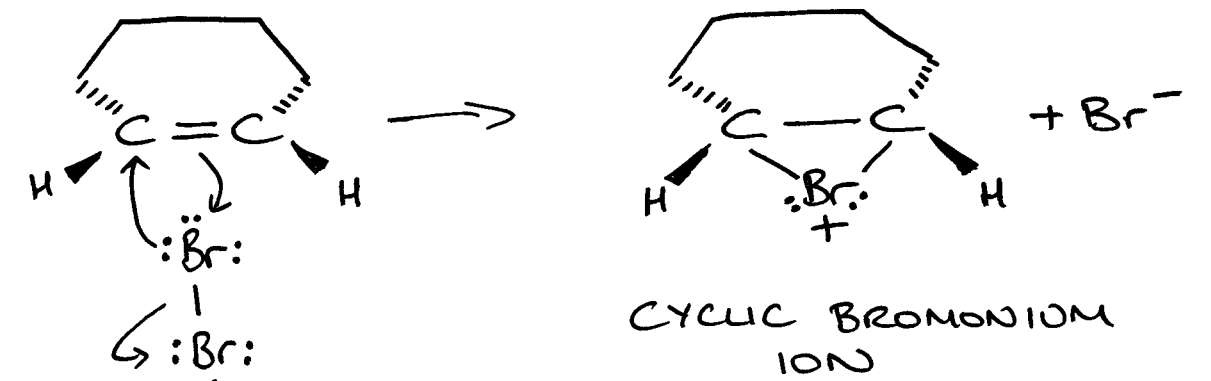
STEREOSPECIFIC / STEREOSELECTIVE
exclusion / preference

(REGIOSPECIFIC / REGIOSELECTIVE)

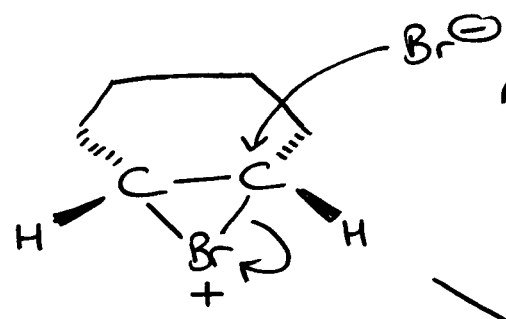
- consider mechanism



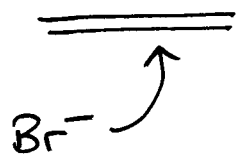
mechanism is:



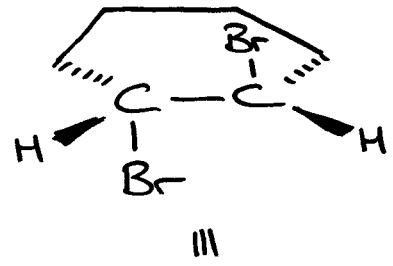
5



Attach occurs from TOP FACE
(ANTI-STEREOSPECIFICITY)

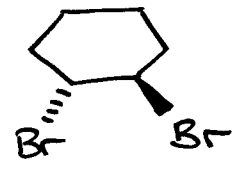


attach blocked



III

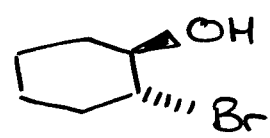
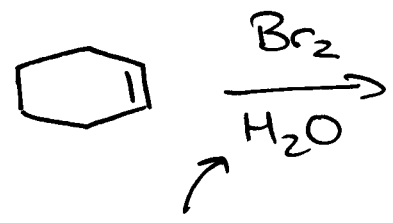
COULD HAVE FORMED BROMONIUM ION ON TOP FACE & ATTACHED FROM BOTTOM



TRANS

IF OTHER C ATOM OF BROMONIUM ION WAS ATTACHED, OTHER ENANTIOMER WOULD BE FORMED

3 ADDITION OF HOCl / HOBr



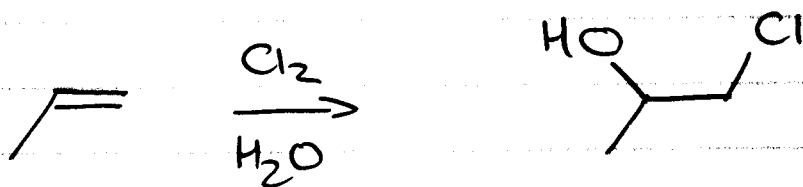
ANTI-STEREOSPECIFIC

not an INERT SOLVENT

HALOHYDRIN (BROMOXYDRIN)

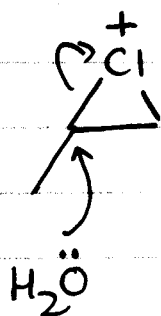
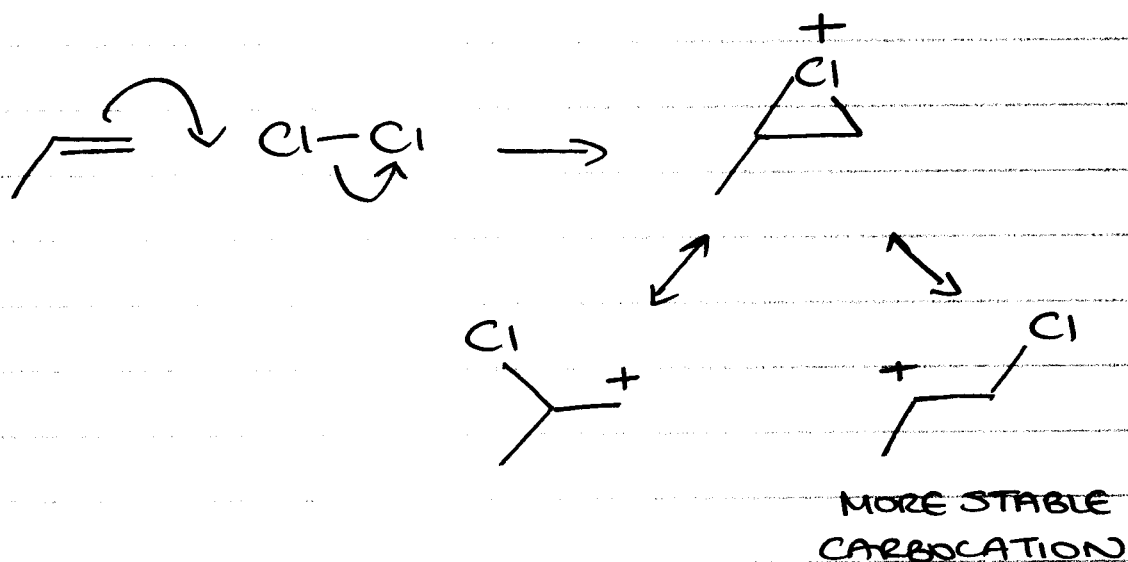
(6)

ALSO REGIOSPECIFIC

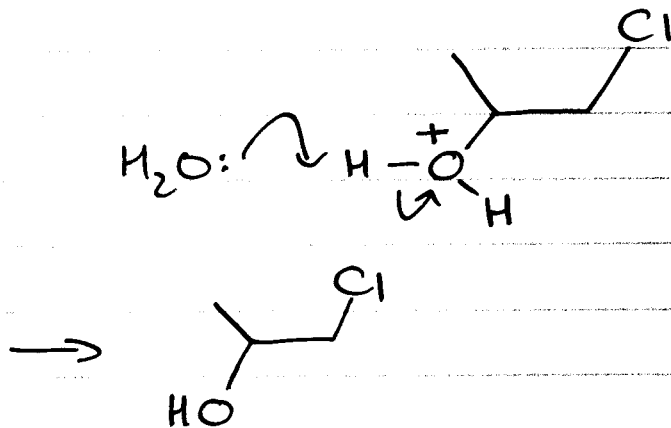


-OH ADDS to more SUBSTITUTED C ATOM of ALKENE

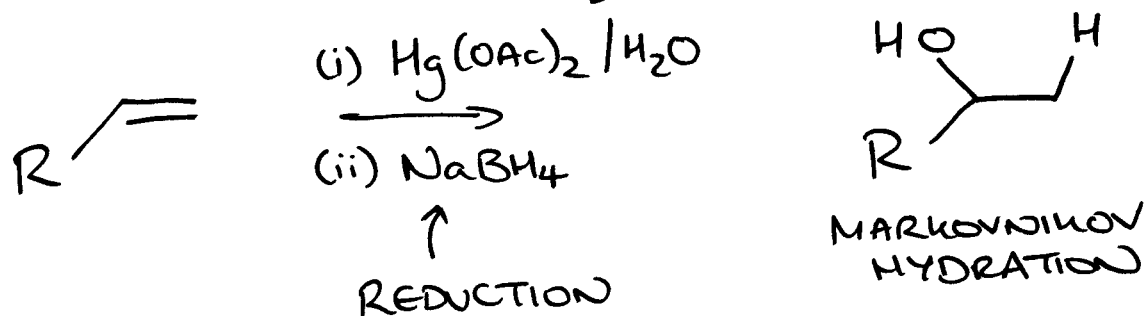
consider mechanism:



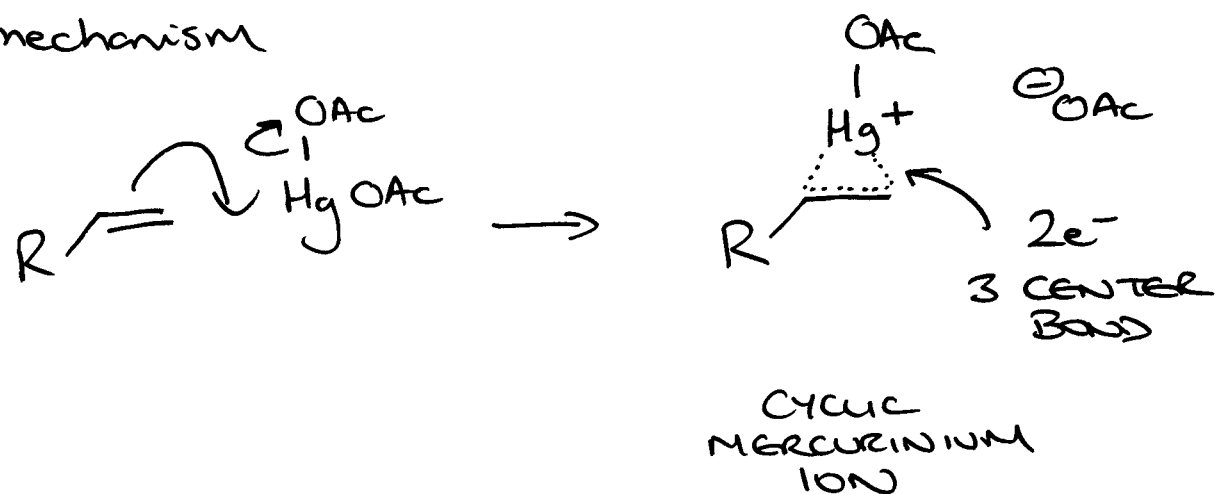
OPENS VIA MOST STABLE C^+



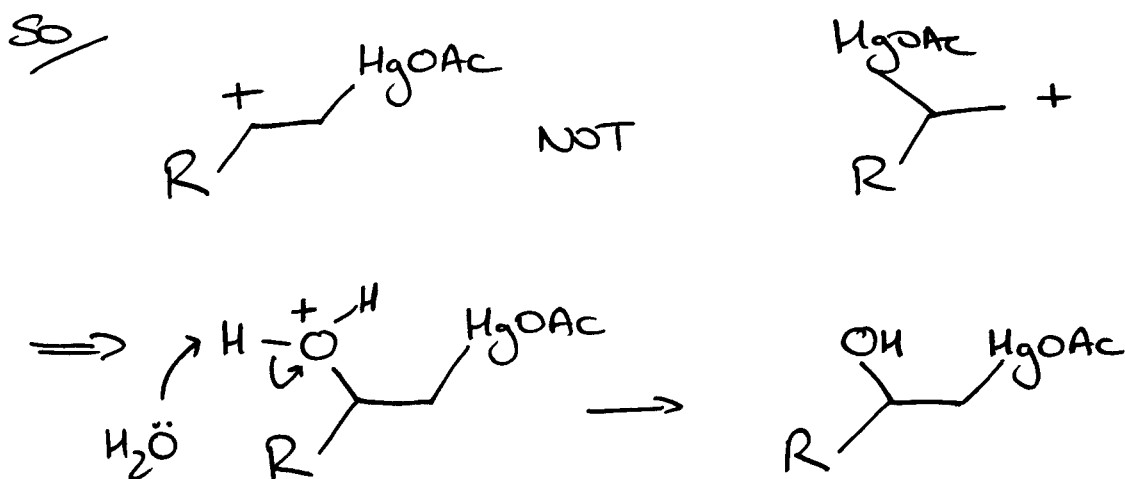
④ OXYMERCURATION



mechanism

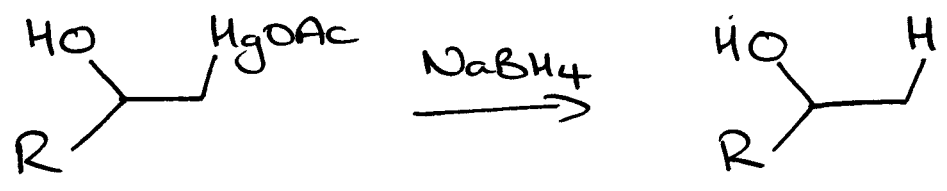


Opens via most stable C⁺



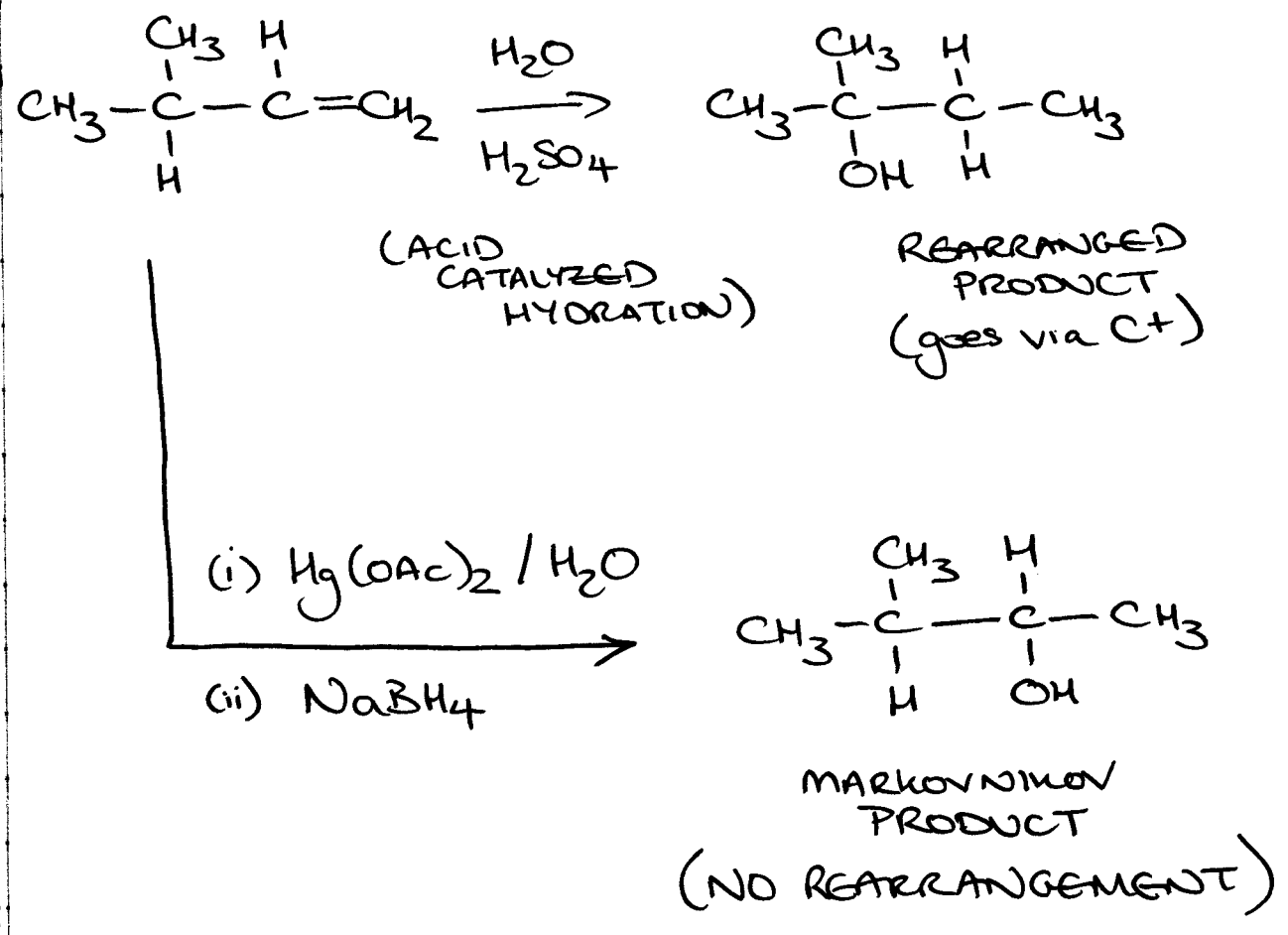
8

ORGANOMERCURY COMPOUND IS REDUCED WITH NaBH_4



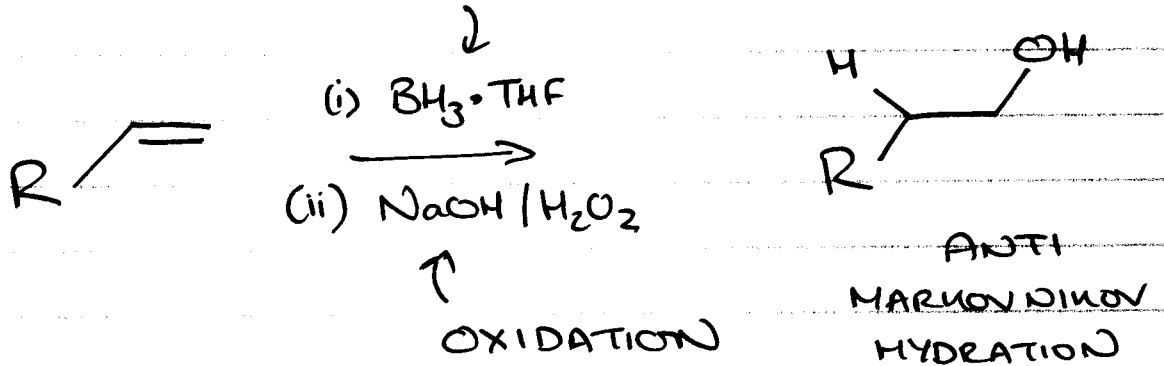
So, why is this useful?

CONSIDER

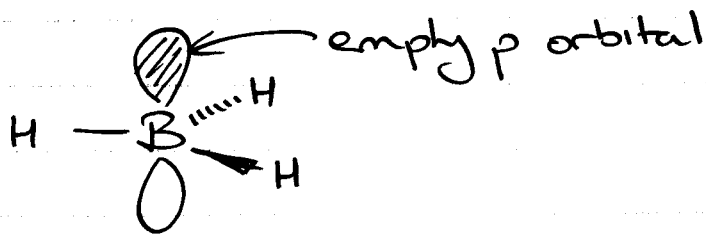


REGIOSPECIFIC w/ ANTI STEREOSPECIFICITY (similar to addition of $\text{Br}_2 / \text{Cl}_2$)

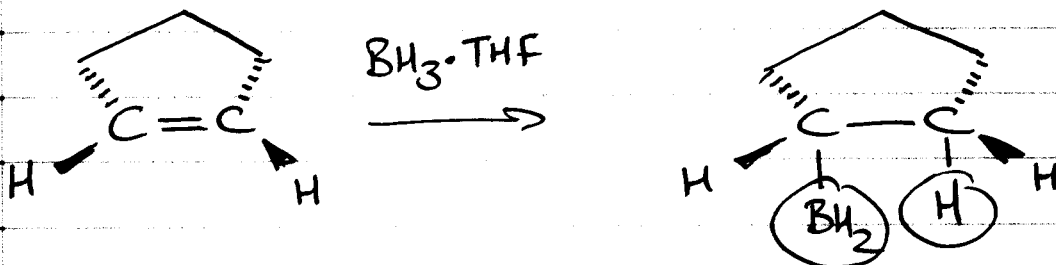
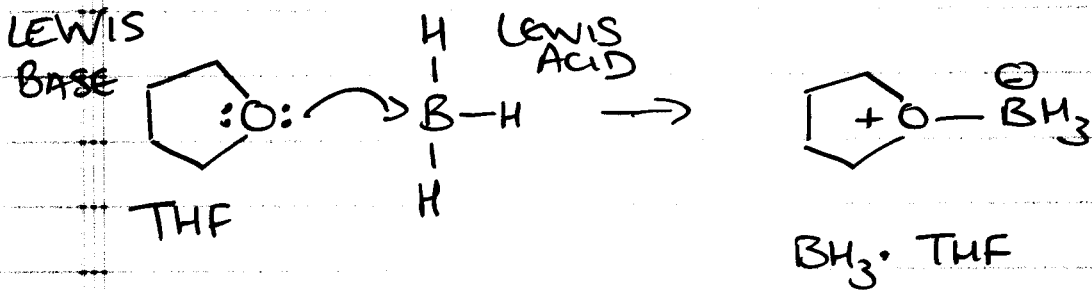
⑤ HYDROBORATION



BORANE (BH₃)



(actually exists as B₂H₆)
↳ WHAT IS THE STRUCTURE?



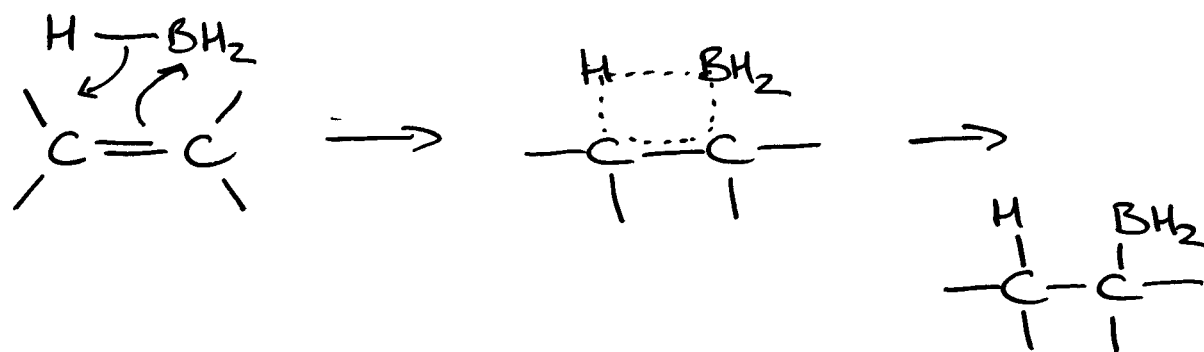
SYN STEREOSPECIFIC

(10)

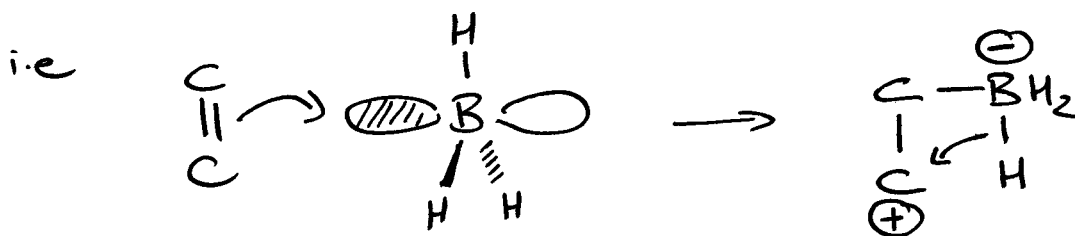


REGIOSELECTIVE

BORON ADDS TO LESS SUBSTITUTED CARBON



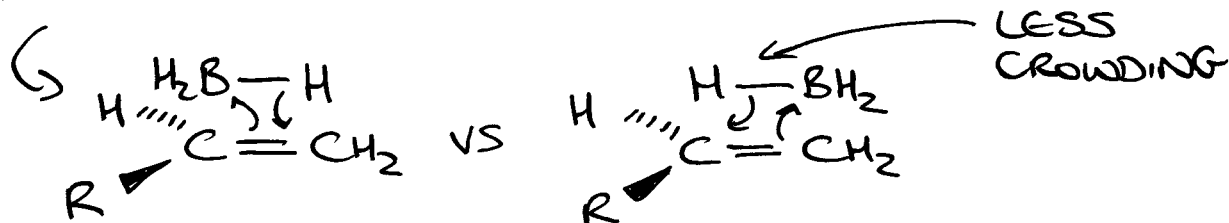
DOES NOT GO THROUGH A C⁺



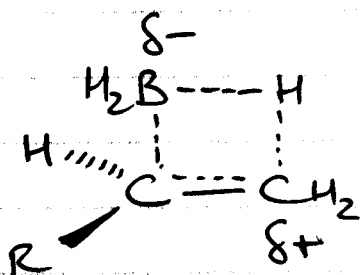
BUT: THERE ARE NO REARRANGEMENTS,
AND SO C⁺ NOT AN INTERMEDIATE

WHY REGIOSELECTIVE?

(i) STERIC (ii) ELECTRONICS

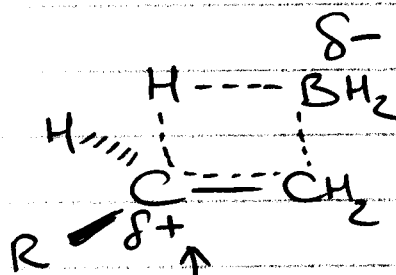


(ii) ELECTRONICS



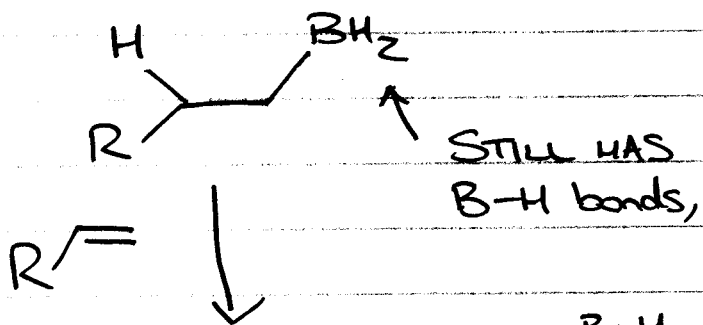
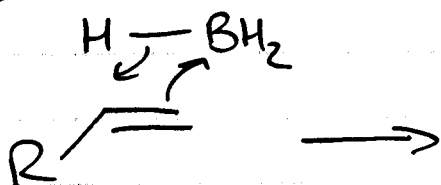
partial C^+
character

VS

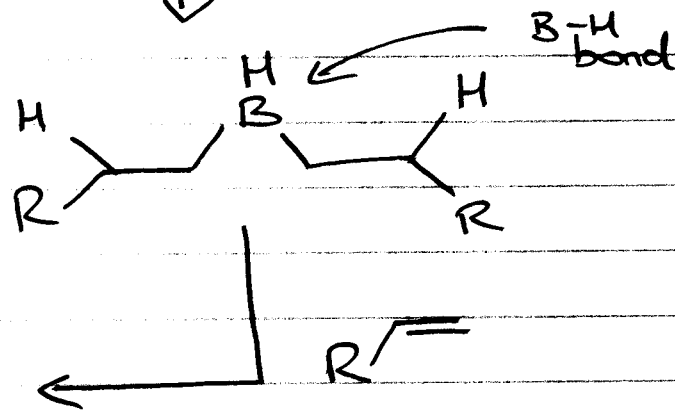
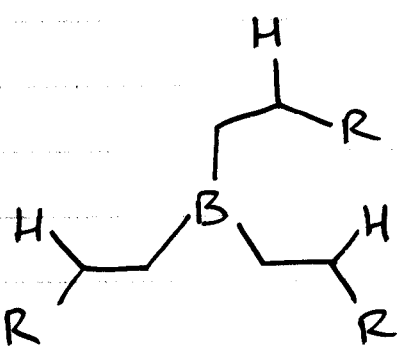


partial C^+
character
(MORE STABLE)

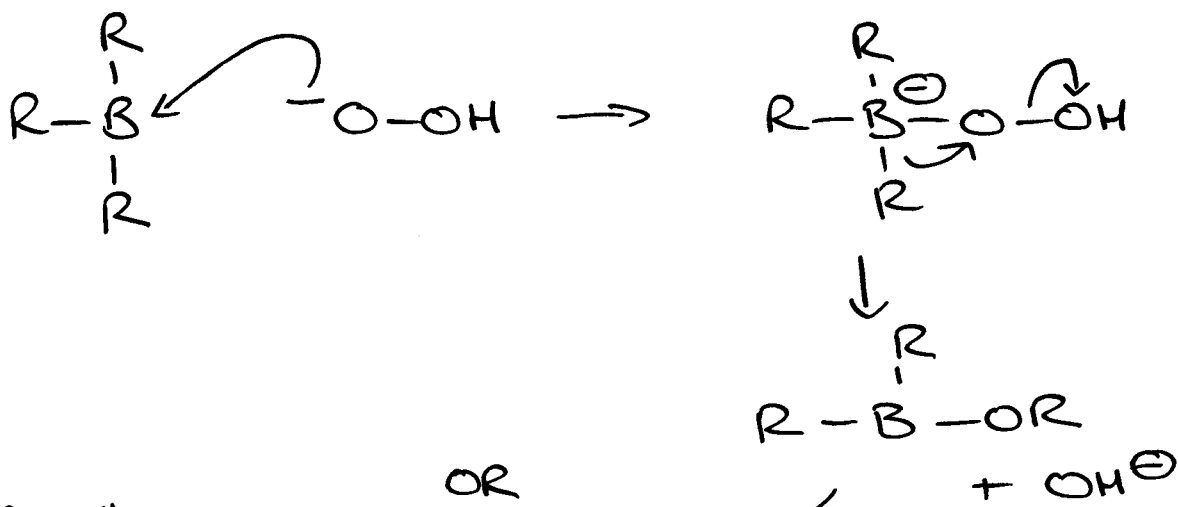
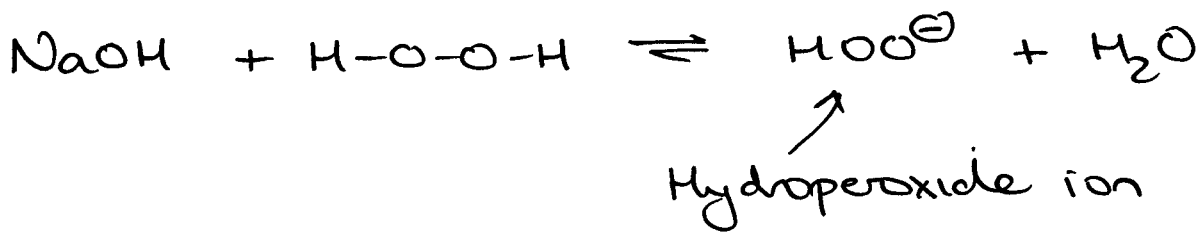
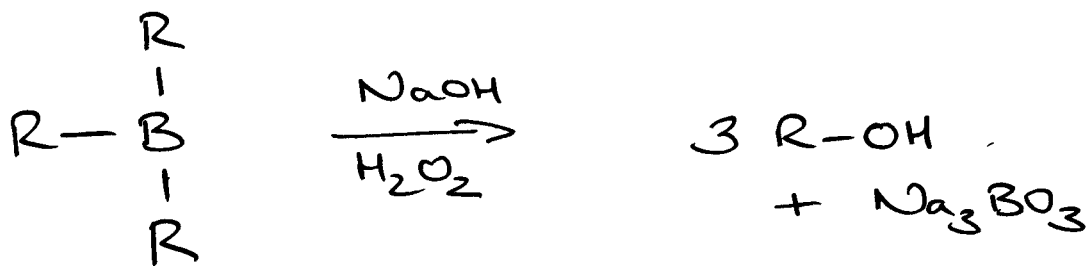
So



So



TRIALKYLBORANE



TRIALKYL
BORATE

