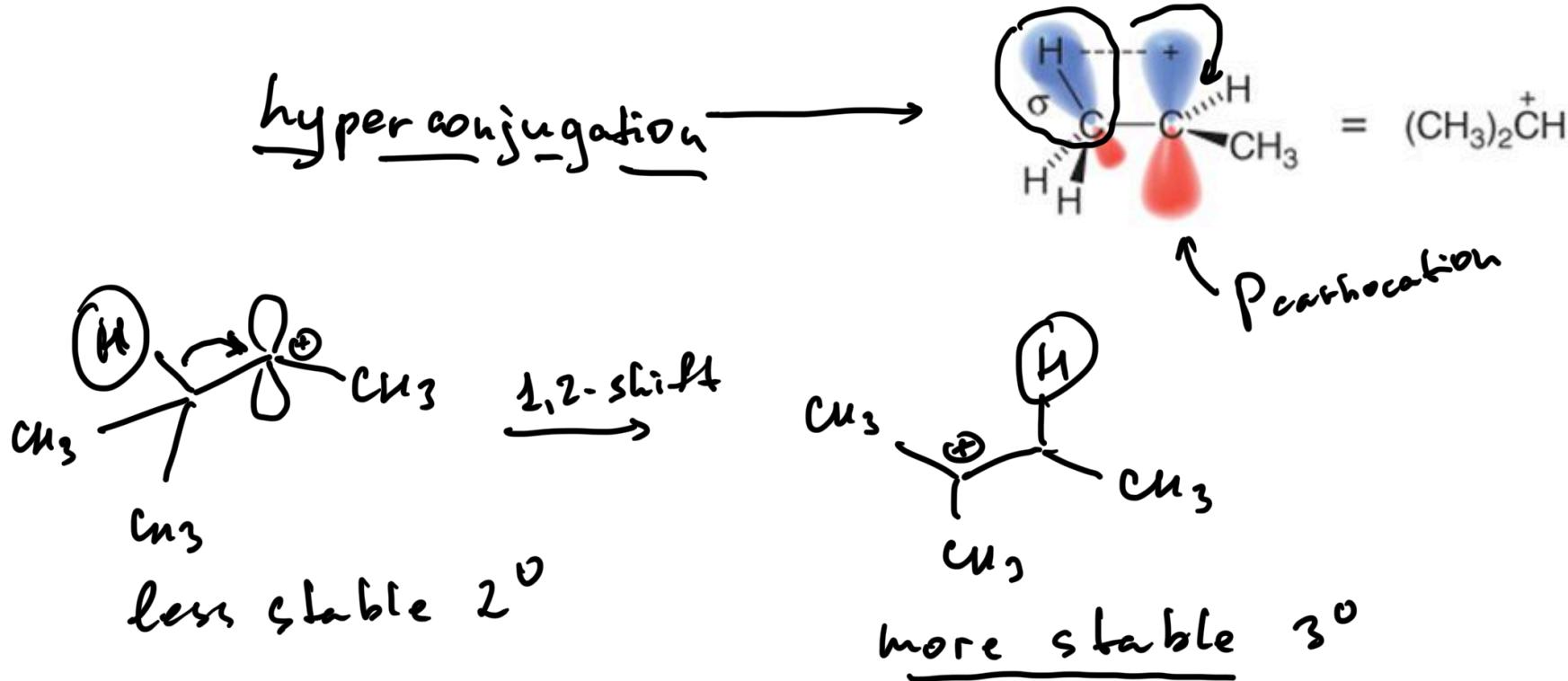


Dehydration reactions: carbocationic rearrangements

1,2-hydride and 1,2-alkyl shifts, formation of more stable carbocation

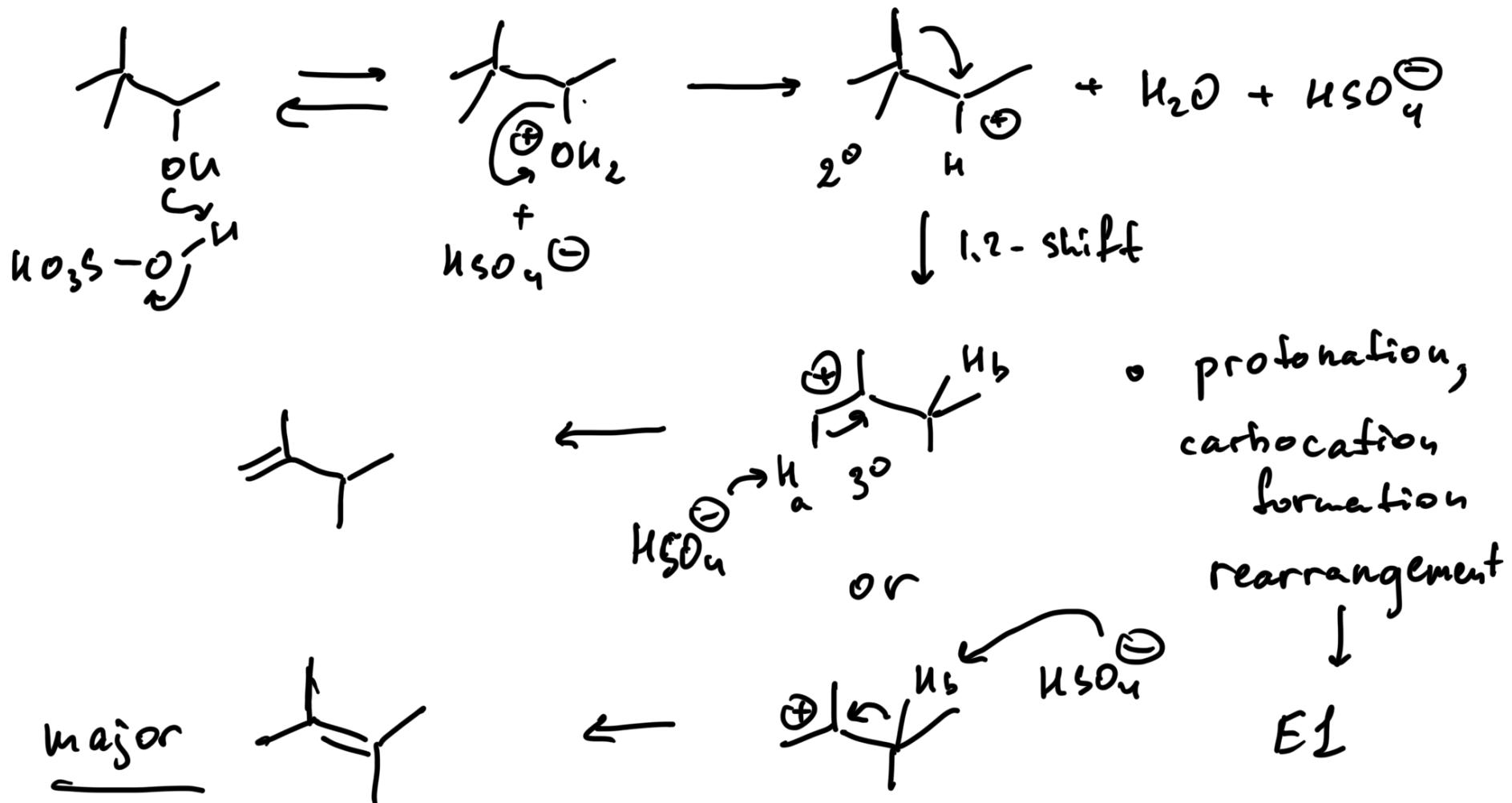
hyperconjugation



1,2-shifts occur when more stable
carbocation results

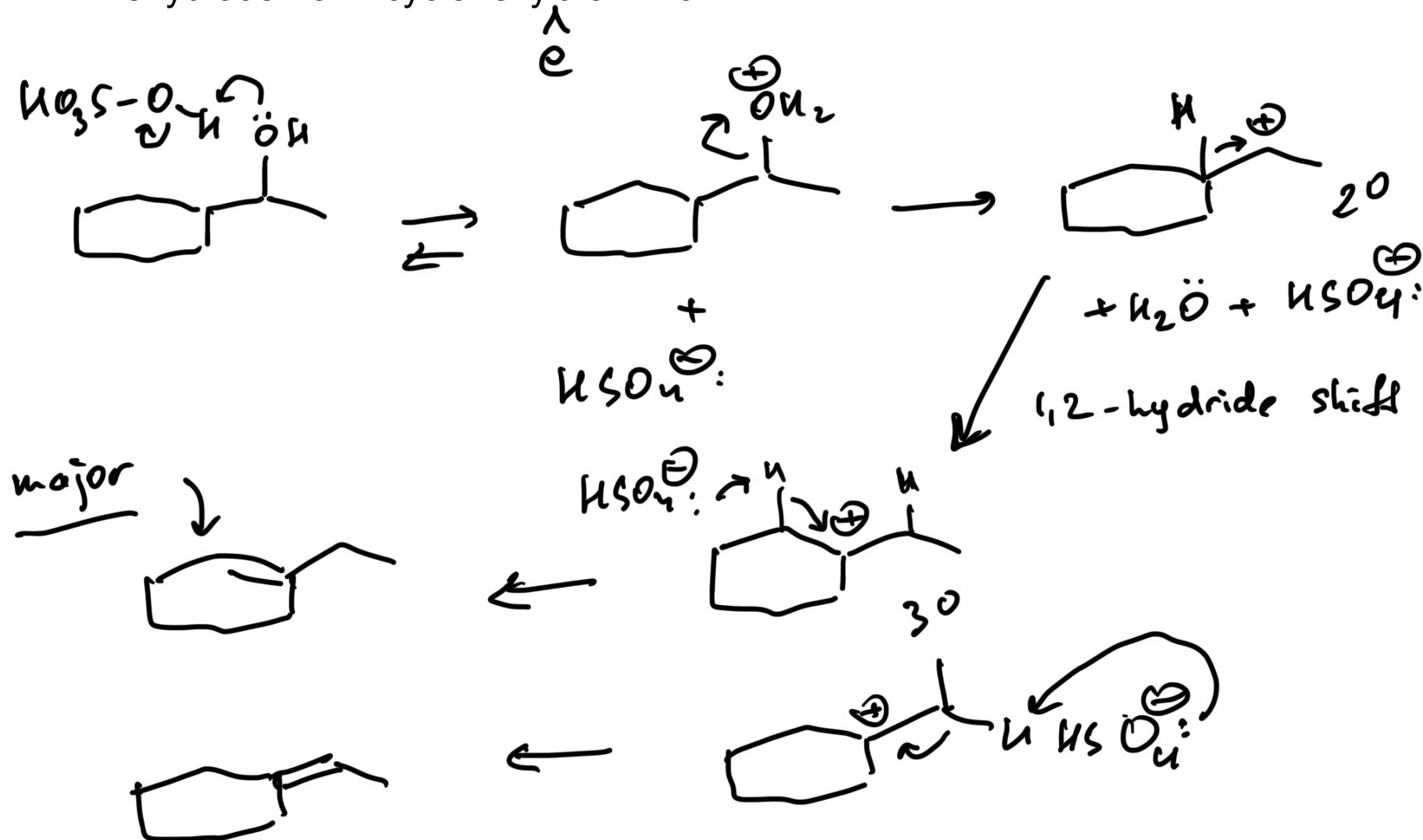
Dehydration reactions: carbocationic rearrangements

Dehydration of 3,3-dimethylbutan-2-ol



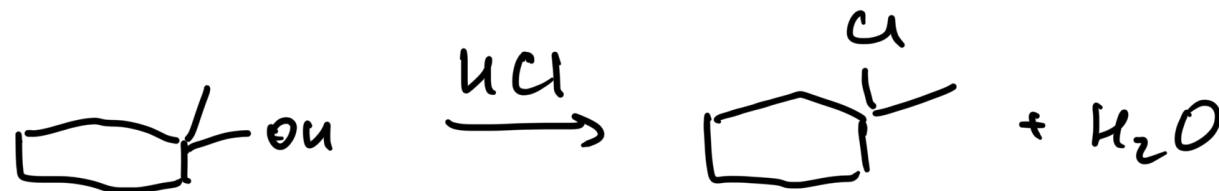
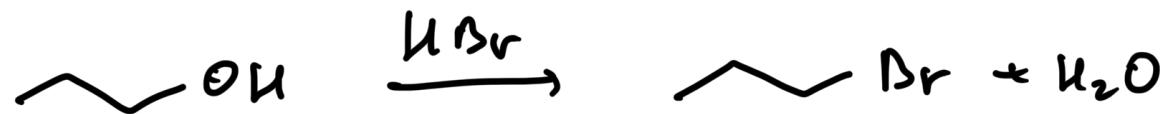
Dehydration reactions: carbocationic rearrangements

Dehydration of 1-cyclohexylthan-1-ol

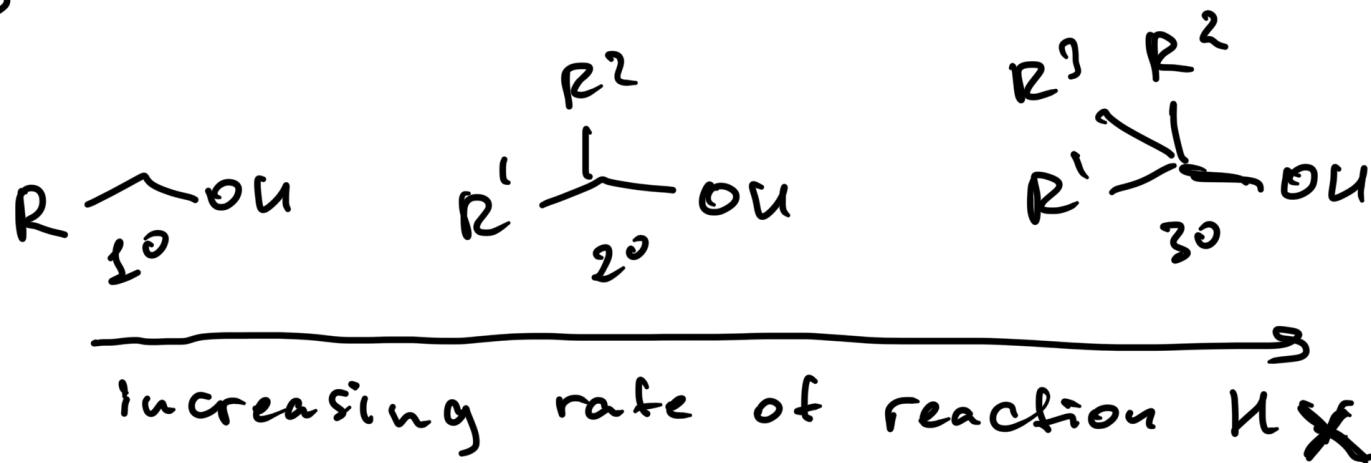


Alcohols: conversion to alkyl halides with HX

Preparation of alkyl halides (X = Cl, Br, I), reactivity trends



general for 1° , 2° , 3° alcohols



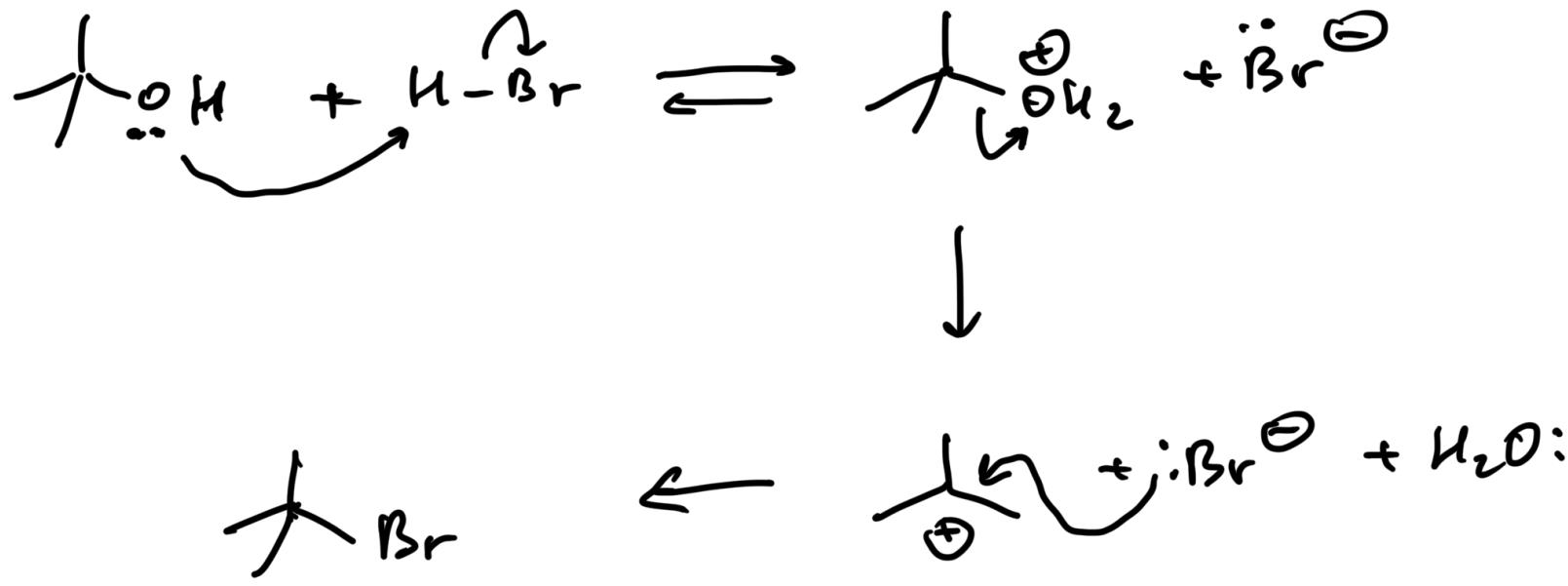
Alcohols: conversion to alkyl halides with HX

Structure of alcohol determines the mechanism of the reaction with HX

- 1° alcohols react via S_N2 mechanism
- $2^\circ, 3^\circ$ alcohols react via S_N1 mechanism

Conversion to alkyl halides with HX: S_N1 mechanism

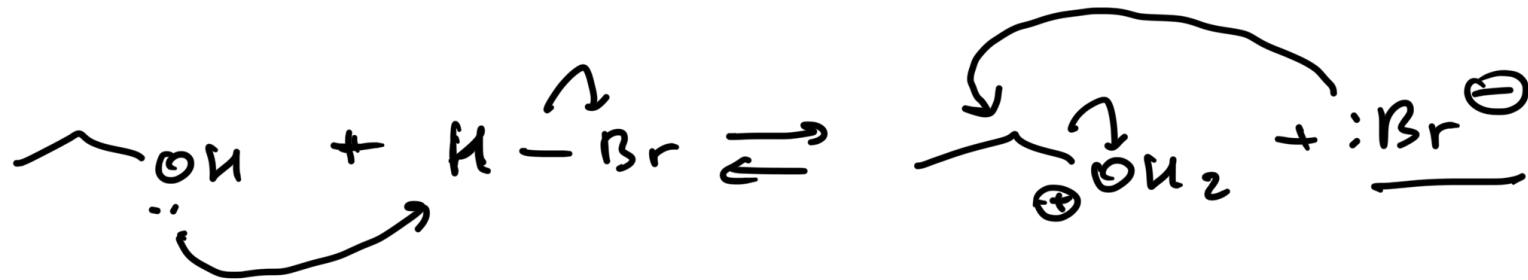
3° and 2° alcohols, mechanism



- protonation, then S_N1

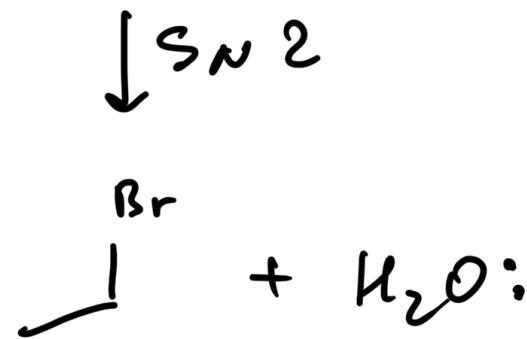
Conversion to alkyl halides with HX: S_N2 mechanism

1° alcohols, mechanism



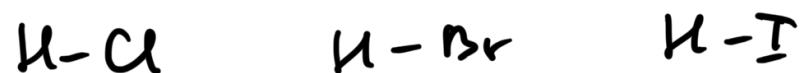
• protonation

then S_N2

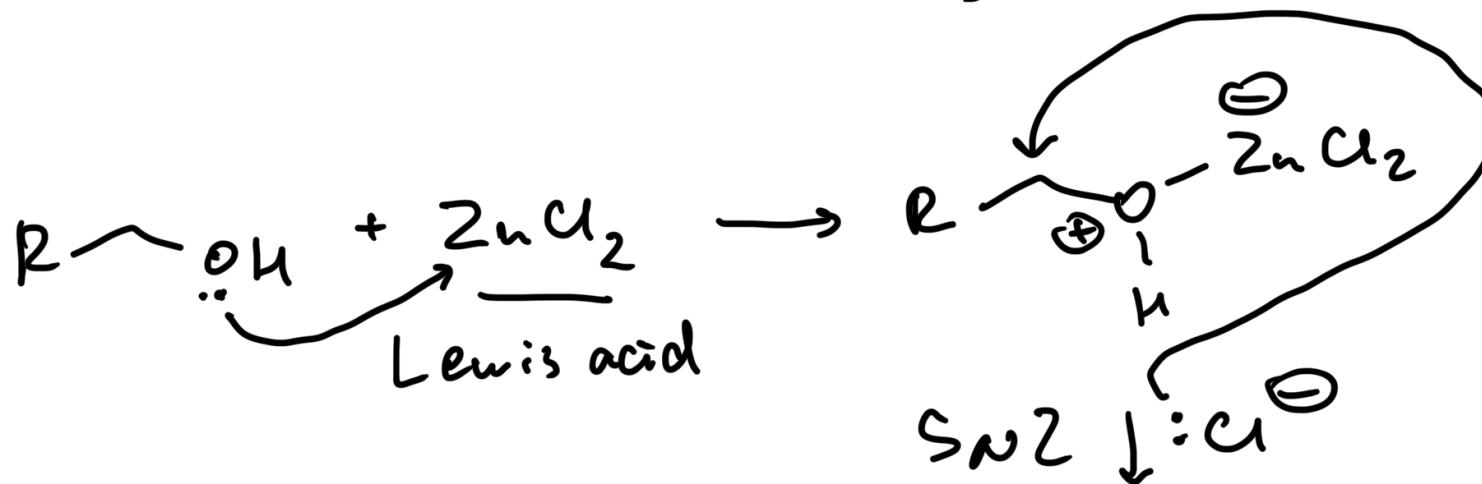


Conversion to alkyl halides with HX: hydrogen halides

Reactivity trends, acceleration in the presence of Lewis acid



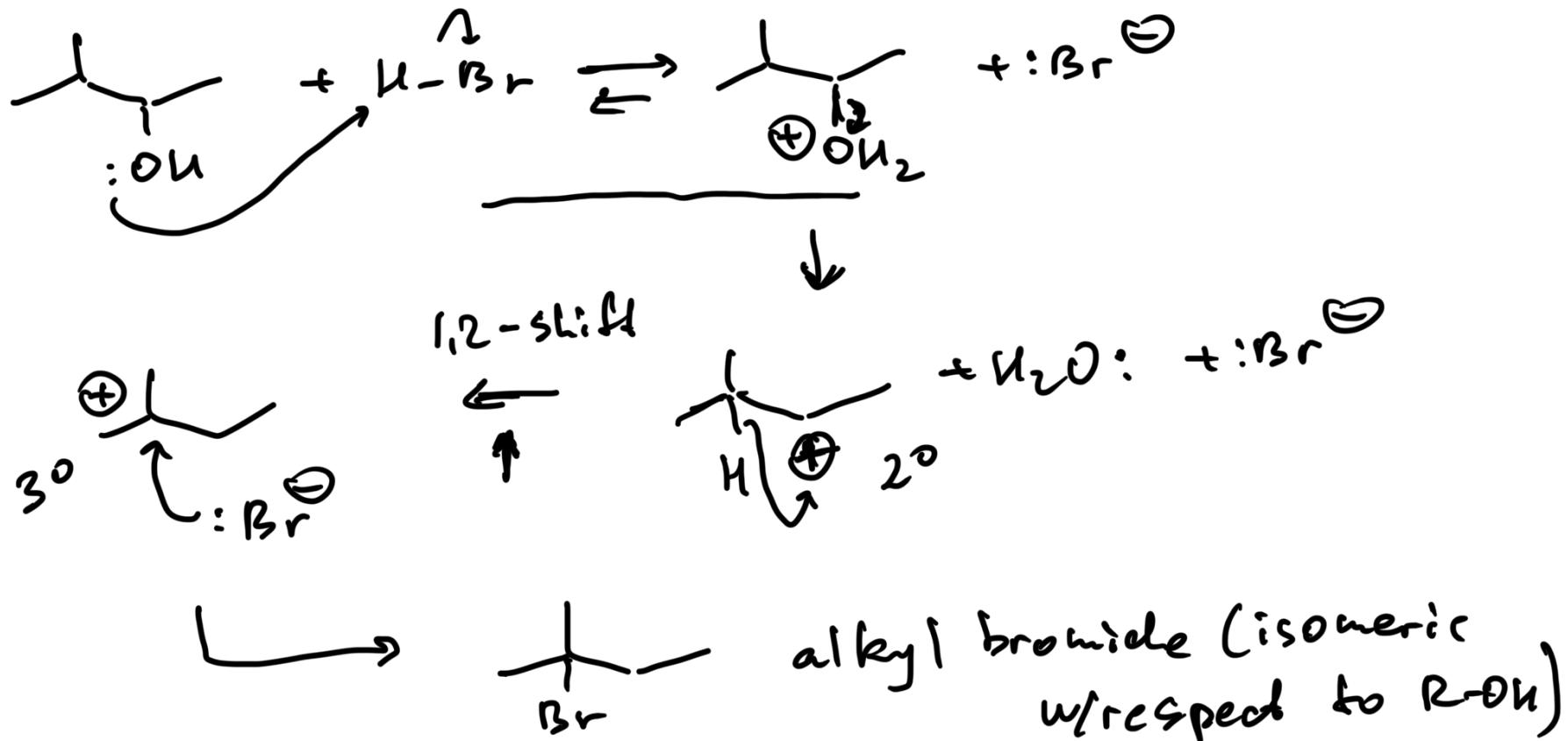
increase in reactivity towards R-OH



Conversion to alkyl halides with HX: carbocations

Rearrangements during the conversion of 3° and 2° alcohols to alkyl halides

- 1,2-shifts (rearrangements) are signs of carbocations!

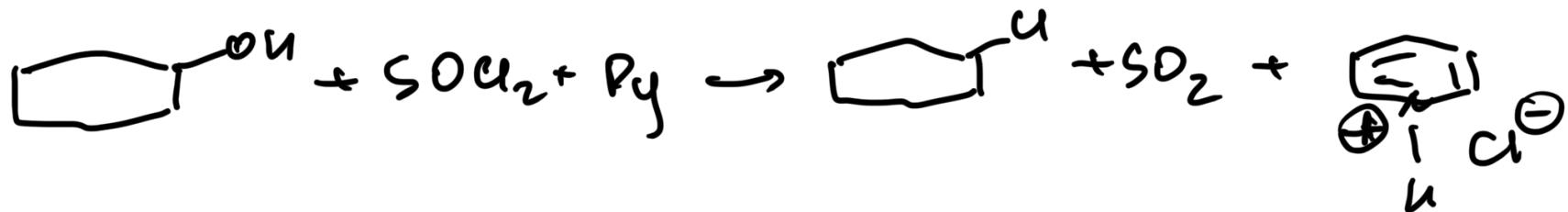
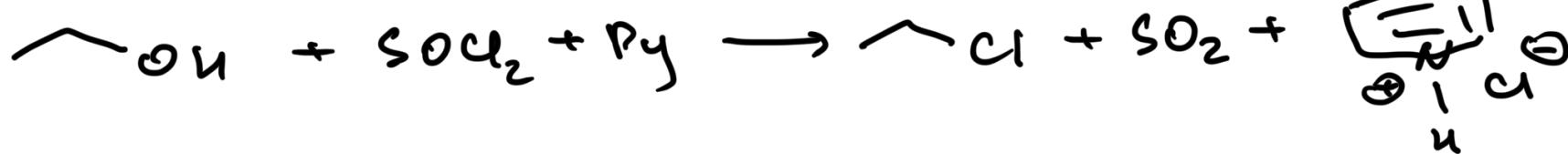


Conversion to alkyl chlorides with SOCl_2

Conversion of 1° and 2° alcohols to alkyl chlorides with SOCl_2 and pyridine

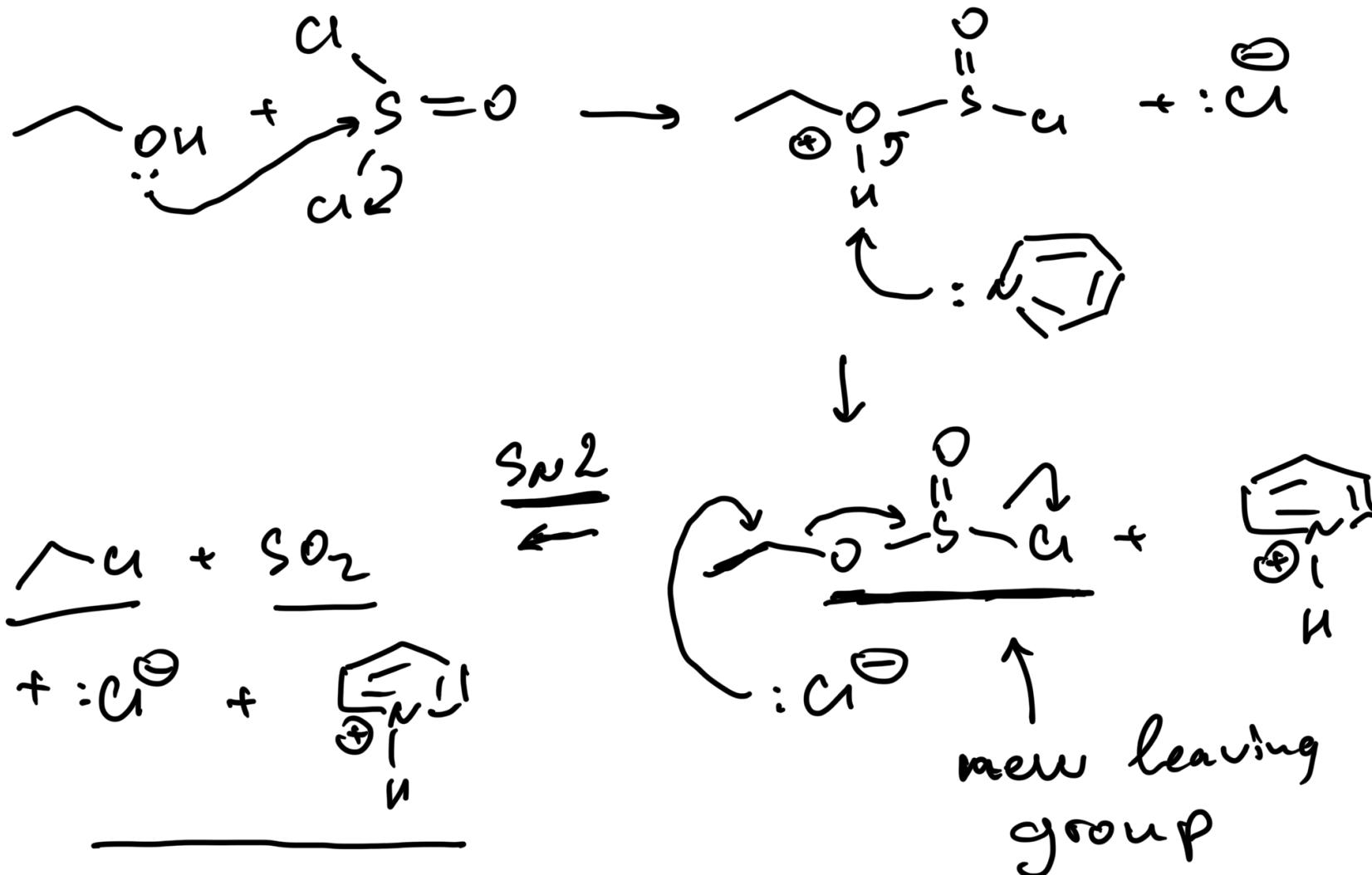


thionyl chloride



Conversion to alkyl chlorides with SOCl_2

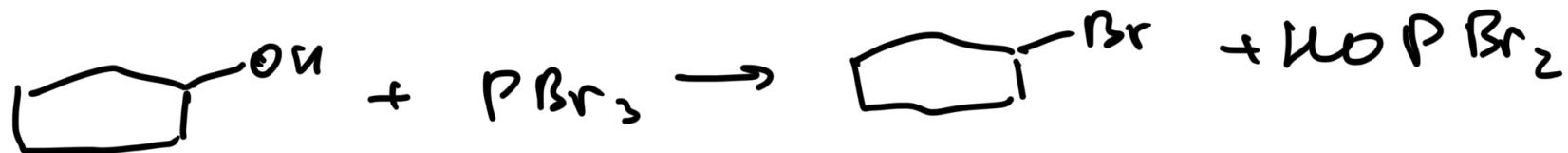
Conversion of 1° and 2° alcohols to alkyl chlorides with SOCl_2 and pyridine



Conversion to alkyl bromides with PBr_3

Conversion of 1° and 2° alcohols to alkyl bromides with $\underline{\text{PBr}_3}$

phosphorus tribromide



Conversion to alkyl bromides with PBr_3

Conversion of 1° and 2° alcohols to alkyl bromides with PBr_3

