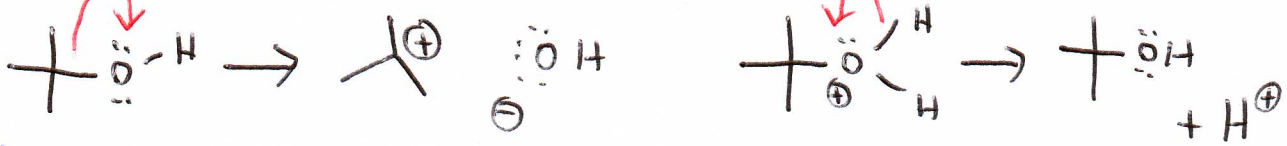
10/21/11 Single versus electron pair mechanisms
stepwise versus concerted; anionic vs. cationic
stereochemical and regiochemical consequences

Electron Pair Mechanisms

↑↑ indicates 2 e⁻

Heterolysis – Uneven breaking of a bond



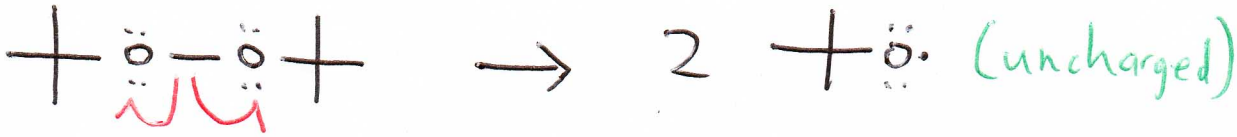
Heterogenesis – Uneven formation of a bond

protonation – add H^+ to a molecule

Single Electron mechanisms

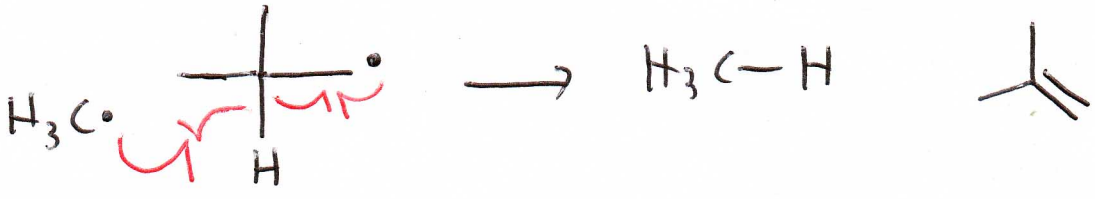
↑ 1e⁻ involved

Homolysis – Even breaking of a bond



Homogenesis – Even formation of a bond

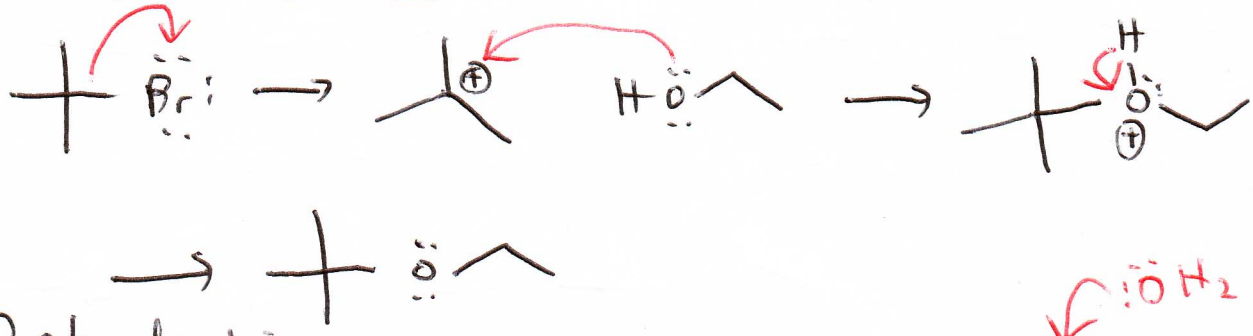
Disproportionation



Types of mechanisms

Cationic – often involve acids and/or the formation of a carbocation as a ~~[illegible]~~ key reaction step

Examples: SN1



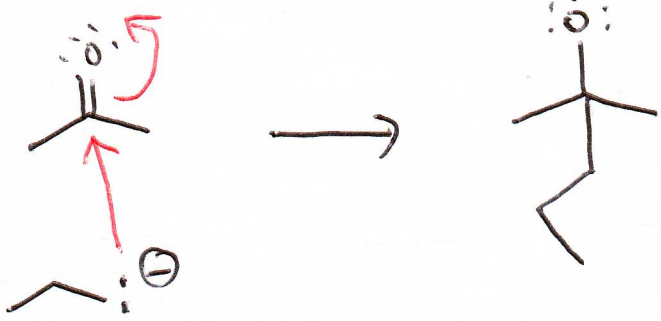
Dehydration

Stepwise – mechanisms that contain multiple elementary steps

Anionic – usually involve strong bases and occur in a small number of steps

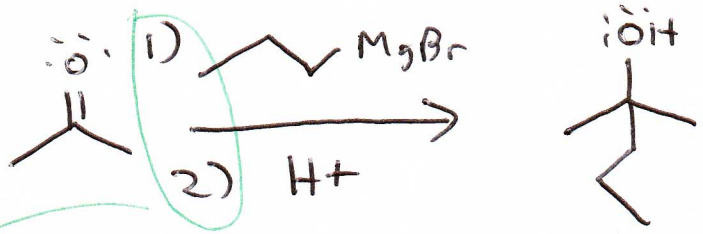
Examples: SN2

Grignard



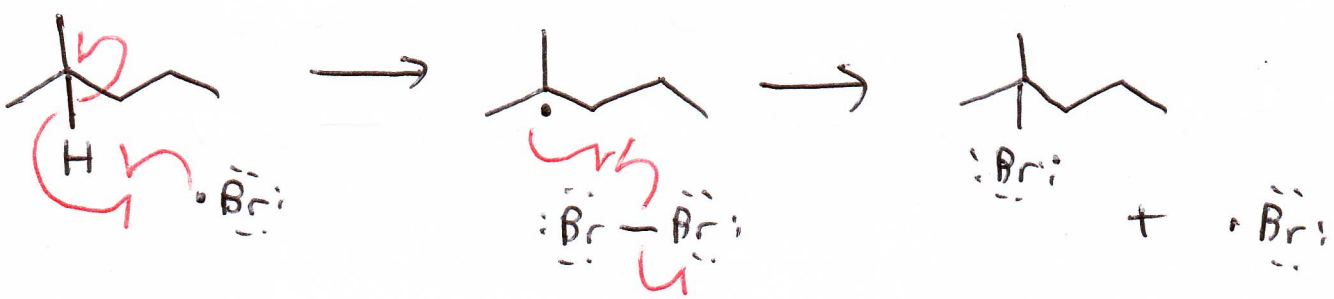
Concerted – mechanism with simultaneous steps

Work-up - A secondary rxn or sequence of rxns used to isolate a product.



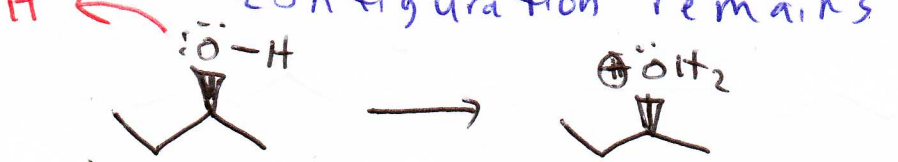
↳ These numbers indicate reaction order. The reagents for step 2 are not introduced until the reaction in step 1 is fully completed.

Radical -



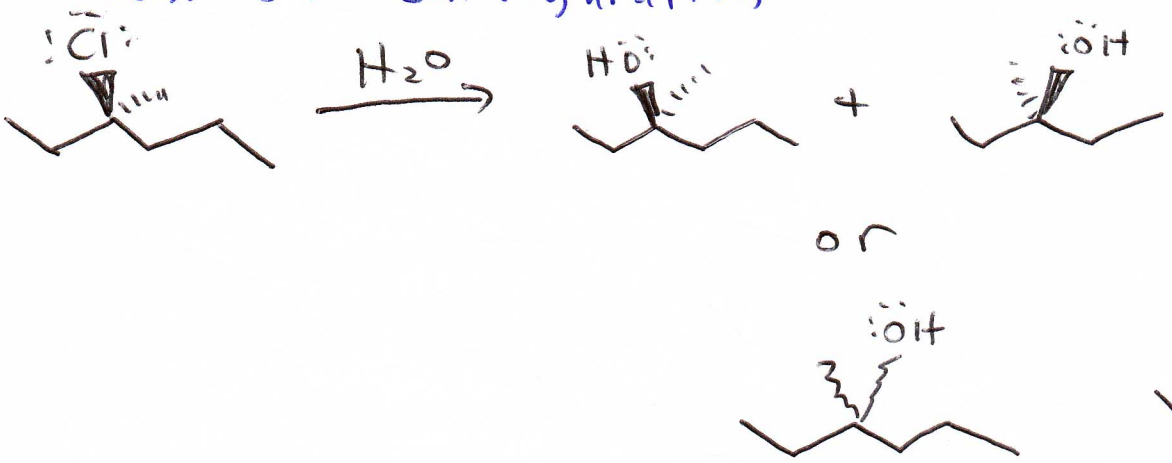
Stereochemical consequences * geometry

retention of configuration - configuration* remains unchanged



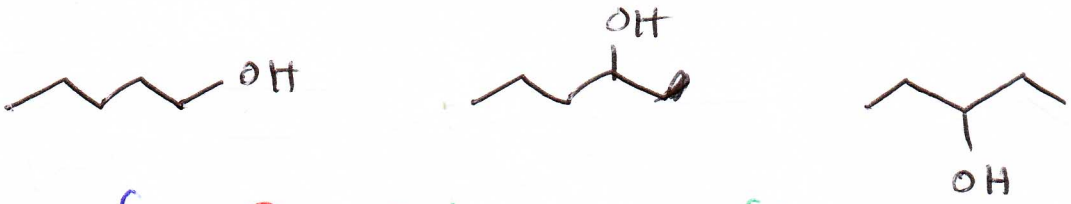
inversion of configuration

loss of configuration

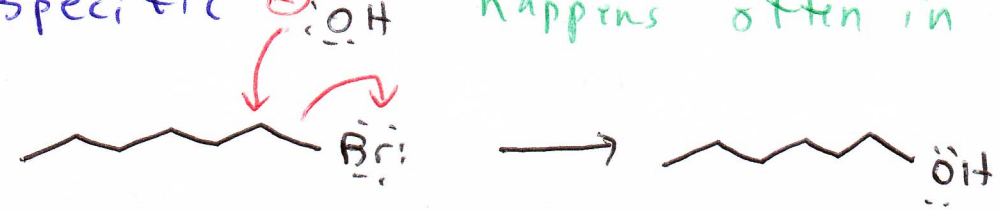


Regiochemical consequences

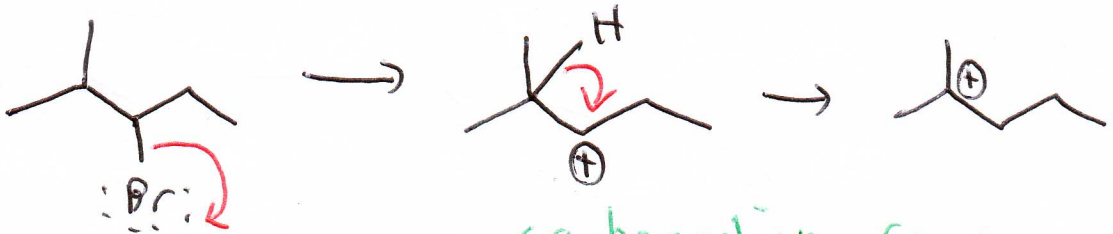
regioisomers – isomers that are structurally very similar except for the position of a key functional group



specific – happens often in anionic rxns



non-specific – cationic mechanisms



carbocation rearrangement
hydride shift