

14.S: Electrophilic Reactions (Summary)

Understand why the π bond in a carbon-carbon double bond is more reactive than the σ bond.

Addition

- Be able to draw a mechanism for the electrophilic addition of a haloacid to an alkene.
 - Stereochemistry: understand why nonenzymatic electrophilic addition of a haloacid to an alkene occurs with racemization (both inversion and retention of configuration) at both alkene carbons. Be able to distinguish syn vs anti addition.
 - Regiochemistry: Be able to predict the regiochemical outcome of an electrophilic addition, based on the relative stability of the two possible carbocation intermediates. Be able to predict when anti-Markovnikov addition is likely to occur.
- Be able to predict the product of nonenzymatic addition of water/alcohol to an alkene, including regio- and stereo-chemistry when applicable. Be able to draw complete mechanisms.
- Be able to predict the products of nonenzymatic addition of water/alcohol to a conjugated diene or triene, including regio- and stereochemistry when applicable. Be able to draw complete mechanisms, including multiple resonance forms for carbocation intermediates.
- Be able to apply your understanding of nonenzymatic alkene addition reactions to draw mechanisms for enzymatic addition reactions. In particular, you should be able to draw mechanisms for biochemical electrophilic addition reactions in which a new carbon-carbon bond is formed.

Elimination

- Be able to draw a mechanism for an E1 elimination reaction.
- Be able to predict possible E1 reaction products from a common starting compound, taking into account both regiochemistry (Zaitsev's rule) and stereochemistry.
- Be able to recognize and draw a mechanism for biochemical E1 reactions in which
 - the second step is a deprotonation event
 - the second step is a decarboxylation event
- Be able to distinguish whether a biochemical elimination reaction is likely to proceed through a E1cb or E1 mechanism, based on the structure of the starting compound.

Isomerization/substitution

- Be able to recognize and draw mechanisms for a biochemical electrophilic isomerization reaction (shifting the location of the carbon-carbon double bond).
- Be able to recognize and draw mechanisms for a biochemical electrophilic substitution reaction.
- Be able to recognize and draw mechanisms for a biochemical electrophilic aromatic substitution reaction, and be able to explain the ring-activating effect (how the carbocation intermediate is stabilized by resonance, usually with lone-pair electrons on either an oxygen or a nitrogen atom).
- Be able to recognize when a hydride or alkyl shift is likely to occur with a carbocation reaction intermediate.
- Be able to draw a mechanism for a reaction that includes a carbocation rearrangement.

This page titled [14.S: Electrophilic Reactions \(Summary\)](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Tim Soderberg](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.