Review

Reduction – addition of electron (e⁻)



Oxidation – removal of electron (e)

Ozonolysis: Oxidation of Alkenes

- cleavage of alkenes by ozone (O₃)

Ozone is a resonance stabilized electrophile that adds to alkenes



Note: First Ozonide is also called a molozonide

Ozonolysis

Ozone (O₃) – colourless gas, "electrical" smell

General scheme:



Note: zinc oxide is commonly found in strong sunscreens

Example 1



formaldehyde – cadaver preservation

Example 2



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aside: 2 isoprene units make up myrcene, making this a monoterpene



question taken from a final examination (for the moment, ignore loss of HBr Rxn)



Example 4



If you were given ozonlysis of a molecule to make acetone, how would you make it?



Example 5



2,8-dimethyl-nona-2,7-diene

Epoxidation

- concerted reaction: all bonds break and form at the same time
- stereospecific: the stereochemistry of the products is determined by the starting material

General scheme



Peracetic acid (epoxidizing reagent) is NOT the same as acetic acid (product of this reaction; also a component of vinegar).

Example 1

Cis-2-butene



(1:1) Racemic mixture

Cis-2-butene product: a meso compound **Trans-2-butene product:** a racemate



- Done by Adolf Butenandt

Gypsy moth sex pheromone

- The epoxide formed is a compound called disparlure

- Results in 50:50 mixture, but only the one shown is the active pheromone
- Pheromones (pherein horman to carry excitement), chemical messengers

Do humans produce epoxides? Yes, we do.

Example 1



Leukotriene A4 -- substance (chemical messenger) that mediates anaphylaxis (allergic reaction, asthma)