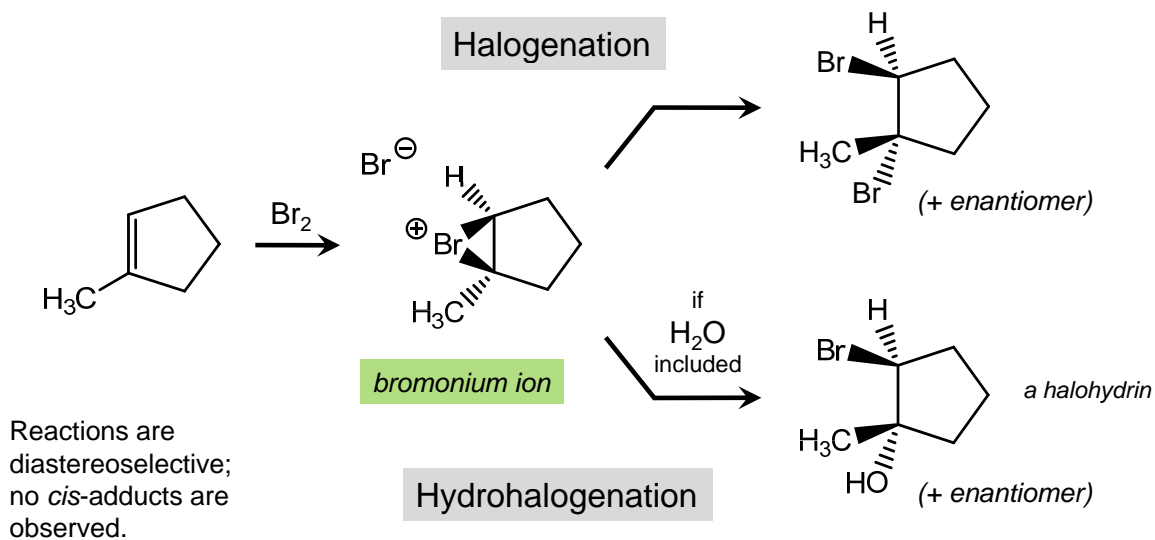
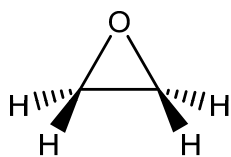


Electrophilic Alkene Halogenation and Hydrohalogenation

Adds -Br and -Br (or -Br and -OH) *anti* onto double bond, to yield trans-products.



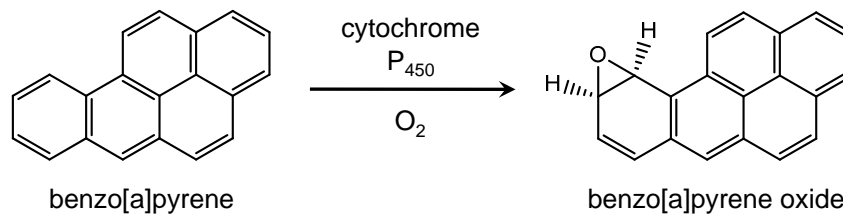
Epoxides



Epoxide: A three-membered ring made of two carbons and one oxygen.

Very reactive towards nucleophiles.

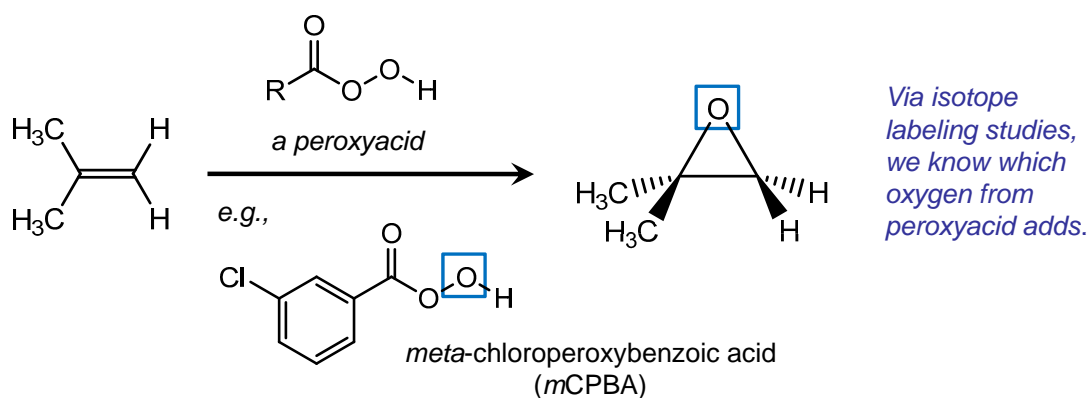
Example from biology:



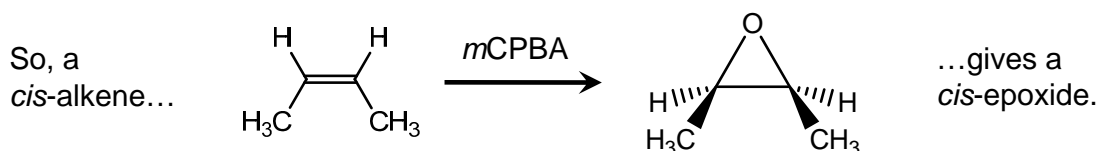
a polycyclic aromatic hydrocarbon (PAH)
byproduct of burning tobacco, charring meat

reacts with nucleophiles in DNA to generate DNA "lesions", which can produce cancer-causing mutations

Synthesis of Epoxides

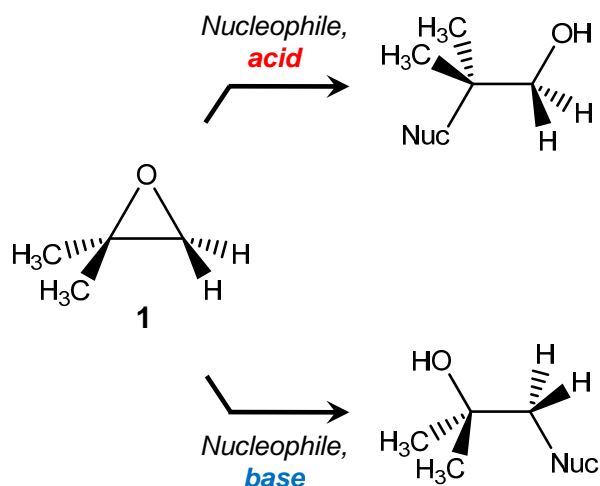


Stereochemistry of alkene starting material is retained in epoxide product.



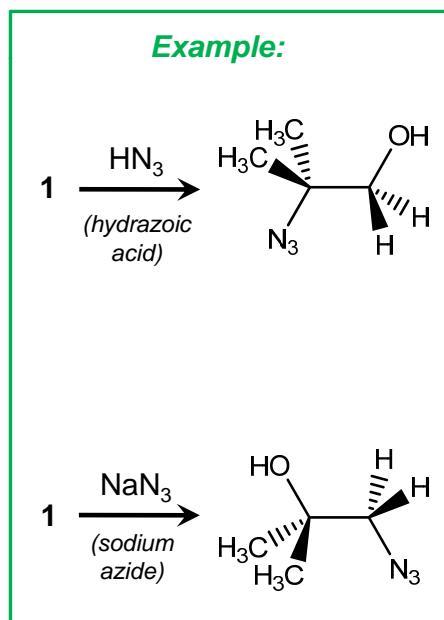
Ring-Opening Reactions of Epoxides

In acid, nucleophile adds to site of most stable carbocation.



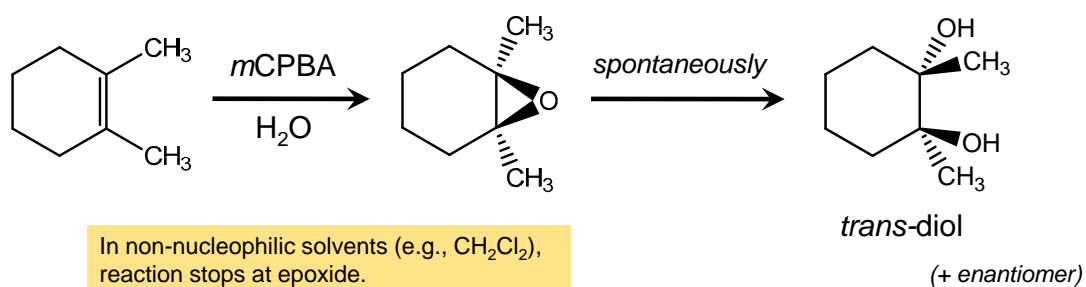
In base, nucleophile adds to least hindered carbon.

Example:

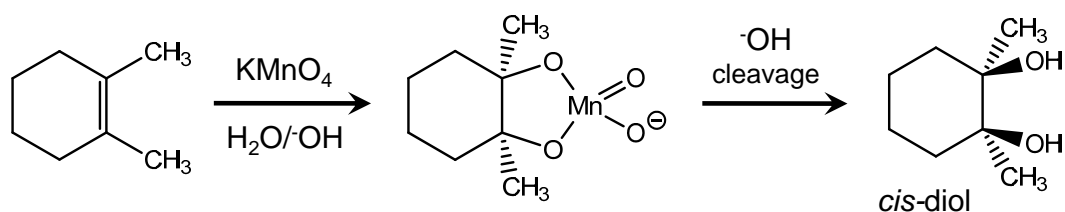


Dihydroxylation of Alkenes

anti-Dihydroxylation via epoxides:



syn-Dihydroxylation with permanganate:



Alkene Ozonolysis

Splits $\text{C}=\text{C}$ double bonds, converts alkene carbons into carbonyls ($\text{C}=\text{O}$).

