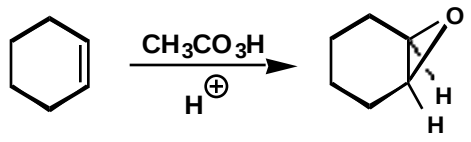
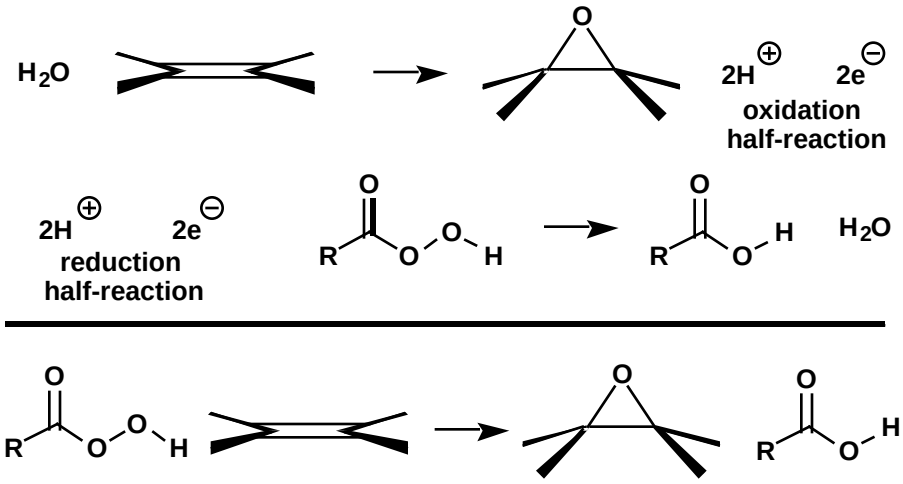
Text Related to Segment 12.03 ©2002 Claude E. Wintner

Turning now to an example of oxidation in organic chemistry, again we consider a case that involves alkenes, but now their reaction with peracids. Thus, cyclohexene reacts with peracetic acid, generally in the presence of a trace of mineral acid catalyst to yield the corresponding oxirane (epoxide):



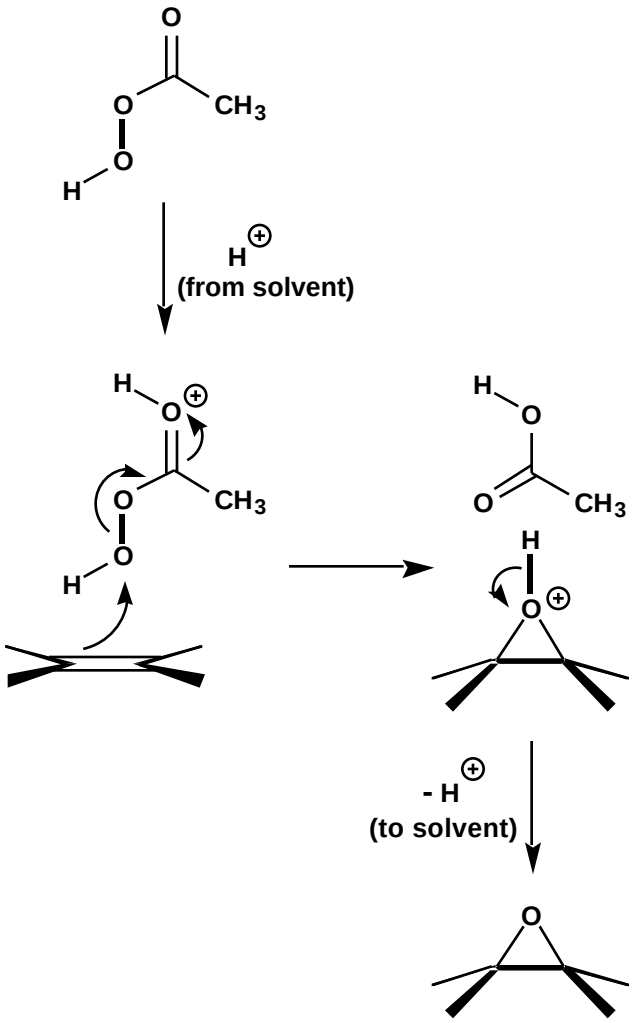
The half-reactions and overall reaction involved are as follows:



half-reactions and overall reaction for alkene oxidation by peracids

An outline of the mechanism which is considered to be operative is given below. The two electrons of the π bond of the alkene — acting as a nucleophile — displace acetic acid from (protonated) peracetic acid, thereby breaking the relatively weak O—O bond of the peracid and yielding the (protonated) oxirane. (Recall that a curved arrow is used to denote the movement of two electrons.) Note how the

electrons move from one face of the nucleophile (donor, base) to the "electron sink" of the electrophile (acceptor, acid). There follows a simple proton transfer from the oxirane back to the solvent, whence it originally was derived.



schematic for mechanism of reaction of peracids with alkenes to yield oxiranes