

ORGANIC CHEMISTRY 1 LECTURE GUIDE 2019

BY RHETT C. SMITH

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By Rhett C. Smith, Ph.D.

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Companion Books from the Proton Guru:

Organic Chemistry 1 Reactions and Practice Problems 2019

by Rhett C. Smith

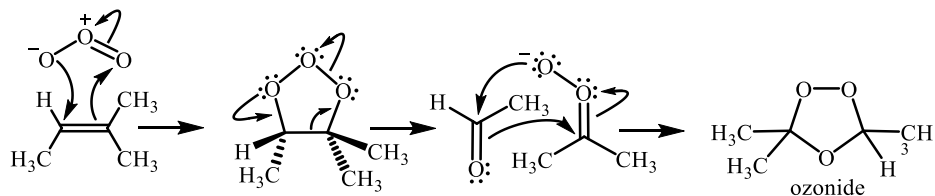
Organic Chemistry 1 Primer 2019,

by Rhett C. Smith, Andrew G. Tennyson, and Tania Houjeiry

Lecture Topic III.10: Ozonolysis and Preparation of Vicinal Diols

Ozonolysis

Ozonolysis differs from the other reactions of alkenes in that instead of *adding* atoms to the pi bond, **both bonds of the C=C are broken**. The first step of ozonolysis is to react the alkene with ozone (O_3):



The ozonide is exposed to either reducing or oxidizing workup:

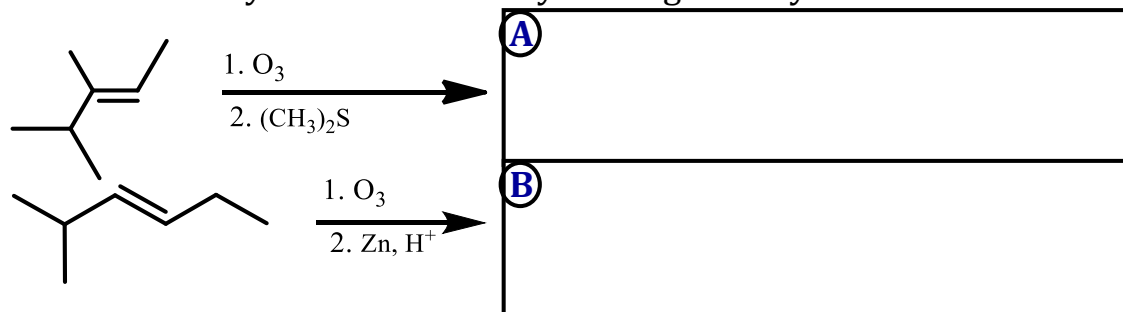
A Reducing workup (Zn/H_3O^+ or R_2S):

B Oxidizing workup (H_2O_2)

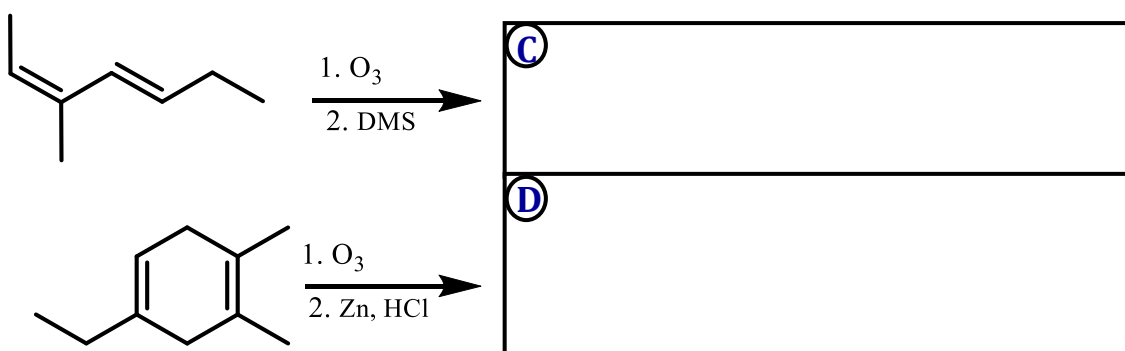
Notes

Ozonolysis

The net ozonolysis reactions that you see generally look like these:



If there is more than one double bond, all will react:

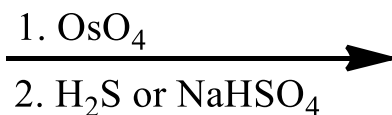
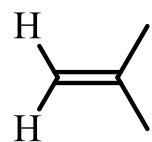


Notes

Organic Chemist Definition of oxidation and reduction:

A

Reaction of an alkene with osmium tetroxide (OsO_4) followed by a reductive workup leads to net *syn*-addition of two OH groups to the two carbons that were in the C=C bond:



B

An example where *syn*-addition would be evident:

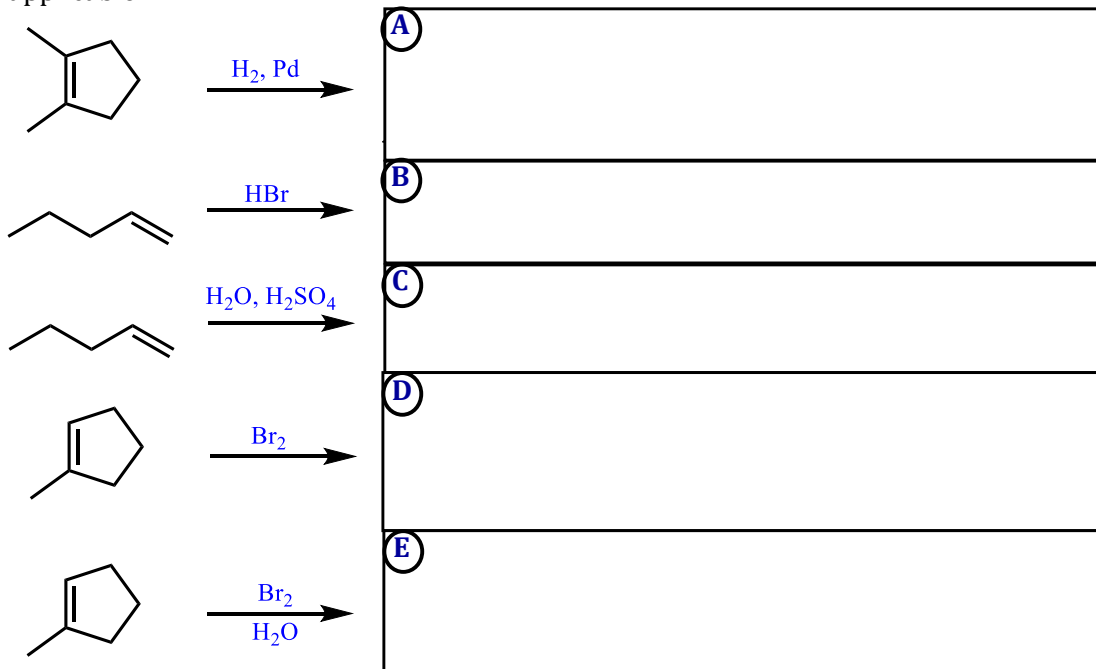
C

Notes

Lecture Topics III.3-10: Recap of Alkene Reactions

Practice, Study and Rationalize

Example. Fill in the major product of each reaction. Show stereochemistry where applicable.

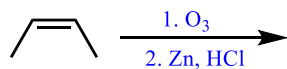
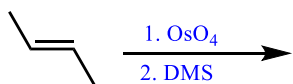
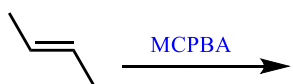
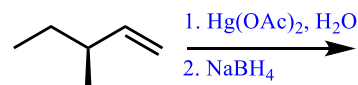
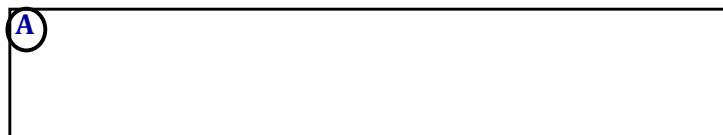
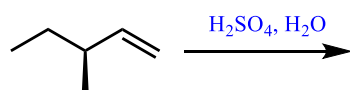


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