

ORGANIC CHEMISTRY 1 LECTURE GUIDE 2019

BY RHETT C. SMITH

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Executive Editor: Rhett C. Smith, Ph.D. You can reach him through our office at: IQ@protonguru.com

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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

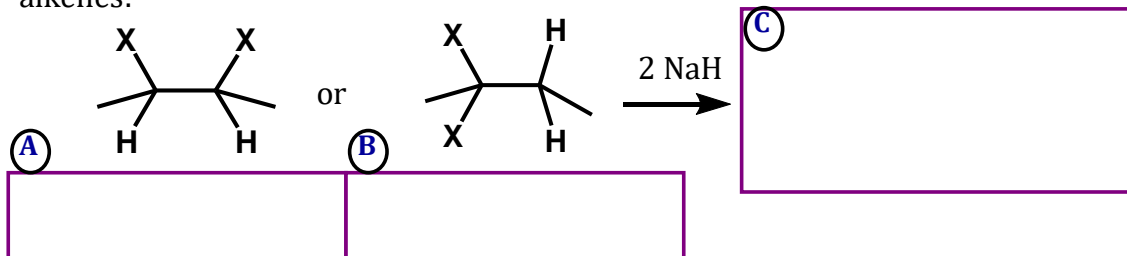
Organic Chemistry 1 Primer 2019,

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

Lecture Topic III.12: Hydrohalogenation and Halogenation of Alkynes

Preparation of Alkynes by Double Elimination

Alkynes can be prepared by sequential elimination of two equiv HX from an alkyl dihalide via an E2 mechanism, in a manner analogous to that used to prepare alkenes:



The second elimination is far more difficult, and the reaction can be stopped after one elimination:

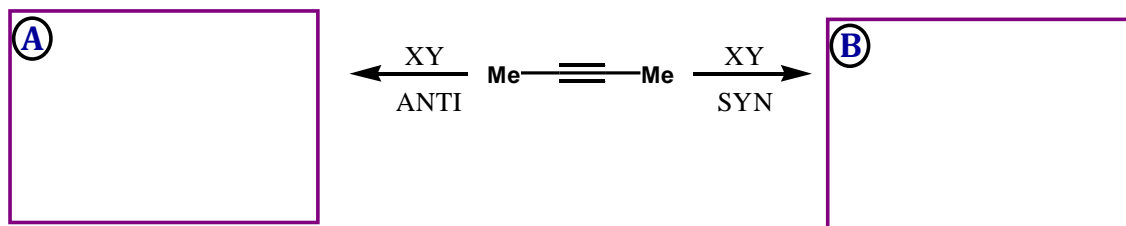


The reverse of double elimination is double addition ...

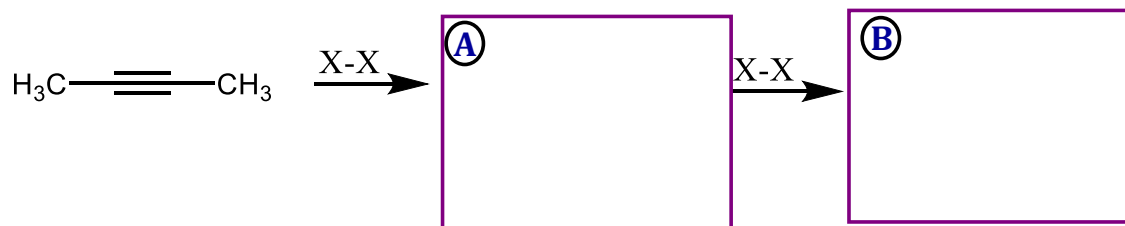
Notes

Lecture Topic III.12: Hydrohalogenation and Halogenation of Alkynes
Addition to Alkyne Pi Bonds

Addition reactions we studied for alkenes can work for alkynes



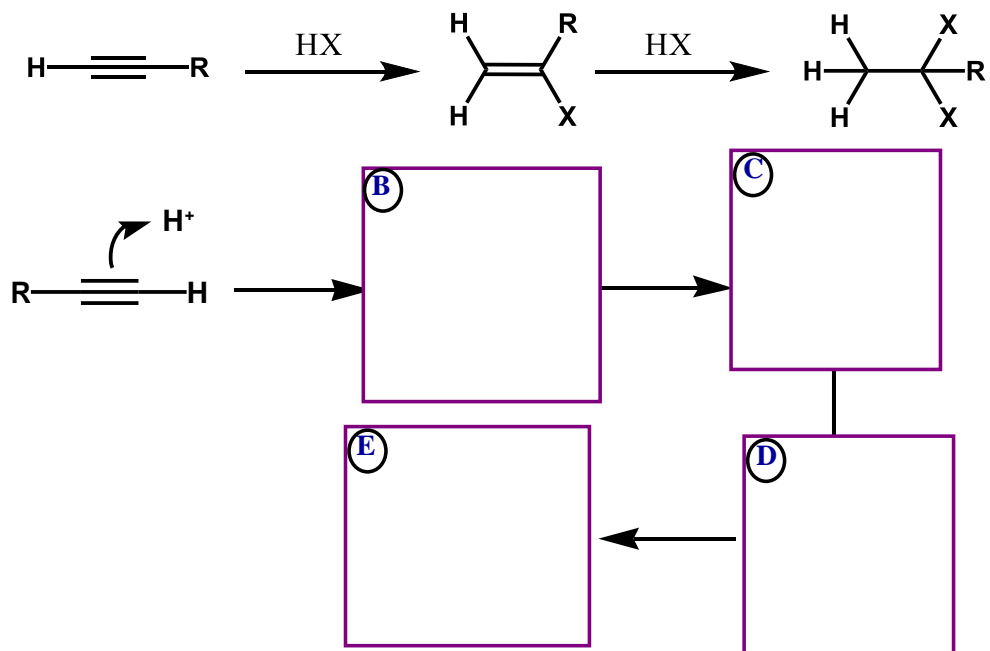
We have TWO pi bonds in an alkyne unit:



Notes

Hydrohalogenation

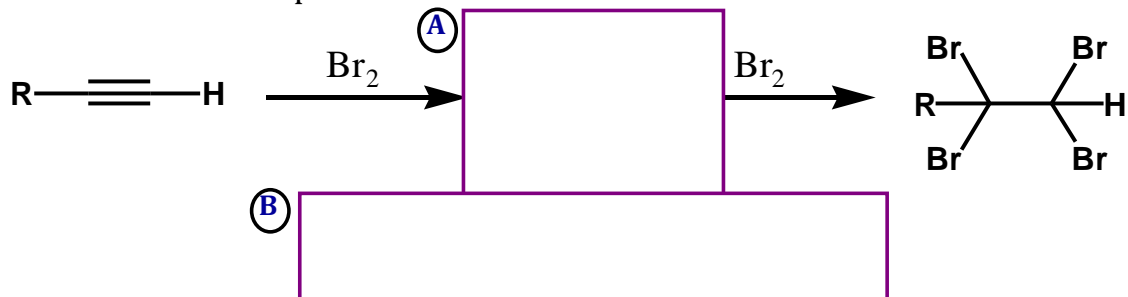
Alkynes can react with HX, yielding Markovnikov products. You should be able to deduce the mechanism in analogy to the reaction you know for alkenes. One equiv of HX leads to an alkene. Excess HX leads to the alkane.



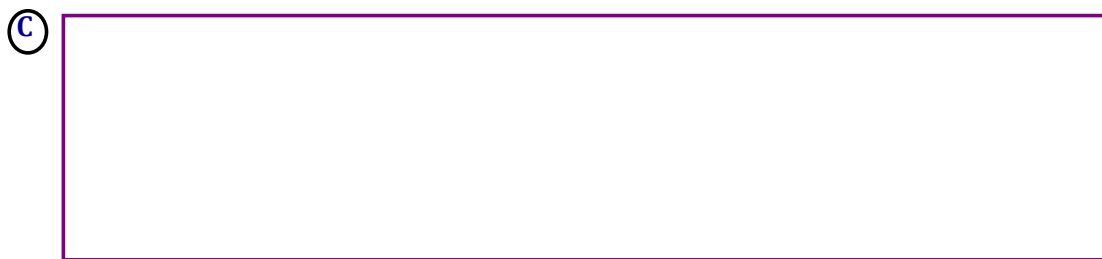
Notes

Lecture Topic III.12: Hydrohalogenation and Halogenation of Alkynes
Halogenation

Alkynes react with halogens in analogy to alkenes. One or two halogen additions can take place across the unsaturated unit:



Though the net result is what we saw for halogenation of alkenes, the mechanism is different:



Notes