

ORGANIC CHEMISTRY 2 LECTURE GUIDE 2019

BY RHETT C. SMITH, PH.D.

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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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Printed in the United States of America

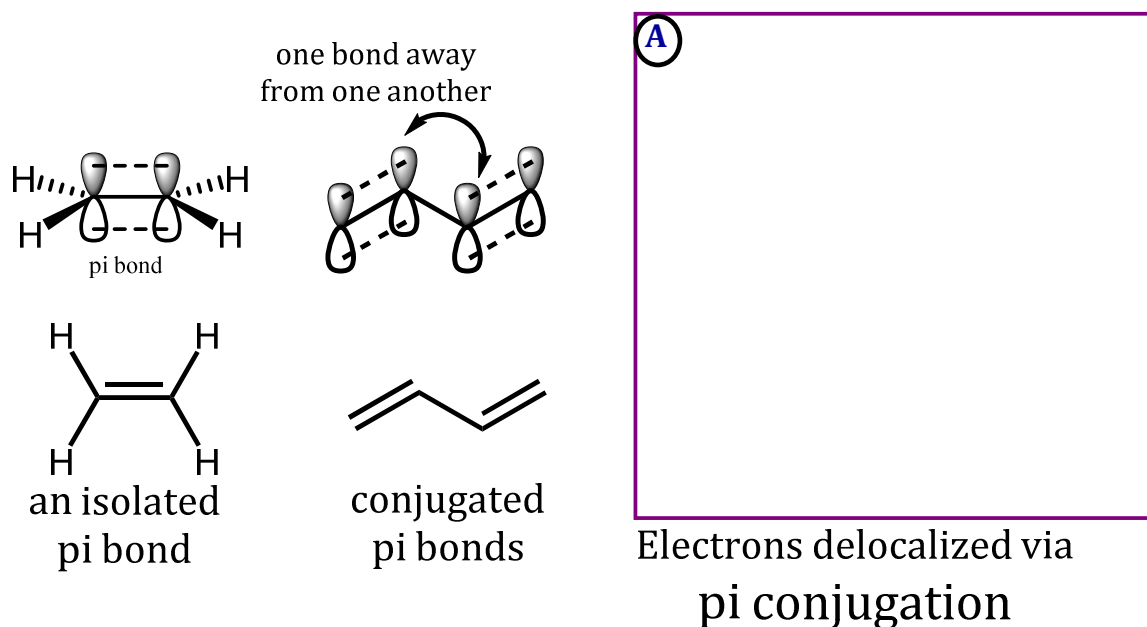
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ISBN 978-0578415017 (IQ-Proton Guru)

Lesson IV.1. Pi Conjugation Stabilizes a Molecule

Defining π -conjugation

We know that resonance delocalization stabilizes molecules. We have usually seen this with charged species or radicals, but delocalization can also stabilize neutral species. All that is required are orbitals of appropriate energy and geometry on neighboring atoms. Consider a simple diene in which the two double bonds are separated by one single bond:

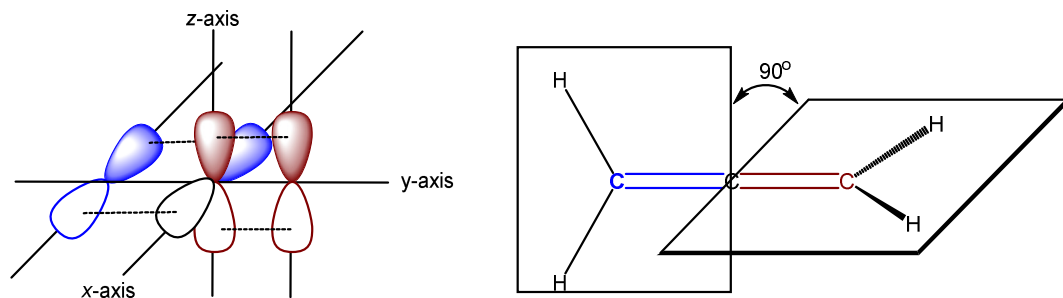


Notes

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Cumulated π -Bonds

When two C=C bonds begin at the same carbon, we get a C=C=C unit:



Such bonds are called:

A

Their stability is:

B

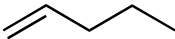
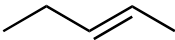
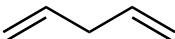
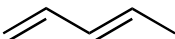
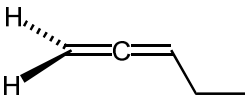
Compared to an isolated C=C

Notes

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Quantifying Alkene Stability

C=C stability is quantified by measuring:

A		ΔH_h (kcal/mol)
	1-pentene	-30.1
	<i>trans</i> -2-pentene	-28.6
	1,4-pentadiene	-60.8
	<i>trans</i> -1,3-pentadiene	-54.1
	1,2-pentadiene	-69.8

Less heat released =

B

Notes: