

ORGANIC CHEMISTRY 2 LECTURE GUIDE 2019

BY RHETT C. SMITH, PH.D.

Marketed by Proton Guru

Find additional online resources and guides at protonguru.com.

There is a lot of online video content to accompany this book at the Proton Guru YouTube Channel! Just go to YouTube and search “Proton Guru Channel” to easily find our content.

Correlating these reactions with your course: The homepage at protonguru.com provides citations to popular text books for further reading on each reaction in this book, so that you can follow along using this book in any course using one of these texts.

Instructors: Free PowerPoint lecture slides to accompany this text can be obtained by emailing IQ@protonguru.com from your accredited institution email account. The homepage at protonguru.com provides a link to citations to popular text books for further reading on each Lesson topic in this primer.

© 2006-2019

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

IQ@protonguru.com

All rights reserved. No part of this book may be reproduced or distributed, in any form or by any means, without permission in writing from the Executive Editor. This includes but is not limited to storage or broadcast for online or distance learning courses.

Cover photo courtesy of William C. Dennis, Jr.

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

ISBN 978-0578415017 (IQ-Proton Guru)

Lesson VII.7. Proton Nuclear Magnetic Resonance Spectrometry

Interpreting proton NMR spectra

Let us examine what we can learn from each part of a ^1H NMR spectrum:

Chemical Shift tells us:

Ⓐ

Integration tells us:

Ⓑ

Caution:

Multiplicity tells us:

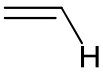
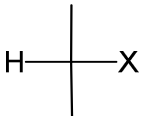
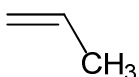
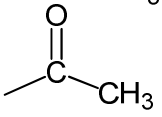
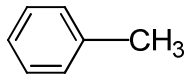
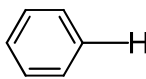
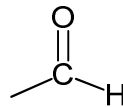
Ⓒ

Notes

Lesson VII.7. Proton Nuclear Magnetic Resonance Spectrometry

Proton NMR Table

General trends in ^1H NMR shifts are provided here:

<u>Protons (Shown)</u>	<u>Chemical Shift</u>	<u>Protons (Shown)</u>	<u>Chemical Shift</u>
$\text{Si}(\text{CH}_3)_4$	0	$\text{R}-\text{OCH}_3$	3.3
$-\text{CH}_3$	0.9		4.5-5.5
$-\text{CH}_2-$	1.2		$\text{X} = \text{I}$ 2.5-4
$\begin{array}{c} \text{H} \\ \\ -\text{C}- \\ \end{array}$	1.4		$\text{X} = \text{Br}$ 2.5-4
	1.7		$\text{X} = \text{Cl}$ 3-4
	2.1		$\text{X} = \text{F}$ 4-4.5
	2.3		6.5-8.0
$\equiv\text{C}-\text{H}$	2.4		10

Notes

Lesson VII.7. Proton Nuclear Magnetic Resonance Spectrometry

Proton NMR trends

Proton NMR typical shifts in a more user-friendly format:

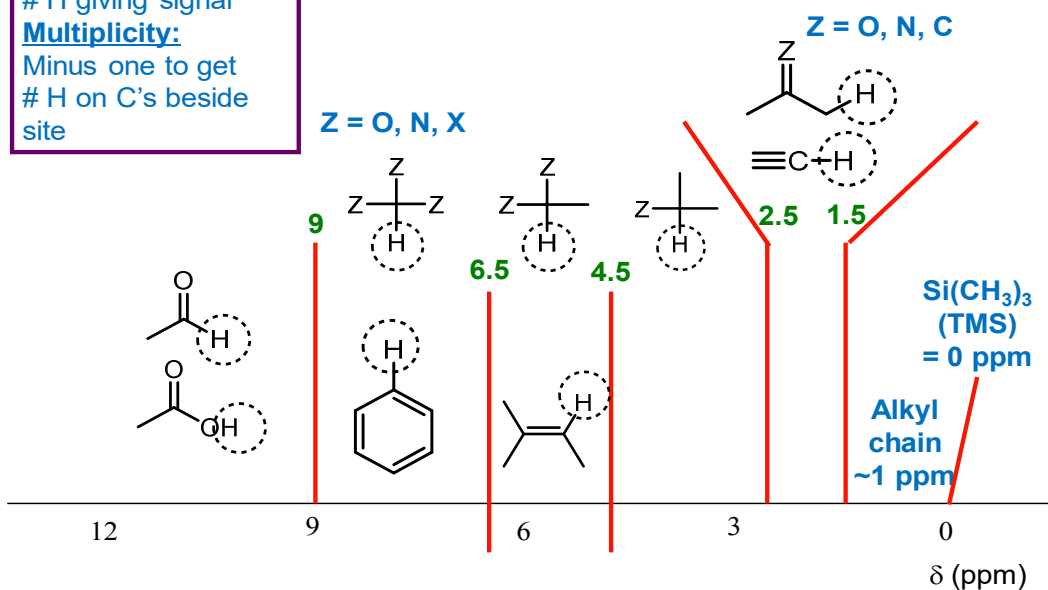
Integration:

H giving signal

Multiplicity:

Minus one to get

H on C's beside site



Notes