

¹H Chemical Shifts in Organic Compounds

Crews, P., et. al. (2010). "Organic Structure Analysis," 2nd Ed. New York: Oxford.

¹H Chemical Shift Ranges for Heteroprotons Subject to Hydrogen Bonding

		δ	17	7 1	6 1	5 1	4 1.	3 1	2 1	1 1	0 9) 8	3 7	7 6	<u>; 5</u>	<u>; 4</u>	1 3	<u>} 2</u>	: 1	
Proton	Class																			
OH	Carboxylic acids						F				1									
	Sulfonic acids								-		l									
-	Phenols												Η		-		1			
	Phenols (intramolecular H bond)							H							H	100-				
	Alcohols													l F	In DA	150	H	<u>+</u>		
<u> </u>	Enols (cyclic α -diketones)													H						
	Enols (β -diketones)			H																
	Enols (β -ketoesters)										-1				in	DMS	İ۷	i i	n aceto	ine
	Water ^b															н	Ή	РĤ	•	
	Oximes								H			1								
NH ₂ and N	HR Alkyl and cyclic amines																	-		+1
	Aryl amines															<u> </u>		1		
	Amides											 								
	Urethanes													-	<u> </u>	H				
	Amines in trifluoroacetic acid														I					
SH	Aliphatic mercaptans																		Н	
	Thiophenols																	+1		
		δ	17	7 1	6 1	5 1	4 1	3 1	2 1	1 1	0 9	9 8	3 7	7 6	5 5	; 4	4 3	3 2	2 1	-

^{*a*} Solvent CDCl₃. Chemical shifts within a range are a function of concentration.

^b See Section 3.6.1.2. Silverstein, R., et. al. (2005). "Spectrometric Identification of Organic Compounds," 7th Ed. New York: Wiley.

TABLE 3.13 ¹H NMR Shift Ranges for Heteroprotons

Туре	Category	δ Range (ppm)						
ОН	Alcohols	1.1–4.3						
	Phenols	4.8-11.5						
	Enols	15.5						
	Carboxylic acids	7.9-12.0						
	Oxymes	9.0						
NH	Aliphatic amines	0.6-1.8						
	Aromatic amines	3.3-6.8						
	Amides	5.3-8.9						
SH	Aliphatic	1.3-1.7						
	Aromatic	2.5 - 4.0						

Crews, P., et. al. (2010). "Organic Structure Analysis," 2nd Ed. New York: Oxford.



¹³C Chemical Shifts in Organic Compounds





¹⁵N Chemical Shifts in Organic Compounds







³¹P Chemical Shifts in Organic Compounds



¹⁹F Chemical Shifts in Organic Solvents



²⁹Si Chemical Shifts in Organic Solvents



Silverstein, R., et. al. (2005). "Spectrometric Identification of Organic Compounds," 7th Ed. Ed. New York: Wiley.