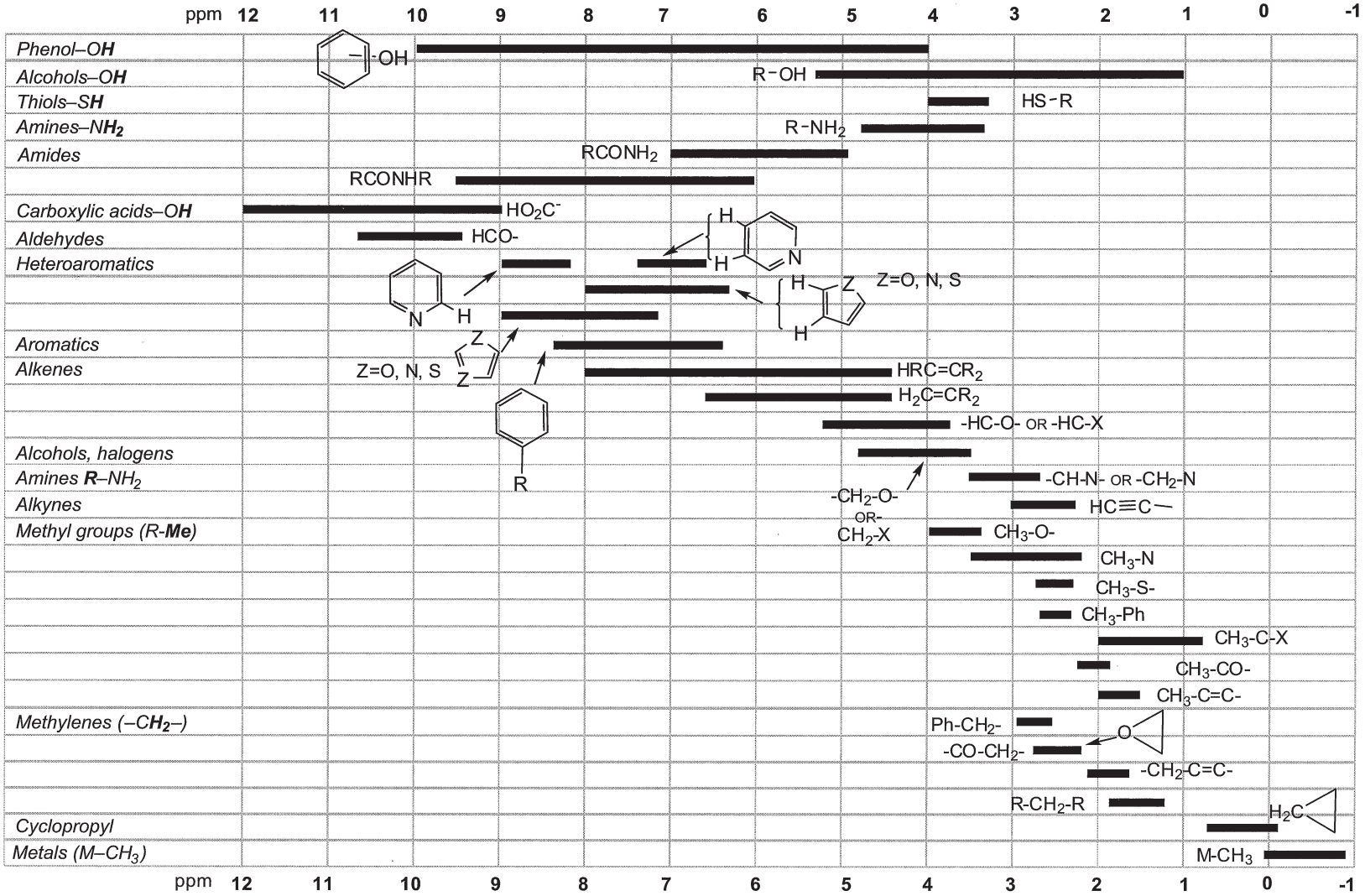
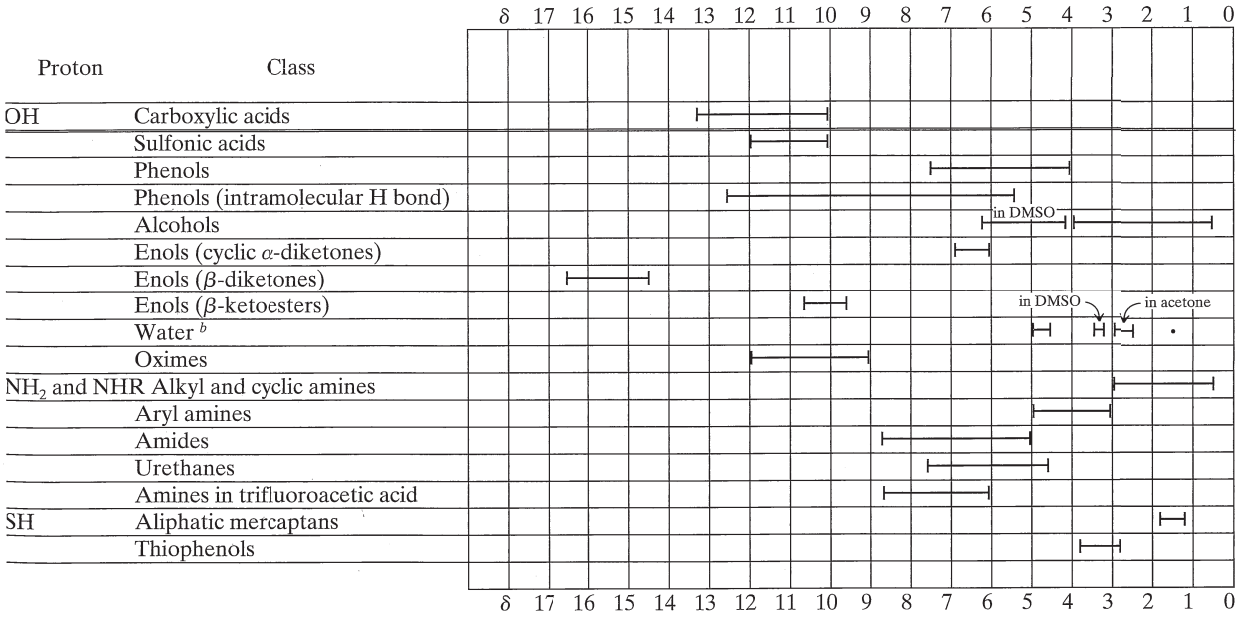
^{1}H Chemical Shifts in Organic Compounds



Relative to TMS (0 ppm)

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

^{1}H Chemical Shift Ranges for Heteroprotons Subject to Hydrogen Bonding



[a] Solvent $CDCl_3$. Chemical shifts within a range are a function of concentration.
[b] See Section 3.6.1.2.

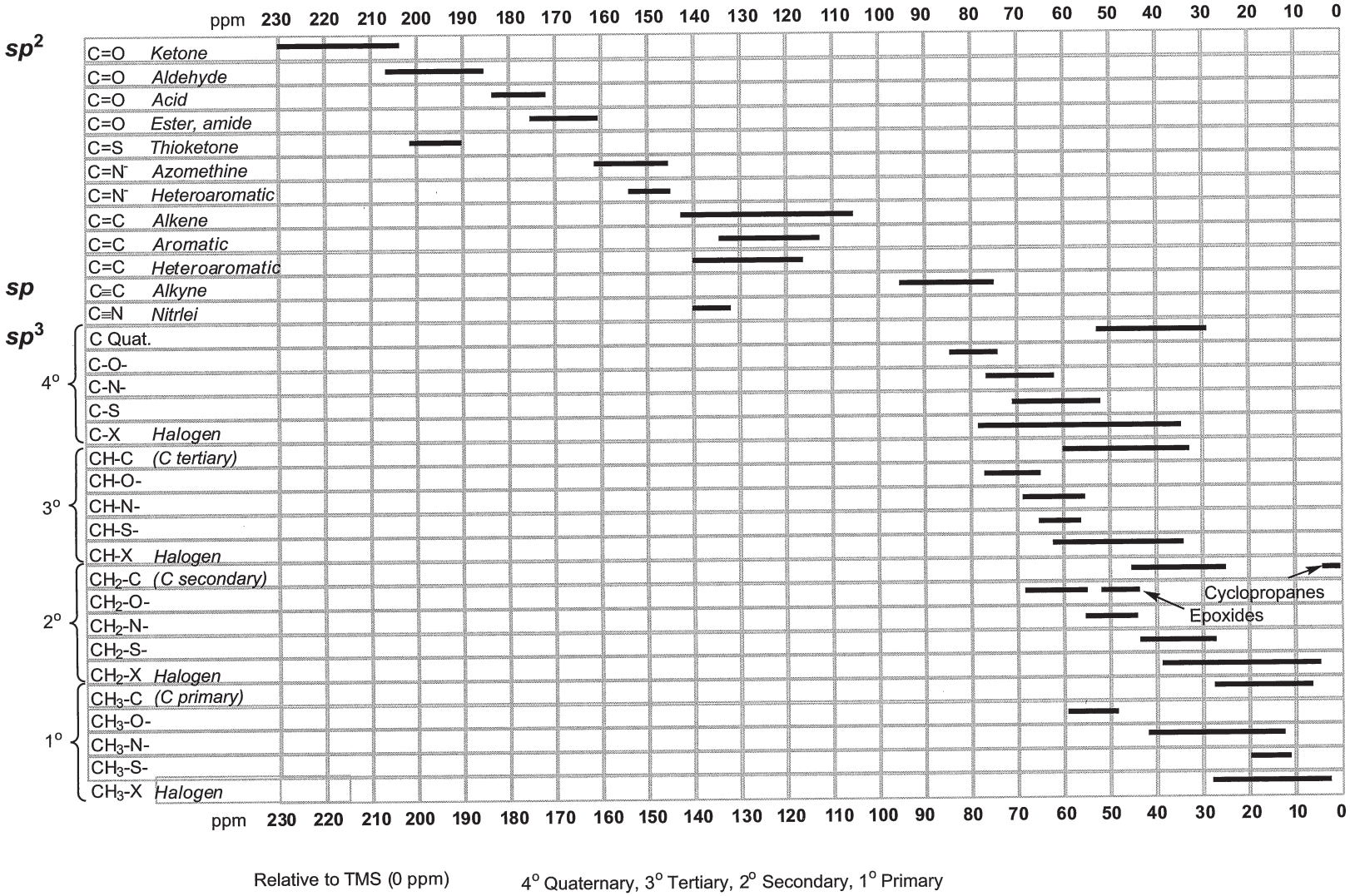
Silverstein, R., et. al. (2005). "Spectrometric Identification of Organic Compounds," 7th Ed. New York: Wiley.

TABLE **3.13** ^{1}H NMR Shift Ranges for Heteroprotons

Type	*Category*	*δ Range (ppm)*
OH	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

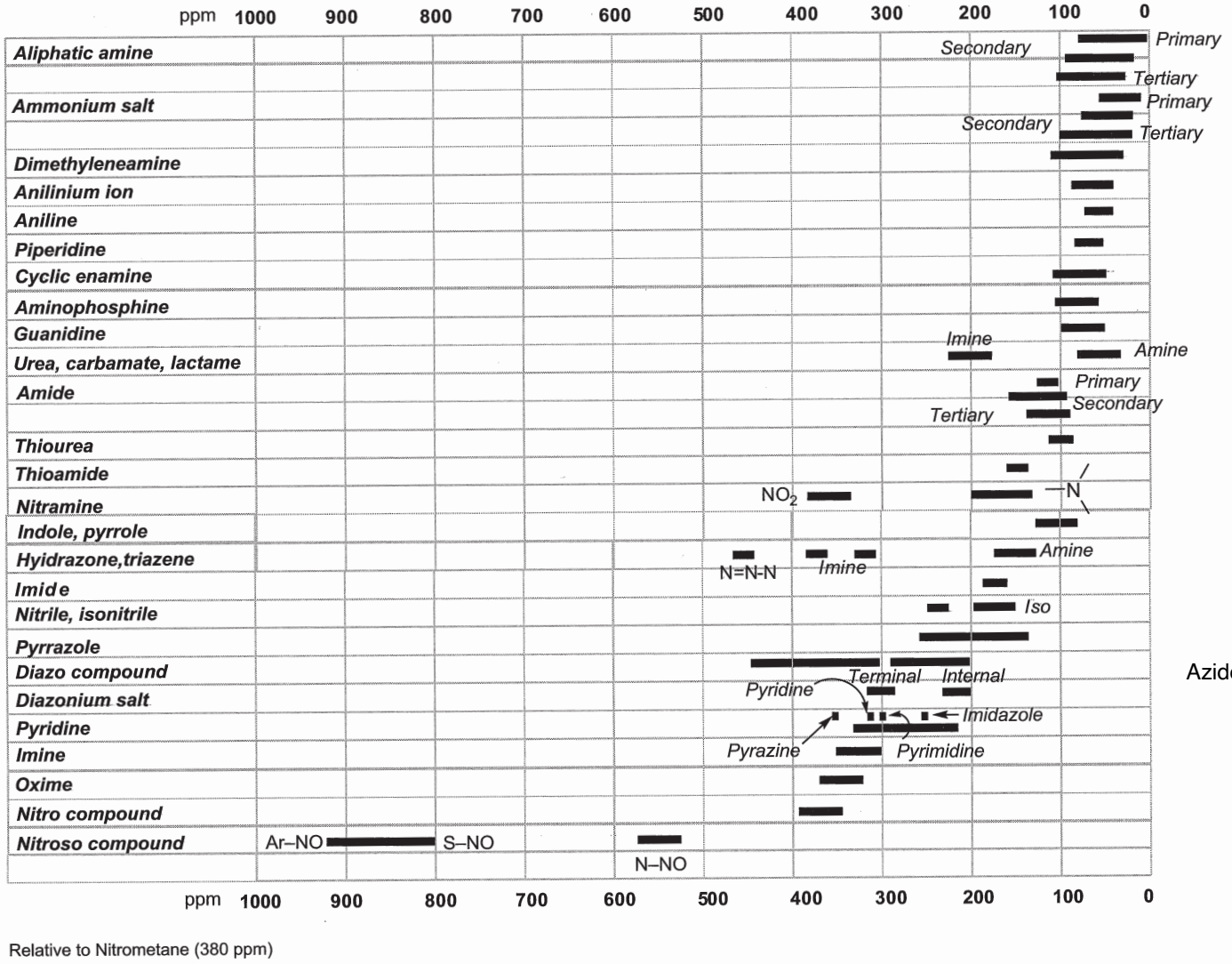
Crews, P., et. al. (2010). "Organic Structure Analysis," 2nd Ed. New York: Oxford.

^{13}C Chemical Shifts in Organic Compounds



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

^{15}N Chemical Shifts in Organic Compounds

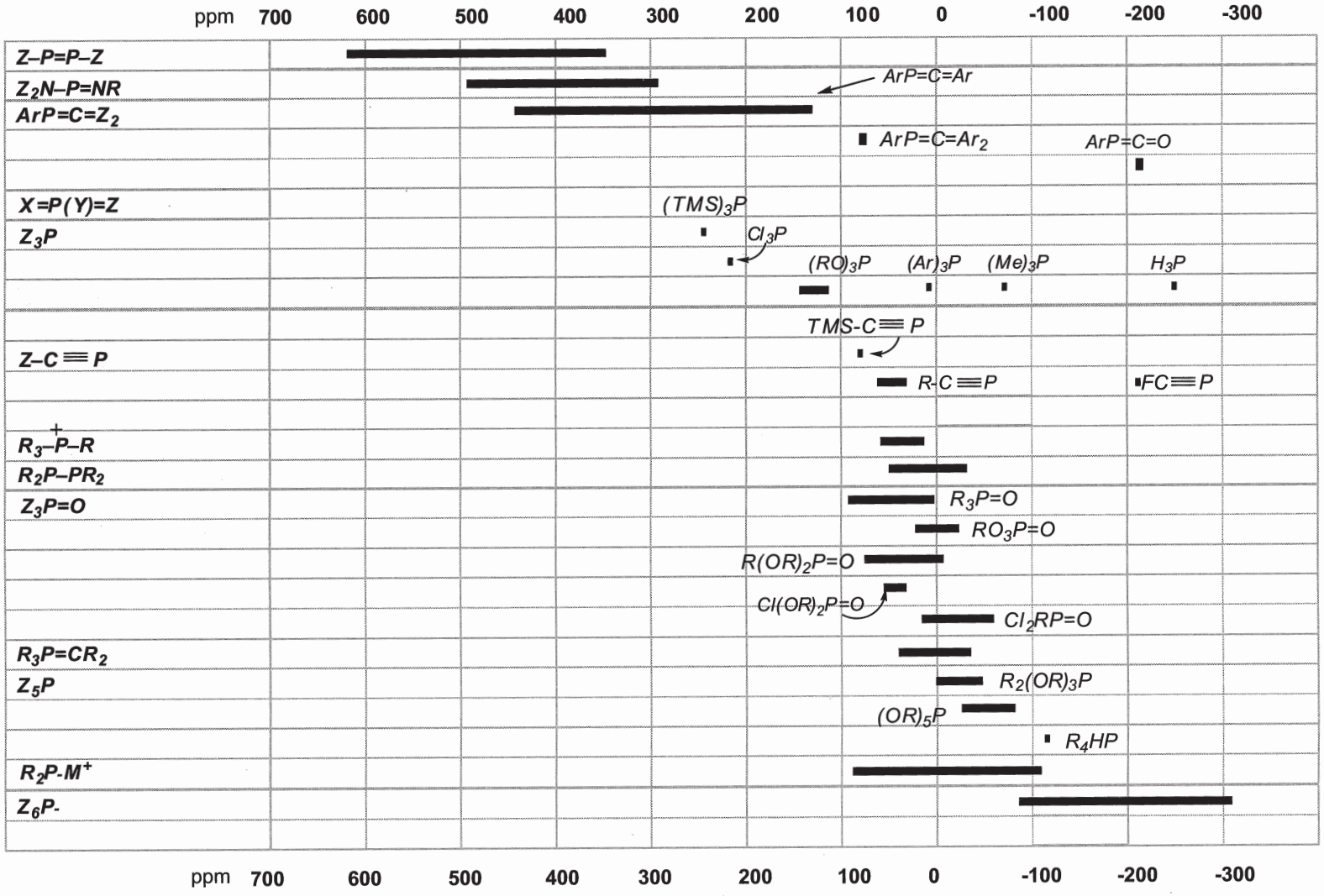


Relative to Nitrometane (380 ppm)

Azide: center ~200-250 ppm, terminal ~100-150 ppm

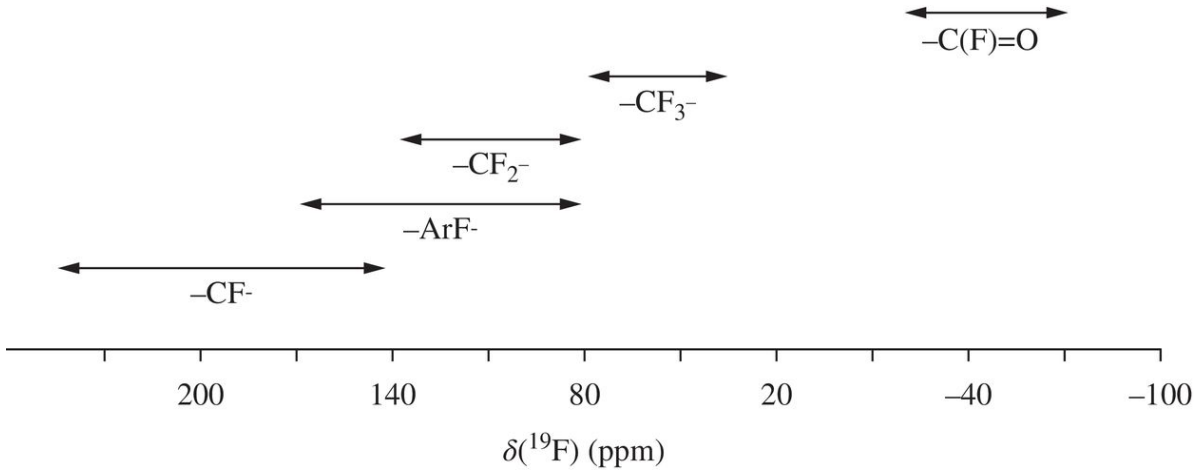
Crews, P., et. al. (2010). "Organic Structure Analysis," 2nd Ed. New York: Oxford.

^{31}P Chemical Shifts in Organic Compounds

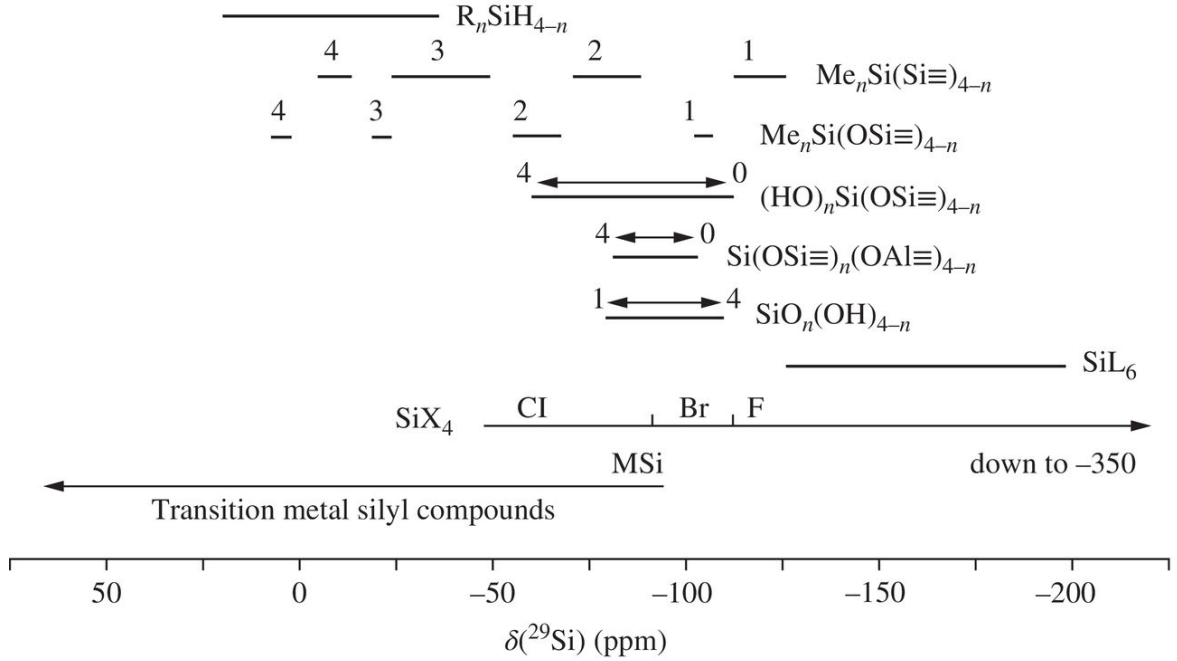


Crews, P., et. al. (2010). "Organic Structure Analysis," 2nd Ed. New York: Oxford.

^{19}F Chemical Shifts in Organic Solvents



^{29}Si Chemical Shifts in Organic Solvents



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