

General Roles of :Z

Names	Acids	Approx. pKa	Conjugate Base, :Z	General Roles of :Z	Importance
Alkane (2°)		51		Base as Li ⁺ salt Nucleophile as Grignard reagent	☆☆
Alkane (1°)		50		Base as Li ⁺ salt Nucleophile as Grignard reagent	☆☆
Alkene (vinyl)	$\text{H}_2\text{C}=\text{CH}-\text{H}$	44		Nucleophile commonly as Grignard reagent	☆☆
Alkene (allyl)	$\text{H}_2\text{C}=\text{CH}-\text{CH}_2-\text{H}$	43		Nucleophile commonly as Grignard reagent	☆☆
Alkane (benzyl)		40		Nucleophile commonly as Grignard reagent	☆
Amine		38		Base and Nucleophile	☆☆☆
Hydrogen	$\text{H}-\text{H}$	35		Base in NaH, CaH ₂ Nucleophile in LiAlH ₄ , NaBH ₄	☆☆☆☆
Alkyne	$\text{HC}\equiv\text{C}-\text{H}$	25		Nucleophile commonly as Grignard reagent	☆
Carbonyl (α-proton of ketone)		19		Nucleophile	☆☆☆☆
Alcohol (3°)		17		Base, too bulky to be nucleophile	☆☆
Alcohol (1°)	$\text{R}-\text{CH}_2-\text{O}-\text{H}$	16		Often as a base but can be nucleophile	☆☆☆
Carbonyl (α-proton of aldehyde)		16		Nucleophile	☆☆☆☆
Cyclopentadiene		16		Nucleophile	☆
Methanol	$\text{CH}_3-\text{O}-\text{H}$	15		Often as a base but can be nucleophile	☆☆☆
Water	$\text{H}-\text{O}-\text{H}$	15		Base and Nucleophile	☆☆☆☆

Ammonium (2°)		11		Weak base, but can be nucleophile	☆☆
Thiol	$R-S-H$	10-11		Nucleophile	☆
Bicarbonate		10		Weak base	☆
Ammonium (1°)		10-11		Weak base, but can be nucleophile	☆☆
Ammonium (3°)		10-11		Weak base, too bulky to be nucleophile	☆☆
Nitroalkane		10		Nucleophile	☆
Ammonium	H_3N^+-H	9	$:NH_3$	Weak base, nucleophile, poor leaving group	☆☆
Hydrogen Cyanide	$N\equiv C-H$	9	$N\equiv C^-$	Nucleophile	☆
Dicarbonyl (α -proton)		9		Nucleophile	☆☆☆
Carboxylic Acid	RCO_2-H	4	RCO_2^-	Weak base, poor leaving group	☆☆
Hydrogen Fluoride (hydrofluoric acid)	$F-H$	3	F^-	Weak base, poor leaving group	☆☆
Protonated water	H_2O^+-H	-1.7	H_2O	Weak base, nucleophile, good leaving group	☆☆☆☆
Sulfonic Acid	$ArSO_3-H$	-6.5	$ArSO_3^-$	Good leaving group	☆☆
Hydrochloric Acid (hydrogen chloride)	$Cl-H$	-7	Cl^-	Leaving group, poor nucleophile	☆☆
Hydrobromic Acid (hydrogen bromide)	$Br-H$	-9	Br^-	Good leaving group, poor nucleophile	☆☆
Hydriodic Acid (hydrogen iodide)	$I-H$	-10	I^-	Good leaving group, good nucleophile	☆☆☆