

Leaving groups in organic reactions

	Acid	pKa	Conjugate Base Nucleophile Leaving Group	Leaving Group from tetrahedral intermediate	Leaving Group in S _N 1, S _N 2, E1 & E2 Reactions
1	CH ₄	50	CH ₃ [⊖]	Never !	Never !
2	C ₆ H ₆	43	C ₆ H ₅ [⊖]		
3	C ₆ H ₅ -CH ₃	41	C ₆ H ₅ -CH ₂ [⊖]		
4	H ₂	35	H [⊖]		
5	NH ₃	35	NH ₂ [⊖]		
6	H-C≡C-H	26	H-C≡C: [⊖]		
7	CH ₃ CO ₂ CH ₂ CH ₃	23	[⊖] CH ₂ CO ₂ CH ₂ CH ₃	Fair Leaving Groups	Never !
8	CH ₃ COCH ₃	20	CH ₃ COCH ₂ [⊖]		
9	(CH ₃) ₃ COH	19	(CH ₃) ₃ CO [⊖]		
10	CH ₃ CH ₂ OH	17	CH ₃ CH ₂ O [⊖]		
11	H ₂ O	15.7	HO [⊖]		
12	CH ₃ OH	15.5	CH ₃ O [⊖]		
13		15			
14	CH ₂ (CO ₂ Et) ₂	13	[⊖] CH(CO ₂ Et) ₂		
15	CH ₃ COCH ₂ CO ₂ Et	11	CH ₃ COCH [⊖] CO ₂ Et		
16	CH ₃ NO ₂	10.2	[⊖] CH ₂ NO ₂		
17	C ₆ H ₅ -OH	10	C ₆ H ₅ -O [⊖]	Excellent Leaving Groups	Poor to Fair Leaving Groups
18	[⊕] NH ₄	9.4	NH ₃		
19	HCN	9.1	[⊖] CN		
20	(CH ₃ CO) ₂ CH ₂	9	(CH ₃ CO) ₂ CH [⊖]		
21	H ₂ S	7	HS [⊖]		
22		5.2			
23	CH ₃ CO ₂ H	4.8	CH ₃ CO ₂ [⊖]		
24		4.6			
25	HN ₃	4.6	[⊖] N ₃		
26		4.5			
27		4.2			
28		3.4			
29	HF	3.2	F [⊖]	Excellent "Almost Instant" Leaving Groups	Excellent Leaving Groups
30	CF ₃ CO ₂ H	0.2	CF ₃ CO ₂ [⊖]		
31	HNO ₃	-1.3	[⊖] NO ₃		
32	H ₃ O [⊕]	-1.7	H ₂ O		
	CH ₃ CH ₂ OH ₂ [⊕]	-2.4	CH ₃ CH ₂ OH		
33	HCl	-5	Cl [⊖]		
34		-5.7			
35	HBr	-7	Br [⊖]		
36	HI	-9	I [⊖]		
37	H ₂ SO ₄	-11	HSO ₄ [⊖]		