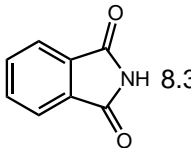
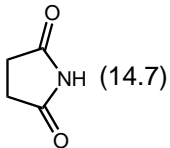
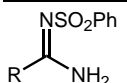
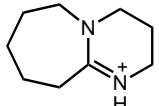
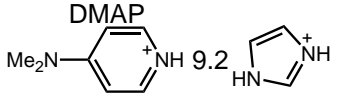
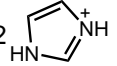

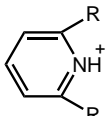
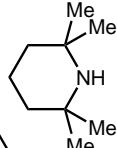
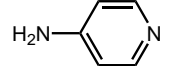
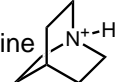
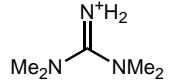
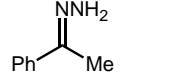
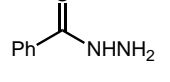
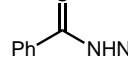
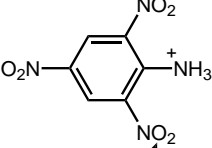
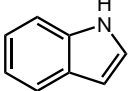
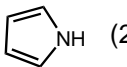
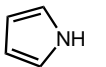
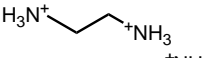
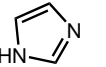
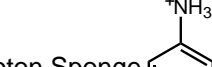
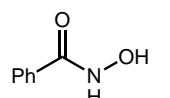
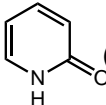
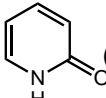
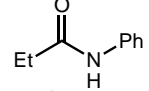
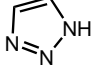
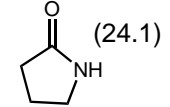
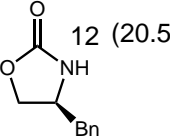
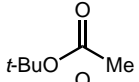
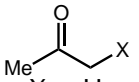
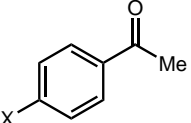
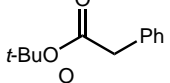
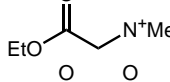
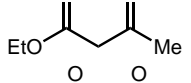

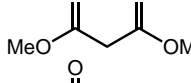
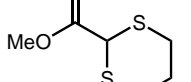
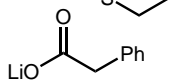
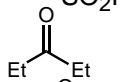

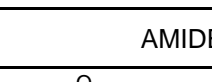
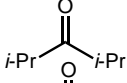
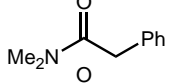
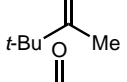
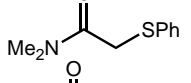
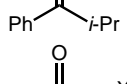
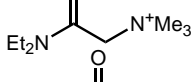
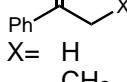
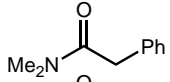
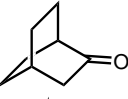
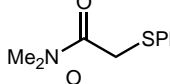
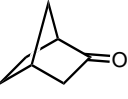
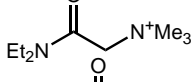
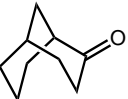
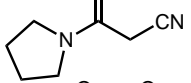
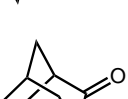
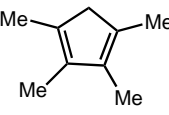
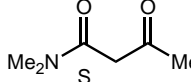
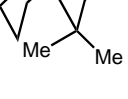
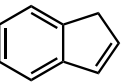


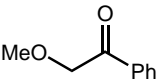
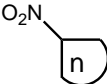
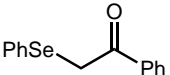
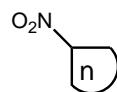
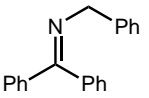
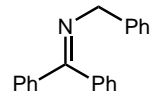


Substrate	pKa	H ₂ O (DMSO)	Substrate	pKa	H ₂ O (DMSO)	Substrate	pKa	H ₂ O (DMSO)	Substrate	pKa	H ₂ O (DMSO)
PROTONATED NITROGEN			AMINES			IMIDES			AMIDINES		
N ⁺ H ₄	9.2	(10.5)	HN ₃	4.7	(7.9)		8.30				
EtN ⁺ H ₃	10.6		NH ₃	38	(41)				R= Me	(17.3)	
<i>i</i> -Pr ₂ N ⁺ H ₂	11.05		<i>i</i> -Pr ₂ NH	(36 THF))					R= Ph	(15.0)	
Et ₃ N ⁺ H	10.75	(9.00)	TMS ₂ NH	26(THF)	(30)	Ac ₂ NH		(17.9)	PROTONATED HETEROCYCLES		
PhN ⁺ H ₃	4.6	(3.6)	PhNH ₂		(30.6)	SULFONAMIDE			DBU		(12) (estimate)
PhN ⁺ (Me) ₂ H	5.20	(2.50)	Ph ₂ NH		(25.0)	MeSO ₂ NH ₂		(17.5)	DMAP		9.2
Ph ₂ N ⁺ H ₂	0.78		NCNH ₂		(16.9)	PhSO ₂ NH ₂		(16.1)			6.95
2-naphthal-N ⁺ H ₃	4.16				(44)	CF ₃ SO ₂ NH ₂	6.3	(9.7)			
H ₂ NN ⁺ H ₃	8.12		TMP		(37)	MeSO ₂ NHPh		(12.9)	R= H (PPTS)	5.21	(3.4)
HON ⁺ H ₃	5.96				(26.5)	GUANIDINIUM, HYDRAZONES, -IDES, & -INES			<i>t</i> -Bu	4.95	(0.90)
Quinuclidine		11.0	AMIDES & CARBAMATES					(13.6)	Me	6.75	(4.46)
Morpholine		N ⁺ H ₂ 8.36	R-C(=O)-NH ₂					(21.6)	Cl, H	0.72	
N-Me morpholine	7.38		R= H		(23.5)			(18.9)	HETEROCYCLES		
	-9.3		CH ₃	15.1	(25.5)	PhSO ₂ NHNH ₂		(17.2)			(20.95)
DABCO		2.97, 8.82 (2.97, 8.93)	Ph		(23.3)	PhNHNHPh		(26.1)			(23.0)
	6.90, 9.95		CF ₃		(17.2)	HYDROXAMIC ACID					(18.6)
Proton Sponge		-9.0, 12.0 (--, 7.50)	NH ₂ (urea)		(26.9)		8.88	(13.7) (NH)			1,2,3 triazole
PhCN ⁺ H	-10		OEt		(24.8)						(17.0)
					(21.6)						(13.9)
					(24.1)						
					12 (20.5)						

*Values <0 for H₂O and DMSO, and values >14 for water and >35 for DMSO were extrapolated using various methods.

Substrate	pKa	H ₂ O (DMSO)	Substrate	pKa	H ₂ O (DMSO)	Substrate	pKa	H ₂ O (DMSO)	Substrate	pKa	H ₂ O (DMSO)
HYDROCARBONS			ESTERS			KETONES					
(Me) ₃ CH	53			24.5	(30.3)						
(Me) ₂ CH ₂	51				(23.6)	X= H		(26.5)	X= H		(24.7)
CH ₂ =CH ₂	50					Ph		(19.8)	OMe		(25.7)
CH ₄	48	(56)			(20.0)	SPh		(18.7)	NMe ₂		(27.5)
	46				(20.0)	COCH ₃	9	(13.3)	Br		(23.8)
CH ₂ =CHCH ₃	43	(44)		11	(14.2)	SO ₂ Ph		(15.1)	CN		(22.0)
PhH	43						19-20	(27.1)			
PhCH ₃	41	(43)		13	(15.7)			(28.3)	n= 4		(25.1)
Ph ₂ CH ₂	33.5	(32.2)			(20.9)			(27.7)	5		(25.8)
Ph ₃ CH	31.5	(30.6)						(26.3)	6		(26.4)
HCCH	24				[30.2 (THF)]				7		(27.7)
PhCCH	23	(28.8)	AMIDES			X= H		(24.7)	8		(27.4)
XC ₆ H ₄ CH ₃					(26.6)	CH ₃		(24.4)			(28.1)
X= <i>p</i> -CN		(30.8)			(25.9)	Ph		(17.7)			(29.0)
<i>p</i> -NO ₂		(20.4)			(24.9)	COCH ₃		(12.7)			(25.5)
<i>p</i> -COPh		(26.9)			(17.2)	COPh		(13.3)			(25.5)
		(26.1)			(18.2)	CO ₂ Et		(22.7)			(32.4)
	20	(20.1)			(25.7)	CN		(10.2)			
	15	(18.0)				F		(21.6)			
H ₂	~36					OMe		(22.85)			
						OPh		(21.1)			
						SPh		(16.9)			
						SePh		(18.6)			
						NPh ₂		(20.3)			
						N ⁺ Me ₃		(14.6)			
						NO ₂		(7.7)			
						SO ₂ Ph		(11.4)			

*Values <0 for H₂O and DMSO, and values >14 for water and >35 for DMSO were extrapolated using various methods.

Substrate	pKa H ₂ O (DMSO)	Substrate	pKa H ₂ O (DMSO)	Substrate	pKa H ₂ O (DMSO)	REFERENCES
ETHERS		PHOSPHONIUM		NITRO		DMSO: JACS <u>97</u> , 7007 (1975) JACS <u>97</u> , 7160 (1975) JACS <u>97</u> , 442 (1975) JACS <u>105</u> , 6188 (1983) JOC <u>41</u> , 1883 (1976) JOC <u>41</u> , 1885 (1976) JOC <u>41</u> , 2786 (1976) JOC <u>41</u> , 2508 (1976) JOC <u>42</u> , 1817 (1977) JOC <u>42</u> , 321 (1977) JOC <u>42</u> , 326 (1977) JOC <u>43</u> , 3113 (1978) JOC <u>43</u> , 3095 (1978) JOC <u>43</u> , 1764 (1978) JOC <u>45</u> , 3325 (1980) JOC <u>45</u> , 3305 (1980) JOC <u>45</u> , 3884 (1980) JOC <u>46</u> , 4327 (1981) JOC <u>46</u> , 632 (1981) JOC <u>47</u> , 3224 (1982) JOC <u>47</u> , 2504 (1982) Acc. Chem. Res. <u>21</u> , 456 (1988) Unpublished results of F. Bordwell
CH ₃ OPh	(49)	P ⁺ H ₄	-14	RNO ₂		
MeOCH ₂ SO ₂ Ph	(30.7)	MeP ⁺ H ₃	2.7	R = CH ₃	≈10 (17.2)	
PhOCH ₂ SO ₂ Ph	(27.9)	Et ₃ P ⁺ H	9.1	CH ₂ Me	(16.7)	
PhOCH ₂ CN	(28.1)	Ph ₃ P ⁺ CH ₃	(22.4)	CHMe ₂	(16.9)	
	(21.1)	Ph ₃ P ⁺ <i>i</i> -Pr	(21.2)	CH ₂ Ph	(12.2)	
		Ph ₃ P ⁺ CH ₂ COPh	(6.2)	CH ₂ Bn	(16.2)	
		Ph ₃ P ⁺ CH ₂ CN	(7.0)	CH ₂ SPh	(11.8)	
				CH ₂ SO ₂ Ph	(7.1)	
				CH ₂ COPh	(7.7)	
						
				n = 3	(26.9)	
				4	(17.8)	
				5	(16.0)	
				6	(17.9)	
				7	(15.8)	
SELENIDES		PHOSPONATES & PHOSPHINE OXIDES		IMINES		Water: Advanced Org. Chem., 3rd Ed. J. March (1985) Unpublished results of W. P. Jencks THF: JACS <u>110</u> , 5705 (1988)
	(18.6)				(24.3)	
PhSeCHPh ₂	(27.5)	X = Ph	(27.6)			
(PhSe) ₂ CH ₂	(31.3)	CN	(16.4)			
PhSeCH ₂ Ph	(31.0)	CO ₂ Et	(18.6)			
PhSeCH=CHCH ₂ SePh	(27.2)	Cl	(26.2)			
		SiMe ₃	(28.8)			
						
		X = SPh	(24.9)			
		CN	(16.9)			
AMMONIUM		PHOSPHINES				
Me ₃ N ⁺ CH ₂ X		Ph ₂ PCH ₂ PPh ₂	(29.9)			
X = CN	(20.6)	Ph ₂ PCH ₂ SO ₂ Ph	(20.3)			
SO ₂ Ph	(19.4)					
COPh	(14.6)					
CO ₂ Et	(20.6)					
CONEt ₂	(24.9)					

*Values <0 for H₂O and DMSO, and values >14 for water and >35 for DMSO were extrapolated using various methods.