

Acid and Base Ionization Constants
 General Chemistry II
 Alan D. Earhart

Ionization Constants for Weak Monoprotic Acids

Name	Formula	K_a	pK_a
Iodic Acid	HIO ₃	1.7×10^{-1}	0.77
Chlorous Acid	HClO ₂	1.0×10^{-2}	2.00
Chloroacetic Acid	HC ₂ H ₂ O ₂ Cl	1.4×10^{-3}	2.85
Nitrous Acid	HNO ₂	4.3×10^{-4}	3.37
Hydrofluoric Acid	HF	3.5×10^{-4}	3.45
Acetylsalicylic Acid	HC ₉ H ₇ O ₄	3.0×10^{-4}	3.52
Formic Acid	HCHO ₂	1.8×10^{-4}	3.75
Benzoic Acid	HC ₇ H ₅ O ₂	6.5×10^{-5}	4.19
Hydrazoic Acid	HN ₃	1.9×10^{-5}	4.72
Acetic Acid	HC ₂ H ₃ O ₂	1.8×10^{-5}	4.75
Butanoic Acid ¹	HC ₄ H ₇ O ₂	1.5×10^{-5}	4.81
Propanoic Acid ²	HC ₃ H ₅ O ₂	1.3×10^{-5}	4.87
Hypochlorous Acid	HClO	3.0×10^{-8}	7.53
Hydrocyanic Acid	HCN	4.9×10^{-10}	9.31
Phenol	HC ₆ H ₅ O	1.3×10^{-10}	9.89

¹also called butyric acid

²also called propionic acid

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Ionization Constants for Weak Bases

Name	Formula	K _b	pK _b
Ethylamine	C ₂ H ₅ NH ₂	6.5 x 10 ⁻⁴	3.19
Butylamine	C ₄ H ₉ NH ₂	5.6 x 10 ⁻⁴	3.23
Caffeine	C ₈ H ₁₀ N ₄ O ₂	4.1 x 10 ⁻⁴	3.39
Methylamine	CH ₃ NH ₂	3.6 x 10 ⁻⁴	3.44
Ammonia	NH ₃	1.8 x 10 ⁻⁵	4.75
Hydrazine	N ₂ H ₄	1.7 x 10 ⁻⁶	5.77
Strychnine	C ₂₁ H ₂₂ N ₂ O ₂	1.8 x 10 ⁻⁶	5.74
Morphine	C ₁₇ H ₁₉ NO ₃	1.8 x 10 ⁻⁶	5.75
Hydroxylamine	HONH ₂	1.1 x 10 ⁻⁸	7.97
Pyridine	C ₅ H ₅ N	1.8 x 10 ⁻⁹	8.75
Aniline	C ₆ H ₅ NH ₂	4.3 x 10 ⁻¹⁰	9.37
Urea	CO(NH ₂) ₂	1.3 x 10 ⁻¹⁴	13.90

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Ionization Constants for Weak Polyprotic Acids

Name	Formula	K _{a1}	pK _{a1}	K _{a2}	pK _{a2}	K _{a3}	pK _{a3}
Sulfuric Acid	H ₂ SO ₄	large		1.2 x 10 ⁻²	1.92		
Oxalic Acid	H ₂ C ₂ O ₄	5.9 x 10 ⁻²	1.23	6.5 x 10 ⁻⁵	4.19		
Sulfurous Acid	H ₂ SO ₃	1.5 x 10 ⁻²	1.81	1.2 x 10 ⁻⁷	6.91		
Phosphoric Acid	H ₃ PO ₄	7.6 x 10 ⁻³	2.12	6.2 x 10 ⁻⁸	7.21	2.1 x 10 ⁻¹³	12.68
Phthalic Acid ³	H ₂ C ₈ H ₄ O ₄	1.3 x 10 ⁻³	2.89	3.1 x 10 ⁻⁶	5.51		
Tartaric Acid ⁴	H ₂ C ₄ H ₄ O ₆	6.0 x 10 ⁻⁴	3.22	4.6 x 10 ⁻⁵	4.34		
Citric Acid	H ₃ C ₆ H ₅ O ₇	7.2 x 10 ⁻⁴	3.14	1.7 x 10 ⁻⁵	4.77	4.1 x 10 ⁻⁷	6.39
Carbonic Acid	H ₂ CO ₃	4.3 x 10 ⁻⁷	6.37	5.6 x 10 ⁻¹¹	10.25		
Hydrogen Sulfide (aq)	H ₂ S	1.3 x 10 ⁻⁷	6.89	7.1 x 10 ⁻¹⁵	14.15		

³ortho-phthalic acid

⁴meso-tartaric acid

All constants are at 25 °C.

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