

# Ionization Constants for Acids and Bases



Acid Name	Formula	pK <sub>a</sub>	K <sub>a</sub>
thiocyanic acid	HSCN	-1.8	63
iodic acid	HIO <sub>3</sub>	0.78	0.17
chlorous acid	HClO <sub>2</sub>	1.94	1.1 x 10 <sup>-2</sup>
hydrofluoric acid	HF	3.20	6.3 x 10 <sup>-4</sup>
nitrous acid	HNO <sub>2</sub>	3.25	5.6 x 10 <sup>-4</sup>
formic acid	HCHO <sub>2</sub>	3.75	1.8 x 10 <sup>-4</sup>
hydrazoic acid	HN <sub>3</sub>	4.6	2.5 x 10 <sup>-5</sup>
acetic acid	HC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	4.756	1.75 x 10 <sup>-5</sup>
butanoic acid	HC <sub>4</sub> H <sub>7</sub> O <sub>2</sub>	4.83	1.5 x 10 <sup>-5</sup>
propanoic acid	HC <sub>3</sub> H <sub>5</sub> O <sub>2</sub>	4.87	1.3 x 10 <sup>-5</sup>
aluminum	Al <sup>3+</sup>	5.0	1 x 10 <sup>-5</sup>
hypochlorous acid	HClO	7.40	4.0 x 10 <sup>-8</sup>
hypobromous acid	HBrO	8.55	2.8 x 10 <sup>-9</sup>
hydrocyanic acid	HCN	9.21	6.2 x 10 <sup>-10</sup>
arsenous acid	H <sub>3</sub> AsO <sub>3</sub>	9.29	5.1 x 10 <sup>-10</sup>

Base Name	Formula	pK <sub>b</sub>	K <sub>b</sub>
ethylamine	C <sub>2</sub> H <sub>5</sub> NH <sub>2</sub>	3.35	4.5 x 10 <sup>-4</sup>
butylamine	C <sub>4</sub> H <sub>9</sub> NH <sub>2</sub>	3.40	4.0 x 10 <sup>-4</sup>
propylamine	C <sub>3</sub> H <sub>7</sub> NH <sub>2</sub>	3.46	3.5 x 10 <sup>-4</sup>
trimethylamine	C <sub>3</sub> H <sub>9</sub> N	4.20	6.4 x 10 <sup>-5</sup>
allylamine	C <sub>3</sub> H <sub>5</sub> NH <sub>2</sub>	4.51	3.1 x 10 <sup>-5</sup>
benzylamine	C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> NH <sub>2</sub>	4.66	2.2 x 10 <sup>-5</sup>
ammonia	NH <sub>3</sub>	4.75	1.8 x 10 <sup>-5</sup>
morpholine	C <sub>4</sub> H <sub>9</sub> NO	5.50	3.2 x 10 <sup>-6</sup>
strychnine	C <sub>21</sub> H <sub>22</sub> N <sub>2</sub> O <sub>2</sub>	5.74	1.8 x 10 <sup>-6</sup>
ethyleneimine	C <sub>2</sub> H <sub>5</sub> N	5.96	1.1 x 10 <sup>-6</sup>
hydrazine	N <sub>2</sub> H <sub>4</sub>	5.9	1 x 10 <sup>-6</sup>
hydroxylamine	NH <sub>2</sub> OH	8.06	8.8 x 10 <sup>-9</sup>
pyridine	C <sub>5</sub> H <sub>5</sub> N	8.77	1.7 x 10 <sup>-9</sup>
aniline	C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub>	9.13	7.5 x 10 <sup>-10</sup>

Lide, David R., Ed., Handbook of Chemistry and Physics, 84<sup>th</sup> ed., CRC Press: Boca Raton FL, 2003, 8-46 to 8-58. Values are all for 25 °C unless stated otherwise.

Base K<sub>b</sub> values were converted from K<sub>a</sub> reference values using K<sub>w</sub> = 1.01 x 10<sup>-14</sup> at 25 °C.

# Ionization Constants for Acids and Bases



Acid Name	Formula	K <sub>a1</sub>	K <sub>a2</sub>	K <sub>a3</sub>
sulfuric acid	H <sub>2</sub> SO <sub>4</sub>	large	1.0 x 10 <sup>-2</sup>	
oxalic acid <sup>1</sup>	H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	5.6 x 10 <sup>-2</sup>	1.5 x 10 <sup>-4</sup>	
sulfurous acid	H <sub>2</sub> SO <sub>3</sub>	1.4 x 10 <sup>-2</sup>	6 x 10 <sup>-8</sup>	
maleic acid	H <sub>2</sub> C <sub>4</sub> H <sub>2</sub> O <sub>4</sub>	1.2 x 10 <sup>-2</sup>	5.9 x 10 <sup>-7</sup>	
phosphoric acid	H <sub>3</sub> PO <sub>4</sub>	6.9 x 10 <sup>-3</sup>	6.2 x 10 <sup>-8</sup>	4.8 x 10 <sup>-13</sup>
malonic acid	H <sub>2</sub> C <sub>3</sub> H <sub>2</sub> O <sub>4</sub>	1.4 x 10 <sup>-3</sup>	2.0 x 10 <sup>-6</sup>	
citric acid	H <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>7</sub>	7.4 x 10 <sup>-4</sup>	1.7 x 10 <sup>-5</sup>	4.0 x 10 <sup>-7</sup>
lysergic acid <sup>2</sup>	H <sub>2</sub> C <sub>16</sub> H <sub>14</sub> N <sub>2</sub> O <sub>2</sub>	3.6 x 10 <sup>-4</sup>	2.1 x 10 <sup>-8</sup>	
ascorbic acid <sup>3</sup>	H <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>6</sub>	9.1 x 10 <sup>-5</sup>	2 x 10 <sup>-12</sup>	
succinic acid	H <sub>2</sub> C <sub>4</sub> H <sub>4</sub> O <sub>4</sub>	6.2 x 10 <sup>-5</sup>	2.3 x 10 <sup>-6</sup>	
adipic acid <sup>4</sup>	H <sub>2</sub> C <sub>6</sub> H <sub>8</sub> O <sub>4</sub>	3.9 x 10 <sup>-5</sup>	3.9 x 10 <sup>-6</sup>	
sebacic acid <sup>2</sup>	H <sub>2</sub> C <sub>10</sub> H <sub>16</sub> O <sub>4</sub>	2.6 x 10 <sup>-5</sup>	2.6 x 10 <sup>-6</sup>	
heptanedioic acid	H <sub>2</sub> C <sub>7</sub> H <sub>10</sub> O <sub>4</sub>	1.9 x 10 <sup>-5</sup>	2.6 x 10 <sup>-6</sup>	
carbonic acid	H <sub>2</sub> CO <sub>3</sub>	4.5 x 10 <sup>-7</sup>	4.7 x 10 <sup>-11</sup>	
cyanuric acid <sup>2</sup>	H <sub>3</sub> C <sub>3</sub> N <sub>3</sub> O <sub>3</sub>	1.3 x 10 <sup>-7</sup>	4 x 10 <sup>-12</sup>	3 x 10 <sup>-14</sup>
hydrogen sulfide	H <sub>2</sub> S	8.9 x 10 <sup>-8</sup>	1 x 10 <sup>-19</sup>	
telluric acid <sup>4</sup>	H <sub>2</sub> Te	2.1 x 10 <sup>-8</sup>	1 x 10 <sup>-11</sup>	

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<sup>1</sup>Also known as ethanedioic acid

<sup>2</sup>temperature was not listed <sup>3</sup>K<sub>a2</sub> at 16 °C

<sup>4</sup>18 °C