

## Conjugate acid / base pairs

$K_a$	acid / base	$K_b$
$\approx 10^8$	HClO <sub>4</sub> / ClO <sub>4</sub> <sup>-</sup>	$\approx 10^{-22}$
$\approx 10^8$	HBr / Br <sup>-</sup>	$\approx 10^{-22}$
$\approx 10^6$	HCl / Cl <sup>-</sup>	$\approx 10^{-20}$
$\approx 10^3$	H <sub>2</sub> SO <sub>4</sub> / HSO <sub>4</sub> <sup>-</sup>	$\approx 10^{-17}$
25	HNO <sub>3</sub> / NO <sub>3</sub> <sup>-</sup>	$4 \times 10^{-16}$
$7.9 \times 10^{-2}$	HSCN / SCN <sup>-</sup>	$1.3 \times 10^{-13}$
$*5.6 \times 10^{-2}$	(oxalic acid) H <sub>2</sub> C <sub>2</sub> O <sub>4</sub> / HC <sub>2</sub> O <sub>4</sub> <sup>-</sup>	$1.8 \times 10^{-13}$
$*1.2 \times 10^{-2}$	HClO <sub>2</sub> / ClO <sub>2</sub> <sup>-</sup>	$8.4 \times 10^{-13}$
$7.11 \times 10^{-3}$	H <sub>3</sub> PO <sub>4</sub> / H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	$1.42 \times 10^{-12}$
$*6.3 \times 10^{-3}$	[Fe(H <sub>2</sub> O) <sub>6</sub> ] <sup>3+</sup> / [Fe(H <sub>2</sub> O) <sub>5</sub> OH] <sup>2+</sup>	$5.49 \times 10^{-12}$
$*5.6 \times 10^{-4}$	HNO <sub>2</sub> / NO <sub>2</sub> <sup>-</sup>	$1.8 \times 10^{-11}$
$*6.3 \times 10^{-4}$	HF / F <sup>-</sup>	$1.6 \times 10^{-11}$
$3.3 \times 10^{-4}$	HOCN / OCN <sup>-</sup>	$3.1 \times 10^{-11}$
$3.2 \times 10^{-4}$	(aspirin) C <sub>8</sub> H <sub>7</sub> O <sub>2</sub> COOH / C <sub>8</sub> H <sub>7</sub> O <sub>2</sub> COO <sup>-</sup>	$3.2 \times 10^{-11}$
$1.80 \times 10^{-4}$	(formic acid) HCOOH / HCOO <sup>-</sup>	$5.61 \times 10^{-11}$
$7.9 \times 10^{-5}$	(vitamin C) H <sub>2</sub> C <sub>6</sub> H <sub>6</sub> O <sub>6</sub> / HC <sub>6</sub> H <sub>6</sub> O <sub>6</sub> <sup>-</sup>	$1.3 \times 10^{-10}$
$6.28 \times 10^{-5}$	(benzoic acid) C <sub>6</sub> H <sub>5</sub> COOH / C <sub>6</sub> H <sub>5</sub> COO <sup>-</sup>	$1.61 \times 10^{-10}$
$2.51 \times 10^{-5}$	C <sub>6</sub> H <sub>5</sub> NH <sub>3</sub> <sup>+</sup> / C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub> (aniline)	$4.02 \times 10^{-10}$
$1.76 \times 10^{-5}$	(acetic acid) CH <sub>3</sub> COOH / CH <sub>3</sub> COO <sup>-</sup>	$5.74 \times 10^{-10}$
$*1.1 \times 10^{-5}$	[Al(H <sub>2</sub> O) <sub>6</sub> ] <sup>3+</sup> / [Al(H <sub>2</sub> O) <sub>5</sub> OH] <sup>2+</sup>	$9.2 \times 10^{-10}$
$6.3 \times 10^{-6}$	C <sub>5</sub> H <sub>5</sub> NH <sup>+</sup> / C <sub>5</sub> H <sub>5</sub> N (pyridine)	$1.6 \times 10^{-9}$
$4.46 \times 10^{-7}$	(carbonic acid) H <sub>2</sub> CO <sub>3</sub> / HCO <sub>3</sub> <sup>-</sup>	$2.26 \times 10^{-8}$
$9.5 \times 10^{-8}$	H <sub>2</sub> S / HS <sup>-</sup>	$1.1 \times 10^{-7}$
$3.0 \times 10^{-8}$	HClO / ClO <sup>-</sup>	$3.4 \times 10^{-7}$
$*6.2 \times 10^{-9}$	C <sub>18</sub> H <sub>21</sub> O <sub>3</sub> NH <sup>+</sup> / C <sub>18</sub> H <sub>21</sub> O <sub>3</sub> N (codeine)	$1.6 \times 10^{-6}$
$2.3 \times 10^{-9}$	HBrO / BrO <sup>-</sup>	$4.4 \times 10^{-6}$
$5.69 \times 10^{-10}$	NH <sub>4</sub> <sup>+</sup> / NH <sub>3</sub> (ammonia)	$1.78 \times 10^{-5}$
$6.2 \times 10^{-10}$	HCN / CN <sup>-</sup>	$1.6 \times 10^{-5}$
$1.59 \times 10^{-10}$	(CH <sub>3</sub> ) <sub>3</sub> NH <sup>+</sup> / (CH <sub>3</sub> ) <sub>3</sub> N	$6.35 \times 10^{-5}$
$1.01 \times 10^{-10}$	(phenol) C <sub>6</sub> H <sub>5</sub> OH / C <sub>6</sub> H <sub>5</sub> O <sup>-</sup>	$1.00 \times 10^{-5}$
$4.68 \times 10^{-11}$	HCO <sub>3</sub> <sup>-</sup> / CO <sub>3</sub> <sup>2-</sup>	$2.16 \times 10^{-4}$
$2.33 \times 10^{-11}$	CH <sub>3</sub> NH <sub>3</sub> <sup>+</sup> / CH <sub>3</sub> NH <sub>2</sub>	$4.33 \times 10^{-4}$
$2.12 \times 10^{-11}$	C <sub>2</sub> H <sub>5</sub> NH <sub>3</sub> <sup>+</sup> / C <sub>2</sub> H <sub>5</sub> NH <sub>2</sub>	$4.76 \times 10^{-4}$
$2.2 \times 10^{-12}$	H <sub>2</sub> O <sub>2</sub> / HO <sub>2</sub> <sup>-</sup>	$4.6 \times 10^{-3}$
$K_w = 1.0 \times 10^{-14}$	H <sub>2</sub> O $\rightleftharpoons$ H <sup>+</sup> + OH <sup>-</sup> / H <sup>+</sup> + OH <sup>-</sup> $\rightleftharpoons$ H <sub>2</sub> O	$1/K_w = 1.0 \times 10^{14}$
$1 \times 10^{-19}$	HS <sup>-</sup> / S <sup>2-</sup>	$\approx 10^5$
$1 \times 10^{-36}$	OH <sup>-</sup> / O <sup>2-</sup>	$\approx 10^{22}$

stronger acids

stronger bases

$K_a$  are given at 25 °C

$$K_a \times K_b = 1.01 \times 10^{-14} .$$

Sources:

National Institute of Standards and Technology 2001.

\*CRC Handbook of Chemistry and Physics, 91<sup>th</sup> Edition, 2010-2011.