

## Thermodynamic Values (25 °C)

Substance and State	$\Delta H_f^\circ$ ( $\frac{\text{kJ}}{\text{mol}}$ )	$\Delta G_f^\circ$ ( $\frac{\text{kJ}}{\text{mol}}$ )	$S^\circ$ ( $\frac{\text{J}}{\text{K}\cdot\text{mol}}$ )	Substance and State	$\Delta H_f^\circ$ ( $\frac{\text{kJ}}{\text{mol}}$ )	$\Delta G_f^\circ$ ( $\frac{\text{kJ}}{\text{mol}}$ )	$S^\circ$ ( $\frac{\text{J}}{\text{K}\cdot\text{mol}}$ )
<b>Carbon</b>				<b>Oxygen</b>			
C(s) (graphite)	0	0	6	O <sub>2</sub> (g)	0	0	205
C(s) (diamond)	2	3	2	O(g) <sub>249</sub>	232	161	
CO(g)	-110.5	-137	198	O <sub>3</sub> (g)	143	163	239
CO <sub>2</sub> (g)	-393.5	-394	214	<b>Nitrogen</b>			
CO <sub>3</sub> <sup>2-</sup> (aq)	-675.2	-527.8	-56.9	N <sub>2</sub> (g)	0	0	192
CH <sub>4</sub> (g)	?	-51	186	NCl <sub>3</sub> (g)	230	271	-137
CH <sub>3</sub> OH(g)	-201	-163	240	NF <sub>3</sub> (g)	-125	-83.6	-139
CH <sub>3</sub> OH(l)	-239	-166	127	NH <sub>3</sub> (g)	?	-17	193
CH <sub>3</sub> Cl(g)	-80.8	-57.4	234	NH <sub>3</sub> (aq)	?	-27	111
CHCl <sub>3</sub> (g)	-100.8			NH <sub>2</sub> CONH <sub>2</sub> (aq)	?	?	174
CHCl <sub>3</sub> (l)	-131.8			NO(g)	90	87	211
H <sub>2</sub> CO(g)	-116	-110	219	NO <sub>2</sub> (g)	32	52	240
HCOOH(g)	-363	-351	249	N <sub>2</sub> O(g)	82	104	220
HCN(g)	135.1	125	202	N <sub>2</sub> O <sub>4</sub> (g)	10	98	304
C <sub>2</sub> H <sub>2</sub> (g)	227	209	201	N <sub>2</sub> O <sub>5</sub> (g)	-42	134	178
C <sub>2</sub> H <sub>4</sub> (g)	52	68	219	HNO <sub>3</sub> (aq)	-207	-111	146
CH <sub>3</sub> CHO(g)	-166	-129	250	HNO <sub>3</sub> (l)	-174	-81	156
C <sub>2</sub> H <sub>5</sub> OH(l)	-278	-175	161	NH <sub>4</sub> Cl(s)	-314	-201	95
C <sub>2</sub> H <sub>6</sub> (g)	-84.7	-32.9	229.5	NH <sub>4</sub> ClO <sub>4</sub> (s)	-295	-89	186
C <sub>3</sub> H <sub>6</sub> (g)	20.9	62.7	266.9	<b>Silver</b>			
C <sub>3</sub> H <sub>8</sub> (g)	-104	-24	270	Ag(s)	0	0	42.6
C <sub>3</sub> H <sub>8</sub> O <sub>3</sub> (l)	-577.9		206.3	Ag <sup>+</sup> (aq)	105.6	77.1	72.7
C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> (s)	-1275	-910.1	212.1	Ag(S <sub>2</sub> O <sub>3</sub> ) <sup>3-</sup> (aq)	-1285.7	--	--
C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> (s)	-2221.7	-1548.3	360.2	AgBr(s)	-100.4	-96.9	107.1
<b>Bromine</b>				AgCl(s)	-127.1	-109.8	96.2
Br <sub>2</sub> (l)	0	0	152.	<b>Sulfur</b>			
BrCl(g)	14.64	-0.96	240	S(rhombic)	0	0	31.8
Br <sup>-</sup> (aq)	-121.6	-104	82.4	SO <sub>2</sub> (g)	-296.8	-300.2	248.8
<b>Chlorine</b>				SO <sub>3</sub> (g)	-395.7	-371.1	256.3
Cl <sub>2</sub> (g)	0	0	223	H <sub>2</sub> S(g)	-20.17	-33.0	205.6
Cl <sub>2</sub> (aq)	-23	7	121	<b>Phosphorus</b>			
Cl <sup>-</sup> (aq)	-167	-131	57	P <sub>4</sub> (s)	0	0	41.1
HCl(g)	-92	-95	187	PCl <sub>5</sub> (g)	-375	-305	365
<b>Fluorine</b>				<b>Aluminum</b>			
F <sub>2</sub> (g)	0	0	203	AlCl <sub>3</sub> (s)	-526	-505	184
F <sup>-</sup> (aq)	-333	-279	-14	<b>Barium</b>			
HF(g)	-271	-273	174	BaCl <sub>2</sub> (aq)	-872	-823	123
<b>Hydrogen</b>				Ba(OH) <sub>2</sub> ·8H <sub>2</sub> O(s)	-3342	-2793	427
H <sub>2</sub> (g)	0	0	131	<b>Iodine</b>			
H(g) <sub>217</sub>	203	115		I <sub>2</sub> (s)	0	0	116.7
H <sup>+</sup> (aq)	0	0	0	HI(g)	25.94	1.30	206.3
OH <sup>-</sup> (aq)	-230	-157	-11	<b>Lead</b>			
H <sub>2</sub> O(l)				Pb <sup>2+</sup> (aq)	+0.92		18.5
H <sub>2</sub> O(g)	-242	-229	189	PbCO <sub>3</sub> (s)	-699	-626.3	131
<b>Magnesium</b>							
Mg(s)	0	0	33				
Mg(aq)	-492	-456	-118				
MgO(s)	-601	-569	26.9				