

## 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>Nitrogen</b>			
C(s) (graphite)	0	0	6	N <sub>2</sub> (g)	0	0	192
C(s) (diamond)	2	3	2	NCl <sub>3</sub> (g)	230	271	
CO(g)	-110.5	-137	198	NF <sub>3</sub> (g)	-125	-83.6	261
CO <sub>2</sub> (g)	-393.5	-394	214	NH <sub>3</sub> (g)	-46	-17	193
CH <sub>4</sub> (g)	-75	-51	186	NH <sub>3</sub> (aq)	-80	-27	111
CH <sub>3</sub> OH(g)	-201	-163	240	NH <sub>2</sub> CONH <sub>2</sub> (aq)	?	?	174
CH <sub>3</sub> OH(l)	-239	-166	127	NO(g)	90	87	211
H <sub>2</sub> CO(g)	-116	-110	219	NO <sub>2</sub> (g)	34	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	N <sub>2</sub> H <sub>3</sub> CH <sub>3</sub> (l)	54	180	166
CH <sub>3</sub> CHO(g)	-166	-129	250	HNO <sub>3</sub> (aq)	-207	-111	146
C <sub>2</sub> H <sub>5</sub> OH(l)	-278	-175	161	HNO <sub>3</sub> (l)	-174	-81	156
C <sub>2</sub> H <sub>6</sub> (g)	-84.7	-32.9	229.5	NH <sub>4</sub> Cl(s)	-314	-201	95
C <sub>3</sub> H <sub>6</sub> (g)	20.9	62.7	266.9	NH <sub>4</sub> ClO <sub>4</sub> (s)	-295	-89	186
C <sub>3</sub> H <sub>8</sub> (g)	-104	-24	270				
<b>Bromine</b>				<b>Silver</b>			
Br <sub>2</sub> (l)	0	0	152.231	Ag(s)	0	0	42.6
BrCl(g)	14.64	-0.96	239.99	Ag <sup>+</sup> (aq)	105.6	77.1	72.7
<b>Chlorine</b>				Ag(S <sub>2</sub> O <sub>3</sub> ) <sup>3-</sup> (aq)	-1285.7	--	--
Cl <sub>2</sub> (g)	0	0	222.957	AgBr(s)	-100.4	-96.9	107.1
Cl <sub>2</sub> (aq)	-23	7	121	AgCl(s)	-127.1	-109.8	96.2
Cl <sup>-</sup> (aq)	-167	-131	57	<b>Sulfur</b>			
HCl(g)	-92	-95	187	S(rhombic)	0	0	31.8
<b>Fluorine</b>				S(monocl)	0.3	0.1	32.6
F <sub>2</sub> (g)	0	0	203	SO <sub>2</sub> (g)	-296.8	-300.2	248.8
F <sup>-</sup> (aq)	-333	-279	-14	SO <sub>3</sub> (g)	-395.7	-371.1	256.3
HF(g)	-271	-273	174	H <sub>2</sub> S(g)	-20.17	-33.0	205.6
<b>Hydrogen</b>				<b>Titanium</b>			
H <sub>2</sub> (g)	0	0	131	TiCl <sub>4</sub> (g)	-763	-727	355
H(g)	217	203	115	TiO <sub>2</sub> (s)	-945	-890	50
H <sup>+</sup> (aq)	0	0	0	<b>Aluminum</b>			
OH <sup>-</sup> (aq)	-230	-157	-11	AlBr <sub>3</sub> (3)	-526.3	-505	184
H <sub>2</sub> O(s)	-292		41	Al(s)	0	0	28.32
H <sub>2</sub> O(l)	-286	-237	70	<b>Barium</b>			
H <sub>2</sub> O(g)	-242	-229	189	BaCl <sub>2</sub> (aq)	-872	-823	123
<b>Magnesium</b>				Ba(OH) <sub>2</sub> ·8H <sub>2</sub> O(s)	-3342	-2793	427
Mg(s)	0	0	33	<b>Iodine</b>			
Mg(aq)	-492	-456	-118	I <sub>2</sub> (s)	0	0	116.7
MgO(s)	-601	-569	26.9	I <sub>2</sub> (g)	62.25	19.37	260.57
<b>Oxygen</b>				HI(g)	25.94	1.30	206.3
O <sub>2</sub> (g)	0	0	205				
O(g) 249	232	161					
O <sub>3</sub> (g)	143	163	239				

