

Inorganic Compounds: Physical and Thermochemical Data

H_f^θ Standard molar enthalpy change of formation at 298 K. Chosen standard pressure is 1 atm.

G_f^θ Standard molar Gibbs free energy change in formation at 289 K. Chosen standard pressure is 1 atm.

S^θ Standard molar entropy at 298 K. Chosen standard pressure is 1 atm.

m_{sat} Solubility in water measured in moles per 100 grams at 298 K. A figure in brackets after the solubility gives the concentration of the saturated solution as moles per 100 cm³ (mL) of solution for cases where the solution density is known to be significantly different from 1 g cm⁻³. This information is not available for many compounds where it would be relevant. A superscript gives the water of crystallization of the solid phase when different from standard state.

Compound	H_f^θ kJ mol ⁻¹	G_f^θ kJ mol ⁻¹	S^θ J mol ⁻¹ K ⁻¹	m_{sat} mol/100 g H ₂ O
Aluminum				
Al(s)	0	0	28.3	
Al ³⁺ (g)	5483.9	-----	149.9	
Al(aq)	-524.7	-481.2	----	
AlF ₃ (s)	-1504.1	-1425.1	66.4	0.00671
AlCl ₃ (s)	-704.2	-628.9	110.7	0.52
AlCl ₃ ·6H ₂ O(s)	-2691.6	-----	-----	0.346
AlBr ₃ (s)	-527.2	-488.4	163.2	decomposes
AlI ₃ (s)	-313.8	-300.8	159.0	decomposes
Al ₂ O ₃ (s)	-1675.7	-1582.4	50.9	1.00 x 10 ⁻¹⁰
Al(OH) ₃ (s)	-1287.4	-1149.8	85.4	1.28 x 10 ⁻⁶
Al(NO ₃) ₃ ·6H ₂ O(s)	-2850.5	-2203.9	467.8	
Al ₂ S ₃ (s)	-723.8	-----	-----	decomposes
Al ₂ (SO ₄) ₃ (s)	-3440.0	-3100.1	239.3	0.0915
Al ₂ (SO ₄) ₃ ·6H ₂ O(s)	-5311.7	-4622.6	469.0	
Al ₂ (SO ₄) ₃ ·18H ₂ O(s)	-8878.9	-7437.5	----	0.113

Ammonium Compounds (see under Nitrogen)

Compound	H_f^θ kJ mol ⁻¹	G_f^θ kJ mol ⁻¹	S^θ J mol ⁻¹ K ⁻¹	m_{sat} mol/100 g H ₂ O
Antimony				
Sb ³⁺ (g)	2703.3	-----	168.7	
SbH ₃ (g)	145.1	147.7	232.7	8.92 x 10 ⁻⁴
SbF ₃ (s)	-915.5	-807.0	105.4	2.15
SbCl ₃ (s)	-382.2	-323.7	184.0	4.33
SbCl ₅ (l)	-440.2	-350.2	301.0	decomposes
Sb ₄ O ₆ (s)	-1440.6	-1268.2	220.9	slightly soluble
Sb ₂ S ₃ (black)(s)	-174.9	-173.6	182.0	2.06 x 10 ⁻⁶
Sb ₂ (SO ₄) ₃ (s)	-2402.5	-----	-----	insoluble

Arsenic

As(s)	0	0	35.1	
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As ³⁺ (g)	5950.2	-----	162.3	
AsH ₃ (g)	66.4	68.9	222.7	8.92 x 10 ⁻⁴
AsF ₃ (l)	-956.3	-909.1	181.2	decomposers
AsF ₃ (g)	-920.6	-905.7	289.0	
AsCl ₃ (l)	-305.0	-259.4	216.3	decomposes
AsBr ₃ (s)	-197.5	-169.0	161.1	decomposes
As ₂ O ₃ (s)	-653.0	-571.0	117.0	0.0104
As ₂ O ₅ (s)	-924.9	-782.4	105.4	2.97 x 10 ⁻¹⁴
As ₂ O ₃ (s)	-169.0	-168.6	163.6	2.03 x 10 ⁻⁷
As ₄ O ₆ (s)	-1314.0	-1153.0	223.0	

Barium

Ba(s)	0	0	66.9	
Ba ²⁺ (g)	1660.5	-----	170.2	
Ba ²⁺ (aq)	-537.0	-560.8	9.6	
BaH ₂ (s)	-178.7	-132.2	-----	decomposes to H ₂
BaF ₂ (s)	-1207.1	-1156.9	96.4	9.24 x 10 ⁻⁴
BaCl ₂ (s)	-858.6	-810.4	123.7	0.146
BaCl ₂ ·2H ₂ O(s)	-1406.1	-1296.5	202.9	0.178
Ba(ClO ₃) ₂ (s)	-762.7	-556.9	231.0	0.0697
Ba(ClO ₃) ₂ ·H ₂ O(s)	-1069.0	-----	-----	0.125
Ba(ClO ₄) ₂ (s)	-800.0	-535.1	249.0	0.860
BaBr ₂ (s)	-757.3	-736.8	146.0	0.330

Compound	H _f ^θ kJ mol ⁻¹	G _f ^θ kJ mol ⁻¹	S ^θ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
BaBr ₂ ·2HO(s)	-1366.1	-1230.5	226.0	0.356
Ba(BrO ₃) ₂ (s)	-752.7	-577.4	243.0	9.86 x 10 ⁻⁴
Ba(BrO ₃) ₂ ·H ₂ O(s)	-1054.8	-824.6	292.5	0.00202
BaI ₂ (s)	-602.1	-609.0	167.0	0.564
BaI ₂ ·2H ₂ O(s)	-1216.7	-----	-----	0.63
Ba(IO ₃) ₂ (s)	-1027.2	-864.8	249.0	8.11 x 10 ⁻⁵
Ba(IO ₃) ₂ ·H ₂ O(s)	-1322.1	-1104.2	297.0	slightly soluble
BaO(s)	-553.5	-525.1	70.4	0.0277
BaO ₂ (s)	-634.3	-572.0	65.7	slightly soluble, decomposes
Ba(OH) ₂ (s)	-944.7	-855.2	99.7	0.0150
BaCO ₃ (s)	-1216.3	-1137.6	112.1	9.12 x 10 ⁻⁶
Ba(HCO ₃) ₂ (s)	-1921.6	-1734.3	192.0	0.0028
Ba(NO ₃) ₂ (s)	-992.1	-796.7	213.8	0.0391
BaS(s)	-460.0	-456.0	78.2	0.0529
BaSO ₄ (s)	-1473.2	-1362.3	151.9	9.43 x 10 ⁻⁷
BaCrO ₄ (s)	-1428.0	-1338.8	132.2	1.14 x 10 ⁻⁶
BaC ₂ O ₄ (s)	-1368.6	-----	-----	5.2 x 10 ⁻⁵
BaC ₂ O ₄ ·2H ₂ O(s)	-1971.1	-----	-----	5.20 x 10 ⁻⁵

Beryllium

Be(s)	0	0	9.5	
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$\text{Be}^{2+}_{(\text{s})}$	2993.0	-----	136.2	
$\text{BeF}_{2(\text{s})}$	-1026.8	-979.5	53.2	1.80
$\text{BeCl}_{2(\text{s})}$	-490.4	-445.6	82.7	0.896
$\text{BeCl}_2 \cdot 4\text{H}_2\text{O}_{(\text{s})}$	-1808.3	-1563.0	243.1	
$\text{BeBr}_{2(\text{s})}$	-353.5	-354.0	112.1	soluble
$\text{BeO}_{(\text{s})}$	-609.6	-580.3	14.1	1.40×10^{-8}
$\text{Be}(\text{OH})_{2(\text{s})}$	-902.4	-815.0	51.9	
$\text{Be}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}_{(\text{s})}$	-787.8	-----	-----	0.804
$\text{BeS}_{(\text{s})}$	-234.3	-232.0	35.0	decomposes
$\text{BeSO}_4_{(\text{s})}$	-1205.2	-1093.9	77.9	insoluble
$\text{BeSO}_4 \cdot 4\text{H}_2\text{O}_{(\text{s})}$	-2423.7	-2080.7	234.0	0.379

Compound	H_f^θ kJ mol^{-1}	G_f^θ kJ mol^{-1}	S^θ $\text{J mol}^{-1} \text{K}^{-1}$	m_{sat} $\text{mol}/100 \text{ g H}_2\text{O}$
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Bismuth

$\text{Bi}_{(\text{s})}$	0	0	56.9	
$\text{Bi}^{3+}_{(\text{g})}$	5005.7	-----	-----	
$\text{BiCl}_{3(\text{s})}$	-379.1	-315.1	177.0	decomposes
$\text{Bi}(\text{ClO})_{3(\text{s})}$	-366.9	-322.2	120.5	insoluble
$\text{BiI}_{3(\text{s})}$	-105.0	-175.3	233.9	insoluble
$\text{Bi}_2\text{O}_{3(\text{s})}$	-573.9	-493.7	151.5	insoluble
$\text{Bi}_2\text{S}_{3(\text{s})}$	-143.1	-140.6	200.46	3.6×10^{-8}
$\text{Bi}_2(\text{SO}_4)_{3(\text{s})}$	-2544.3	-2583.6	-----	decomposes

Boron

$\text{B}_{(\text{s})}$	0	0	5.9	
$\text{B}^{3+}_{(\text{s})}$	7468.0	-----	138.5	
$\text{B}_2\text{H}_{6(\text{g})}$	35.6	86.6	232.0	decomposes
$\text{BF}_{3(\text{g})}$	-137.0	-1120.3	254.0	0.00472
$\text{BCl}_{3(\text{l})}$	-427.2	-387.4	206.3	decomposes
$\text{BCl}_{3(\text{g})}$	-403.7	-388.7	290.0	decomposes
$\text{BI}_{3(\text{g})}$	71.1	20.8	349.1	
$\text{B}_2\text{O}_{3(\text{s})}$	-1272.8	-1193.7	54.0	0.0160
$\text{B}_2\text{O}_{3(\text{l})}$	-1254.5	-1182.4	77.8	0.0158
$\text{B}(\text{OH})_{3(\text{s})}$	-1094.0	-969.0	88.8	
$\text{BN}_{(\text{s})}$	-254.4	-228.4	14.8	insoluble
$\text{B}_2\text{S}_{3(\text{s})}$	-240.6	-229.0	57.4	decomposes

Bromine

$\text{Br}_{2(\text{l})}$	0	0	152.2	
$\text{Br}_{2(\text{g})}$	30.9	3.1	245.4	0.0224
$\text{Br}^{-1}_{(\text{g})}$	-233.9	-238.7	163.4	

Cadmium

$\text{Cd}_{(\text{s})}$	0	0	51.8	
$\text{Cd}^{2+}_{(\text{g})}$	2623.5	-----	167.7	
$\text{CdF}_{2(\text{s})}$	-700.4	-647.7	77.4	0.0289
$\text{CdCl}_{2(\text{s})}$	-391.5	-344.0	115.3	0.76

$\text{CdCl}_2 \cdot \text{H}_2\text{O}(\text{s})$	-688.4	-587.1	167.8	
$\text{Cd}(\text{ClO}_4)_2(\text{aq})$	-334.6	-94.8	290.8	
Compound	$\text{H}_\text{f}^\ominus$ kJ mol ⁻¹	$\text{G}_\text{f}^\ominus$ kJ mol ⁻¹	S^\ominus J mol ⁻¹ K ⁻¹	m_sat mol/100 g H ₂ O
$\text{Cd}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-2052.7	-----	-----	
$\text{CdBr}_2(\text{s})$	-316.2	-296.3	137.2	0.413
$\text{CdI}_2(\text{s})$	-203.3	-201.4	161.1	0.235
$\text{Cd}(\text{IO}_3)_2(\text{s})$	-----	377.1	-----	soluble
$\text{CdO}(\text{s})$	-258.2	-228.4	54.8	3.80×10^{-6}
$\text{Cd}(\text{OH})_2(\text{s})$	-560.7	-473.6	96.0	5.14×10^{-8}
$\text{Cd}(\text{CN})_2(\text{s})$	162.2	207.9	104.2	0.0103
$\text{Cd}(\text{NO}_3)_2(\text{s})$	-456.3	-259.0	197.9	0.461
$\text{Cd}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}(\text{s})$	-1055.6	-748.9	-----	
$\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}(\text{s})$	-1649.0	-1217.1	-----	0.697
$\text{CdS}(\text{s})$	-161.9	-156.5	64.8	1.46×10^{-11}
$\text{CdSO}_4(\text{s})$	-933.3	-822.8	123.0	0.362
$\text{CdSO}_4 \cdot 2.67\text{H}_2\text{O}(\text{s})$	-1729.4	-1465.3	229.6	1.58

Cesium

$\text{Cs}(\text{s})$	0	0		
$\text{Cs}^{+1}(\text{g})$	458.0	-----	169.7	
$\text{CsF}(\text{s})$	-553.5	-525.5	92.8	3.84
$\text{CsCl}(\text{s})$	-443.0	-414.5	101.2	1.13
$\text{CsClO}_3(\text{s})$	-411.7	-307.9	156.1	0.0290
$\text{CsClO}_4(\text{s})$	-443.1	-314.3	175.1	0.00861
$\text{CsBr}(\text{s})$	-405.8	-391.4	113.1	0.580
$\text{CsI}(\text{s})$	-346.0	-340.6	123.1	0.329
$\text{CsIO}_4(\text{s})$	-----	-380.7	184.0	0.00664
$\text{Cs}_2\text{O}(\text{s})$	-345.8	-308.2	146.9	very soluble, decomposes
$\text{CsOH}(\text{s})$	-417.2	-359.0	86.0	2.02
$\text{CsHCO}_3(\text{s})$	-966.1	-831.8	130.0	1.079
$\text{CsNO}_3(\text{s})$	-506.0	-406.6	155.2	0.0470
$\text{Cs}_2\text{SO}_4(\text{s})$	-1443.0	-1323.7	211.9	0.461

Calcium

$\text{Ca}(\text{s})$	0	0	41.4	
$\text{Ca}^{2+}(\text{g})$	1925.0	-----	154.8	
$\text{CaH}_2(\text{s})$	-186.2	-147.3	42.0	decomposes
$\text{CaF}_2(\text{s})$	-1219.6	-1167.3	68.9	2.31×10^{-5}
Compound	$\text{H}_\text{f}^\ominus$ kJ mol ⁻¹	$\text{G}_\text{f}^\ominus$ kJ mol ⁻¹	S^\ominus J mol ⁻¹ K ⁻¹	m_sat mol/100 g H ₂ O
$\text{CaCl}_2(\text{s})$	-795.8	-748.1	104.6	0.536
$\text{CaCl}_2 \cdot \text{H}_2\text{O}(\text{s})$	-1109.2	-1010.9	-----	0.595
$\text{CaCl}_2 \cdot 2\text{H}_2\text{O}(\text{s})$	-1402.9	-----	-----	0.665
$\text{CaCl}_2 \cdot 4\text{H}_2\text{O}(\text{s})$	-2009.6	-1724.0	212.6	0.979

CaCl ₂ ·6H ₂ O(s)	-2607.9	-2205.0	284.9	0.746
Ca(ClO ₄) ₂ (s)	-736.8	-----	233.0	0.789
Ca(ClO ₄) ₂ ·4H ₂ O(s)	-1948.9	-1476.8	433.5	
CaBr ₂ (s)	-682.8	-663.6	130.0	0.625
CaBr ₂ ·6H ₂ O(s)	-2506.2	-2153.1	410.0	1.929
Ca(BrO ₃) ₂ (s)	-718.8	-----	227.6	
CaI ₂ (s)	-533.5	-528.9	142.0	0.619
CaI ₂ ·8H ₂ O(s)	-2929.6	-----	-----	
Ca(IO ₃) ₂ (s)	-1002.5	-893.3	230.1	0.000513
Ca(IO ₃) ₂ ·H ₂ O(s)	-1293.3	-----	-----	
Ca(IO ₃) ₂ ·6H ₂ O(s)	-2780.7	-2267.7	451.9	0.000261
CaO(s)	-635.1	-604.0	39.7	0.00234
Ca(OH) ₂ (s)	-986.1	-898.6	83.4	0.00153
CaC ₂ (s)	-59.1	-64.8	69.9	decomposes
CaCO ₃ calcite	-1206.9	-1128.8	92.9	0.000013
CaCO ₃ aragonite	-1207.1	-1127.8	88.7	
Ca(NO ₃) ₂ (s)	-635.1	-743.2	193.3	0.622
Ca(NO ₃) ₂ ·2H ₂ O(s)	-1540.8	-1229.3	269.4	
Ca(NO ₃) ₂ ·3H ₂ O(s)	-1838.0	-1471.9	319.2	
Ca(NO ₃) ₂ ·4H ₂ O(s)	-2132.3	-1713.5	375.3	0.841
CaS(s)	-482.4	-477.4	56.5	0.000294
CaSO ₃ (s)	-1156.0	-----	-----	
CaSO ₄ (s)	-1431.1	-1321.9	106.7	0.00466
CaSO ₄ ·½H ₂ O(s)	-1576.7	-1436.8	130.5	0.00110
CaSO ₄ ·2H ₂ O(s)	-2022.6	-1797.4	194.1	0.0700
Ca ₃ (PO ₄) ₂ (s)	-4120.8	-3884.8	236.0	0.0000635
CaCrO ₄ ·2H ₂ O	-1379.0	-1277.4	133.9	0.107
Compound	H_f^θ	G_f^θ	S^θ	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
CaC ₂ O ₄ (s)	-1360.6	-----	-----	5.3 x 10 ⁻⁶
CaC ₂ O ₄ ·H ₂ O(s)	-1674.9	-1514.0	156.5	4.92 x 10 ⁻⁶
CaSi ₂ (s)	-151.0	-----	-----	decomposes
CaSiO ₃ (s)	-1634.9	-1549.7	81.9	8.18 x 10 ⁻⁵
Ca ₂ SiO ₄ (s)	-2307.5	-2192.8	127.7	
Carbon				
C(s, graphite)	0	0	5.7	
C(s, diamond)	1.9	2.9	2.4	
C(g)	716.7	671.3	158.0	insoluble
C ₂ (g)	836.8	780.4	199.3	insoluble
C ₃ (g)	793.5	773.1	212.1	insoluble
CCl ₄ (l)	-134.0	-65.3	214.4	
CO(g)	-110.5	-137.2	197.6	0.0000215
CO ₂ (g)	-393.5	-394.4	213.6	0.00329
CO ₂ (aq)	-413.8	-386.0	117.6	
CO ₃ ²⁻ (aq)	-677.1	-527.8	-56.9	

$\text{C}_2\text{N}_2(\text{g})$	307.9	296.3	242.1	0.0214
$\text{CS}_2(\text{l})$	98.7	65.2	151.3	0.00222
$\text{CS}_2(\text{g})$	117.0	67.2	237.7	

Chlorine

$\text{Cl}_2(\text{g})$	0	0	233.0	
$\text{Cl}^-(\text{g})$	-246.0	-240.0	153.1	
$\text{Cl}_2\text{O}(\text{g})$	80.3	97.9	266.1	0.329
$\text{ClO}_2(\text{g})$	102.5	120.5	256.7	0.129

Chromium

$\text{Cr}(\text{s})$	0	0	23.8	
$\text{Cr}^{3+}(\text{aq})$	-232.0	-----	-----	
$\text{CrF}_3(\text{s})$	-1159.0	-1088.0	93.9	insoluble
$\text{CrCl}_2(\text{s})$	-326.0	-282.0	115.0	
$\text{CrCl}_3(\text{s})$	-556.5	-486.2	115.3	1.62
$\text{CrO}_2\text{Cl}_2(\text{l})$	-579.5	-510.9	221.8	decomposes
$\text{CrI}_3(\text{s})$	-205.0	-202.5	-----	

Compound	H_f^θ kJ mol ⁻¹	G_f^θ kJ mol ⁻¹	S^θ J mol ⁻¹ K ⁻¹	m_{sat} mol/100 g H ₂ O
$\text{Cr}_2\text{O}_3(\text{s})$	-1139.7	-1058.1	81.2	1.20×10^{-9}
$\text{CrO}_3(\text{s})$	-598.5	-501.0	-----	1.69
$\text{Cr}_2(\text{SO}_4)_3(\text{s})$	-3025.0	-----	-----	0.163
$\text{Cr}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}(\text{s})$	-8339.0	-----	-----	0.167
$\text{Cr}(\text{CO})_6(\text{s})$	-1076.9	-975.0	-----	insoluble

Cobalt

$\text{Co}(\text{s})$	0	0	30.0	
$\text{Co}^{2+}(\text{g})$	2841.6	-----	178.8	
$\text{CoF}_3(\text{g})$	-810.9	-707.0	94.6	decomposes to $\text{Co}(\text{OH})_3$
$\text{CoCl}_2(\text{s})$	-312.5	-269.9	109.2	0.339
$\text{CoCl}_2 \cdot 2\text{H}_2\text{O}(\text{s})$	-923.0	-764.8	188.0	
$\text{CoCl}_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-2115.4	-1725.5	343.0	0.433
$\text{Co}(\text{ClO}_4)_2(\text{aq})$	-316.7	-71.5	251.0	
$\text{Co}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-2038.4	-----	-----	0.707
$\text{CoBr}_2(\text{s})$	-220.0	-210.0	135.6	0.305
$\text{CoBr}_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-2020.0	-----	-----	
$\text{CoI}_2(\text{s})$	-88.7	-101.3	158.2	0.508
$\text{Co}(\text{IO}_3)_2(\text{aq})$	-500.8	-310.4	125.5	
$\text{Co}(\text{IO}_3)_2 \cdot 2\text{H}_2\text{O}(\text{s})$	-1081.9	-795.8	267.8	
$\text{CoO}(\text{s})$	-237.9	-214.2	53.0	insoluble
$\text{Co}_3\text{O}_4(\text{s})$	-891.0	-774.0	102.5	insoluble
$\text{Co}(\text{OH})_2(\text{s})$	-539.7	-454.4	79.0	1.40×10^{-6}
$\text{Co}(\text{NO}_3)_2(\text{s})$	-420.5	-237.0	192.0	
$\text{Co}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}(\text{s})$	-1021.7	-----	-----	

$\text{Co}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}(\text{s})$	-1325.9	-----	-----	
$\text{Co}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}(\text{s})$	-1630.5	-----	-----	
$\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-2211.2	-1655.6	-----	0.557
$\text{CoS}(\text{s})$	-80.8	-82.8	67.4	
$\text{CoSO}_4(\text{s})$	-888.3	-782.4	118.0	0.234
$\text{CoSO}_4 \cdot 7\text{H}_2\text{O}(\text{s})$	-2979.9	-2473.8	406.1	0.241
Compound	H_f^θ kJ mol ⁻¹	G_f^θ kJ mol ⁻¹	S^θ J mol ⁻¹ K ⁻¹	m_{sat} mol/100 g H ₂ O

Copper

$\text{Cu}(\text{s})$	0	0	33.2	
$\text{Cu}^{2+}(\text{g})$	3054.0	-----	179.0	
$\text{CuF}_2(\text{s})$	-542.7	-481.0	88.0	0.0463
$\text{CuF}_2 \cdot 2\text{H}_2\text{O}(\text{s})$	-----	-981.6	-----	0.0342
$\text{CuCl}(\text{s})$	-137.2	-119.9	86.2	0.0000606
$\text{CuCl}_2(\text{s})$	-220.1	-175.7	108.1	0.00200
$\text{Cu}(\text{ClO}_4)_2(\text{aq})$	-193.1	48.3	264.4	soluble
$\text{Cu}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-1928.4	-----	-----	very soluble
$\text{CuBr}_2(\text{s})$	-141.8	-108.7	118.0	very soluble
$\text{CuBr}_2 \cdot 4\text{H}_2\text{O}(\text{s})$	-1326.3	-1081.1	293.7	
$\text{CuI}(\text{s})$	-67.7	-69.5	96.7	4.20 x 10 ⁻⁶
$\text{Cu}(\text{IO}_3)_2(\text{aq})$	-377.8	-190.4	137.2	
$\text{Cu}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}(\text{s})$	-692.0	-468.6	247.2	
$\text{Cu}_2\text{O}(\text{s})$	-168.6	-146.0	93.1	insoluble
$\text{CuO}(\text{s})$	-157.3	-129.7	42.6	3.00 x 10 ⁻⁶
$\text{Cu}(\text{OH})_2(\text{s})$	-449.8	-359.4	75.0	decomposes
$\text{Cu}(\text{NO}_3)_2(\text{s})$	-302.9	-118.2	193.0	
$\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}(\text{s})$	-1217.1	-----	-----	0.570
$\text{Cu}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}(\text{s})$	-2110.8	-----	-----	0.824
$\text{Cu}_2\text{S}(\text{s})$	-79.0	-86.2	120.9	1.20 x 10 ⁻¹⁵
$\text{CuS}(\text{s})$	-53.1	-53.6	66.5	2.60 x 10 ⁻¹⁶
$\text{CuSO}_4(\text{s})$	-771.4	-661.9		109.0
$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s})$	-2279.6	-1880.1	300.4	0.139

Fluorine

$\text{F}_2(\text{g})$	0	0	202.7	
$\text{F}^-(\text{g})$	-270.7	-266.6	145.4	
$\text{F}_2\text{O}(\text{g})$	-21.7	-4.7	247.3	decomposes
Compound	H_f^θ kJ mol ⁻¹	G_f^θ kJ mol ⁻¹	S^θ J mol ⁻¹ K ⁻¹	m_{sat} mol/100 g H ₂ O

Gallium

$\text{Ga}^{3+}(\text{g})$	5816.0	-----	161.6	
$\text{GaF}_3(\text{s})$	-1163.0	-1085.3	84.0	0.0000158
$\text{GaCl}_3(\text{s})$	-524.7	-454.8	142.0	very soluble
$\text{GaBr}_3(\text{s})$	-386.6	-359.8	180.0	soluble
$\text{GaI}_3(\text{s})$	-238.9	-217.6	49.0	decomposes

Ga₂O₃(s)	-1089.1	-998.3	85.0	insoluble
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Germanium

Ge⁴⁺(g)	10412.3	-----	-----	
GeF₄(g)	-----	-----	302.8	decomposes
GeCl₂(s)	-----	-----	-----	
GeCl₄(l)	-531.8	-462.8	245.6	decomposes
GeBr₄(l)	-347.7	-331.4	280.7	
GeBr₄(g)	-300.0	-318.0	396.1	
GeO(s)	-212.1	-237.2	50.0	0.0000200
GeO₂(s)	-551.0	-497.1	55.3	0.00451
GeS(s)	-69.0	-71.5	71.0	0.00229
GeS₂(s)	-189.5	-----	-----	0.00329

Gold

Au(s)	0	0	47.7	
Au⁺¹(g)	1262.4	-----	174.7	
AuH(g)	294.9	265.7	211.0	
AuF₃(s)	-363.0	-297.5	210.9	
AuCl₃(s)	-117.6	-55.2	147.3	0.701
AuCl₃·2H₂O(s)	-715.0	-519.0	226.0	slightly soluble
AuBr₃(s)	-53.3	-31.0	100.0	slightly soluble
AuI(s)	0.0	-0.2	119.2	very slightly soluble
Au₂O₃(s)	-3.3	76.2	-----	insoluble

Hydrogen (acids)

H₂(g)	0	0	130.6	
HF(g)	-271.1	-273.2	173.7	0.0433
HCl(g)	-92.3	-95.2	186.8	5.97
HCl(aq)	-167.2	-131.2	56.5	
Compound	H_f⁰	G_f⁰	S⁰	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
HClO(aq)	-131.3	-80.2	106.8	
HBr(g)	-36.4	-53.4	198.6	2.39
HI(g)	26.5	1.7	206.5	0.0556
HIO₃(s)	-230.1	-144.3	118.0	1.44
H₂O(l)	-285.8	-237.2	69.9	
H₂O(g)	-241.8	-228.6	188.7	
H₂O₂(l)	-187.8	-120.4	109.6	soluble
H₃AsO₃(aq)	-742.2	-----	-----	
H₃AsO₄(aq)	-902.5	-----	-----	
HCN(l)	108.9	124.9	112.8	0.0450
HCN(g)	135.1	124.7	201.7	
H₂CO₃(aq)	-699.6	-623.3	187.4	
HCO₃⁻¹(aq)	-692.0	-586.8	91.2	
HNO₃(l)	-174.1	-80.8	266.3	soluble
H₂S(g)	-20.6	-33.6	205.7	0.00980

$\text{H}_2\text{S}_{(\text{aq})}$	-39.7	-27.9	121.3	
$\text{H}_2\text{S}_{2(\text{l})}$	-23.1	-----	-----	decomposes
$\text{H}_2\text{Se}_{(\text{g})}$	76.0	62.3	219.0	
$\text{H}_2\text{SO}_{4(\text{l})}$	-814.0	-690.1	156.9	soluble
$\text{H}_2\text{SO}_{4(\text{aq})}$	-909.3	-744.5	20.1	
$\text{H}_2\text{Te}_{(\text{g})}$	154.0	138.0	234.0	
$\text{H}_3\text{PO}_{4(\text{s})}$	-1279.0	-1119.2	110.5	6.83
$\text{H}_3\text{BO}_{3(\text{s})}$	-1094.3	-969.0	88.8	0.0437
$\text{H}_3\text{O}^{+1}_{(\text{g})}$	979.9	-----	-----	
$\text{OH}^{+1}_{(\text{g})}$	1328.4	-----	-----	
$\text{OH}^{-1}_{(\text{g})}$	-140.9	-----	-----	
$\text{H}_2\text{S}^{+1}_{(\text{aq})}$	995.0	-----	-----	

Iodine

$\text{I}_{2(\text{s})}$	0	0	116.1	
$\text{I}_{2(\text{g})}$	62.4	19.4	260.6	
$\text{IF}_{(\text{g})}$	-95.6	-118.5	236.1	
$\text{I}_2^{+1}_{(\text{g})}$	967.5	-----	-----	
$\text{ICl}_{(\text{s})}$	-35.1	-----	-----	decomposes
	H_f^θ	G_f^θ	S^θ	m_{sat}
Compound	kJ mol^{-1}	kJ mol^{-1}	$\text{J mol}^{-1} \text{K}^{-1}$	$\text{mol}/100 \text{ g H}_2\text{O}$
$\text{ICl}_{3(\text{s})}$	-89.5	-22.3	167.4	decomposes
$\text{IBr}_{(\text{s})}$	-10.5	-----	138.1	decomposes
$\text{I}_2\text{O}_{5(\text{s})}$	-158.1	-38.0	-----	0.561
$\text{I}^{-1}_{(\text{g})}$	-196.6	-221.9	169.1	very slightly soluble

Iron

$\text{Fe}_{(\text{s})}$	0	0	27.0	
$\text{Fe}^{2+}_{(\text{g})}$	2752.2	-----	177.2	
$\text{Fe}^{2+}_{(\text{aq})}$	-89.1	-78.9	137.7	
$\text{Fe}^{3+}_{(\text{g})}$	-48.5	-4.7	315.9	
$\text{FeF}_{2(\text{s})}$	-686.0	-644.0	87.0	slightly soluble
$\text{FeF}_{3(\text{aq})}$	-1046.4	-841.0	357.0	slightly soluble
$\text{FeCl}_{2(\text{s})}$	-341.8	-302.3	117.9	0.636
$\text{FeCl}_2 \cdot 2\text{H}_2\text{O}_{(\text{s})}$	-953.1	-797.5	-----	
$\text{FeCl}_2 \cdot 4\text{H}_2\text{O}_{(\text{s})}$	-1549.3	-1275.7	-----	0.805
$\text{FeCl}_{3(\text{s})}$	-399.5	-334.1	142.3	1.73, decomposes
$\text{FeCl}_3 \cdot 6\text{H}_2\text{O}_{(\text{s})}$	-2223.8	-1812.9	-----	0.340
$\text{Fe}(\text{ClO}_4)_{2(\text{aq})}$	-347.7	-96.1	226.4	
$\text{Fe}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}_{(\text{s})}$	-2086.6	-----	-----	0.270
$\text{FeBr}_{2(\text{s})}$	-249.8	-236.0	140.7	0.505
$\text{FeI}_{2(\text{s})}$	-113.0	-128.4	77.0	soluble
$\text{FeI}_{3(\text{g})}$	71.0	-----	-----	
$\text{FeO}_{(\text{s})}$	-271.9	-245.4	58.5	insoluble
$\text{Fe}_2\text{O}_{3(\text{s})}$	-824.2	-742.2	87.4	insoluble
$\text{Fe}_3\text{O}_{4(\text{s})}$	-1118.4	-1015.5	146.4	insoluble

Fe(OH) ₂ (s)	-569.0	-486.6	88.0	6.70 x 10 ⁻⁶
Fe(OH) ₃ (s)	-823.0	-696.6	106.7	3.40 x 10 ⁻⁷
FeCO ₃ (s)	-740.6	-666.7	92.9	0.000622
Fe(CO) ₅ (l)	-774.0	-705.4	338.1	insoluble
FeS(s)	-100.0	-100.4	60.3	5.01 x 10 ⁻⁶
FeS ₂ (s)	-178.2	-166.9	52.9	
FeSO ₄ (s)	-928.4	-820.9	107.5	0.103
FeSO ₄ ·7H ₂ O(s)	-3014.6	-2510.3	409.2	0.194
Compound	H_f⁰	G_f⁰	S⁰	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
Fe ₂ (S) ₄ (s)	-2581.5	-----	261.7	0.218
Fe(NO ₃) ₃ (aq)	-674.9	-----	-----	

Lead

Pb(s)	0	0	64.8	
Pb ²⁺ (g)	916.8	-----	175.3	
Pb ²⁺ (aq)	-1.7	-24.4	10.5	
PbF ₂ (s)	-664.0	-617.1	110.5	0.000245
PbCl ₂ (s)	-359.4	-314.1	136.0	0.00390
PbCl ₄ (l)	-329.2	-259.0	-----	decomposes
PbBr ₂ (s)	-278.7	-261.9	161.5	0.00265
Pb(BrO ₃) ₂ (s)	-134.0	-50.0	-----	
PbI ₂ (s)	-175.5	-173.6	174.5	0.000165
PbO(s)	-217.3	-187.9	68.7	0.0000108
PbO ₂ (s)	-277.4	-217.4	68.6	insoluble
Pb(OH) ₂ (s)	-515.9	-420.9	88.0	
Pb ₃ O ₄ (s)	-718.4	-601.2	211.3	insoluble
PbCO ₃ (s)	-700.0	-626.3	131.0	4.12 x 10 ⁻⁷
Pb(NO ₃) ₂ (s)	-451.9	-251.0	213.0	0.447
PbS(s)	-100.4	-98.7	91.2	2.84 x 10 ⁻⁷
PbSO ₄ (s)	-919.0	-813.2	148.6	0.0000148
PbCrO ₄ (s)	-899.6	-819.6	152.7	5.26 x 10 ⁻⁸
Pb(CH ₃ COO) ₂ ·3H ₂ O(s)	-1851.0	-----	-----	0.204
Pb(C ₂ H ₅) ₄ (l)	52.7	336.4	472.5	

Lithium

Li(s)	0	0	28.4	
Li ⁺ (g)	679.6	650.0	132.9	
Li ⁺ (aq)	-278.6	-----	10.3	
LiH(s)	-90.5	-68.4	20.3	decomposes
Li ₃ H ₄ (s)	-----	-----	-----	decomposes
LiF(s)	-616.0	-587.7	35.6	0.00509
LiCl(s)	-408.6	-384.4	59.3	2.00
LiClO ₃ (s)	-369.0	-----	-----	5.531
Compound	H_f⁰	G_f⁰	S⁰	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
LiClO ₄ (s)	-381.0	-----	-----	0.564

LiClO₄·H₂O(s)	-697.1	-509.6	155.2	
LiClO₄·3H₂O(s)	-1298.0	-1001.3	254.8	0.810
LiBr(s)	-351.2	-342.0	74.3	0.0200
LiBr·H₂O(s)	-662.6	-594.3	109.6	
LiBr·2H₂O(s)	-962.7	-840.6	162.3	2.012
LiBrO₃(s)	-347.0	-----	-----	
LiI(s)	-270.4	-270.3	86.8	1.21
LiI·H₂O(s)	-590.3	-531.4	123.0	
LiI·2H₂O(s)	-890.4	-780.3	184.0	
LiI·3H₂O(s)	-1192.1	-----	-----	0.804
LiIO₃(s)	-503.4	-----	-----	0.442
Li₂O(s)	-597.9	-561.2	37.6	decomposes
LiOH(s)	-484.4	-439.0	42.8	0.516
LiOH·H₂O(s)	-788.0	-681.0	71.2	0.531
Li₂CO₃(s)	-1215.9	-1132.1	90.4	0.0175
LiHCO₃(s)	-969.6	-880.9	123.4	0.174
Li₃N(s)	-199.0	-155.4	37.7	
LiNO₃(s)	-483.1	-381.2	90.0	1.23
LiNO₃·3H₂O(s)	-1374.4	-1103.7	223.4	
Li₂SO₄(s)	-1436.5	-1321.8	115.1	0.236
Li₂SO₄·H₂O(s)	-1735.5	-1565.7	163.6	0.273
Li₃PO₄(s)	-2095.8	-----	-----	0.000257
LiAlH₄(s)	-116.3	-44.8	78.7	decomposes

Magnesium

Mg(s)	0	0	32.5	
Mg²⁺(aq)	-466.9	-454.8	-138.1	
MgF₂(s)	-1123.4	-1070.3	57.2	0.000122
MgCl₂(s)	-641.3	-591.8	89.6	0.557
MgCl₂·H₂O(s)	-966.6	-861.8	137.2	
MgCl₂·2H₂O(s)	-1279.7	-1118.1	179.9	
Compound	H_f⁰	G_f⁰	S⁰	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
MgCl₂·4H₂O(s)	-1898.9	-1623.5	264.0	
MgCl₂·6H₂O(s)	-2499.0	-2115.0	366.1	0.577
Mg(ClO₄)₂(s)	-568.9	-432.2	213.0	0.448
Mg(ClO₄)₂·2H₂O(s)	-1218.7	-----	-----	
Mg(ClO₄)₂·4H₂O(s)	-1837.2	-----	-----	
Mg(ClO₄)₂·6H₂O(s)	-2445.5	-1863.1	520.9	very soluble
MgBr₂(s)	-524.3	-503.8	117.2	0.551
MgBr₂·6H₂O(s)	-2410.0	-2056.0	397.0	1.081
MgI₂(s)	-364.0	-358.2	129.7	0.532
MgO(s)	-601.7	-569.4	26.9	as Mg(OH)₂
Mg(OH)₂(s)	-924.5	-833.6	63.2	0.00002
MgCO₃(s)	-1095.8	-1012.1	65.7	0.00015

Mg₃N₂(s)	-460.7	-406.0	90.0	decomposes
Mg(NO₃)₂(s)	-790.7	-589.5	164.0	
Mg(NO₃)₂·2H₂O(s)	-1409.2	-----	-----	soluble
Mg(NO₃)₂·6H₂O(s)	-2613.3	-2080.7	452.0	0.490
MgS(s)	-346.0	-341.8	50.3	decomposes
MgSO₄(s)	-1284.9	-1170.7	91.6	0.183
MgSO₄·2H₂O(s)	-1896.2	-1376.5	-----	
MgSO₄·4H₂O(s)	-2496.6	-2138.9	-----	
MgSO₄·6H₂O(s)	-3086.9	-2632.2	348.1	
MgSO₄·7H₂O(s)	-3388.7	-2871.9	372.0	0.360
Mg₃(PO₄)₂·2H₂O(s)	-4022.9	-----	-----	7.61 x 10⁻⁵
Mg₂Si(s)	-77.8	-75.0	75.0	soluble
MgSiO₃(s)	-1549.0	-11462.1	67.7	insoluble
Mg₂SiO₄(s)	-2174.0	-2055.2	95.1	insoluble

Manganese

Mn(s)	0	0	32.0	
Mn²⁺(g)	2519.0	-----	173.6	
Mn²⁺(aq)	-233.0	-228.0	-74.6	
MnCl₂(s)	-481.3	-440.5	118.2	0.504
Compound	H_f^o	G_f^o	S^o	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
MnCl₂·H₂O(s)	-789.9	-696.2	174.1	
MnCl₂·2H₂O(s)	-1092.0	-942.2	218.8	
MnCl₂·4H₂O(s)	-1687.4	-1423.8	303.3	0.613
MnBr₂(s)	-384.9	-365.7	138.0	0.593
MnBr₂·H₂O(s)	-705.0	-----	-----	
MnBr₂·4H₂O(s)	-1590.3	-1292.4	291.6	
MnI₂(aq)	-331.0	-250.6	152.7	
MnI₂·2H₂O(s)	-842.7	-----	-----	
MnI₂·4H₂O(s)	-1438.9	-----	-----	soluble
MnO(s)	-385.2	-362.9	59.7	3.60 x 10⁻⁶
MnO₄⁻¹(aq)	-542.7	-449.4	191.0	
Mn₃O₄(s)	-1387.8	-1283.2	155.6	insoluble
Mn₂O₃(s)	-959.0	-881.2	110.5	insoluble
MnO₂(s) pyrolusite	-520.0	-465.2	53.1	insoluble
Mn(OH)₂(s)	-695.4	-615.0	99.2	2.2 x 10⁻⁶
MnCO₃(s)	-894.1	-816.7	85.8	5.92 x 10⁻⁶
Mn(NO₃)₂(s)	-576.3	-503.3	168.6	
Mn(NO₃)₂·6H₂O(s)	-2371.9	-1809.6	-----	0.877
MnS(s)	-214.2	-218.4	78.2	6.90 x 10⁻⁶
MnSO₄(s)	-1065.2	-957.4	112.1	0.344
MnSO₄·H₂O(s)	-1376.5	-1214.6	-----	0.583
MnSO₄·4H₂O(s)	-2258.1	-1908.3	-----	0.425

MnSO ₄ ·5H ₂ O(s)	-2553.1	-2140.0	-----
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Mercury

Hg(l)	0	0	76.1	
Hg(g)	61.32	-178.6	146.0	
Hg ²⁺ (g)	2890.4	-----	174.9	
Hg ₂ ²⁺ (aq)	172.3	153.6	84.5	
Hg ₂ F ₂ (s)	-485.0	-435.6	160.7	decomposes to Hg ₂ O
Hg ₂ Cl ₂ (s) calomel	-265.2	-210.8	192.5	3.75 x 10 ⁻⁶
HgCl ₂ (s)	-224.3	-178.7	146.0	0.269
Compound	H _f ^o kJ mol ⁻¹	G _f ^o kJ mol ⁻¹	S ^o J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
Hg ₂ Br ₂ (s)	-206.9	-181.1	218.0	6.95 x 10 ⁻⁹
HgBr ₂ (s)	-170.7	-153.1	172.0	0.00169
Hg ₂ I ₂ (s)	-121.3	-111.0	233.5	slightly soluble
HgI ₂ (s) red	-105.4	-101.7	179.9	0.0000106
HgO(s) red	-90.8	-58.6	70.3	0.0000237
Hg(OH) ₂ (aq)	-355.2	-274.9	142.3	
Hg ₂ (NO ₃) ₂ ·2H ₂ O(s)	-868.2	-563.2	-----	decomposes
HgS(s) black	-53.6	-47.7	88.3	5.40 x 10 ⁻⁷
HgS(s) red	-58.2	-50.6	82.4	
Hg ₂ SO ₄ (s)	-743.1	-625.9	200.7	0.0000945
HgSO ₄ (s)	-707.5	-590.0	145.0	decomposes

Nickel

Ni(s)	0	0	30.0	
Ni ²⁺ (aq)	-54.0	-45.6	-128.9	
NiF ₂ (s)	-651.4	-604.2	73.6	0.0265
NiCl ₂ (s)	-305.3	-259.1	97.7	0.506
NiCl ₂ ·2H ₂ O(s)	-922.2	-760.2	176.0	
NiCl ₂ ·4H ₂ O(s)	-1516.7	-1235.0	243.0	
NiCl ₂ ·6H ₂ O(s)	-2103.2	-1713.5	344.4	1.07
Ni(ClO ₄) ₂ (aq)	-312.5	-62.8	235.1	
NiBr ₂ (s)	-212.1	-205.0	133.0	0.516
NiBr ₂ ·3H ₂ O(s)	-1146.4	-----	-----	0.731
Ni(IO ₃) ₂ (s)	-489.1	-326.4	213.0	0.00269
NiO(s)	-239.7	-211.7	38.0	insoluble
NiO ₂ (s)	-----	-199.0	-----	
Ni(OH) ₂ (s)	-529.7	-447.3	88.0	0.0000100
Ni(CN) ₂ (s)	127.6	-----	94.1	insoluble
Ni(NO ₃) ₂ (s)	-415.0	-238.0	192.0	
Ni(NO ₃) ₂ ·3H ₂ O(s)	-1326.3	-----	-----	
Ni(NO ₃) ₂ ·6H ₂ O(s)	-2211.7	-1662.7	-----	0.547
NiS(s)	-82.0	-79.5	53.0	0.0000040
Compound	H _f ^o	G _f ^o	S ^o	m _{sat}

	kJ mol^{-1}	kJ mol^{-1}	$\text{J mol}^{-1} \text{K}^{-1}$	$\text{mol}/100 \text{ g H}_2\text{O}$
$\text{NiSO}_4(\text{s})$	-872.9	-759.8	92.0	0.189
$\text{NiSO}_4 \cdot 4\text{H}_2\text{O}(\text{s})$	-2104.1	-----	-----	
$\text{NiSO}_4 \cdot 6\text{H}_2\text{O}(\text{s})$	-2682.8	-2224.9	334.5	
$\text{NiSO}_4 \cdot 7\text{H}_2\text{O}(\text{s})$	-2976.3	-2462.2	378.9	0.445
$\text{NiC}_3(\text{s})$	-664.0	-615.0	91.6	
$\text{Ni}(\text{CO})_4(\text{l})$	-633.0	-588.3	313.4	0.000105

Nitrogen

$\text{N}_2(\text{g})$	0	0	191.5	
$\text{N}_2\text{H}_4(\text{l})$ hydrazine	50.6	149.2	121.2	very soluble
$\text{NF}_3(\text{g})$	-124.7	-83.3	260.2	slightly soluble
$\text{NCl}_3(\text{l})$	230.1	-----	-----	insoluble
$\text{N}_2\text{O}(\text{g})$	82.0	104.2	219.7	0.00266
$\text{NO}(\text{g})$	90.2	86.6	210.7	0.000188
$\text{N}_2\text{O}_3(\text{g})$	83.7	139.4	312.0	soluble, decomposes
$\text{NO}_2(\text{g})$	33.2	51.3	240.0	soluble, decomposes
$\text{N}_2\text{O}_4(\text{g})$	9.2	97.8	304.2	soluble, decomposes
$\text{N}_2\text{O}_5(\text{g})$	-41.2	113.8	178.2	soluble, decomposes
$\text{NO}_3^{-1}(\text{aq})$	-205.0	-108.7	146.4	

Ammonia

$\text{NH}_3(\text{g})$	-46.1	-16.5	192.3	3.11
$\text{NH}_4^{+1}(\text{aq})$	-132.5	-79.4	113.0	
$\text{NH}_4\text{F}(\text{s})$	-464.0	-348.8	72.0	2.69
$\text{NH}_4\text{Cl}(\text{s})$	-314.4	-203.0	94.6	0.734
$\text{NH}_4\text{ClO}_4(\text{s})$	-295.3	-88.9	186.2	0.0914
$\text{NH}_4\text{Br}(\text{s})$	-270.8	-175.3	113.0	0.799
$\text{NH}_4\text{I}(\text{s})$	-201.4	-112.5	117.0	1.27
$\text{NH}_4\text{IO}_3(\text{s})$	-385.8	-----	-----	0.0107
$(\text{NH}_4)_2\text{Cr}_2\text{O}_7(\text{s})$	-1807.0	-----	-----	
$\text{NH}_4\text{OH}(\text{l})$	-361.2	-254.1	165.6	
$\text{NH}_4\text{NO}_3(\text{s})$	-365.6	-184.0	151.1	2.68
$(\text{NH}_4)_2\text{SO}_4(\text{s})$	-1180.9	-901.9	220.1	0.578
$\text{NH}_4\text{VO}_3(\text{s})$	-1053.1	-888.3	140.6	

Compound	H_f^θ kJ mol^{-1}	G_f^θ kJ mol^{-1}	S^θ $\text{J mol}^{-1} \text{K}^{-1}$	m_{sat} $\text{mol}/100 \text{ g H}_2\text{O}$
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Oxygen

$\text{O}_2(\text{g})$	0	0	205.0	
$\text{O}_3(\text{g})$ ozone	142.7	163.2	238.8	0.219
$\text{OH}^{-1}(\text{aq})$	-230.0	-157.2	-10.8	

Phosphorus

$\text{P}(\text{s})$ (white)	0	0	41.1	
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P ₄ (g)	314.5	278.3	163.2	
PH ₃ (g) phosphine	5.4	13.4	210.1	0.000888
PH ₄ I(s)	-69.9	0.8	123.0	soluble
PF ₃ (g)	-918.8	-897.5	273.1	decomposes
PF ₅ (g)	-1595.8	-----	281.0	decomposes
PCl ₃ (l)	-319.7	-272.4	217.1	decomposes
PCl ₅ (s)	-443.5	-----	166.5	decomposes
POCl ₃ (l)	-597.1	-520.9	222.5	decomposes
PBr ₃ (l)	-184.5	-175.7	240.2	decomposes
PBr ₅ (s)	-269.9	-----	-----	decomposes
POBr ₃ (s)	-458.6	-430.5	-----	decomposes
P ₄ O ₆ (s)	-1640.1	-----	-----	decomposes
P ₄ O ₁₀ (s)	-2984.0	-2697.8	228.9	decomposes
P ₂ S ₅ (s)	251.0	-----	-----	insoluble

Plutonium

PuF ₃ (s)	-1569.0	-1494.0	-----	insoluble
PuCl ₃ (s)	-955.0	-894.1	-----	soluble
PuBr ₃ (s)	-785.8	-763.2	205.0	soluble
PuI ₃ (s)	-556.0	-556.1	234.0	soluble
PuO ₂ (s)	-1045.2	-986.0	76.0	

Potassium

K(s)	0	0	64.2	
K ⁺ (g)	514.3	481.2	154.4	
KF(s)	-567.3	-537.8	66.6	1.75
KF·2H ₂ O(s)	-1163.6	-1021.6	155.2	3.71
KCl(s)	-436.7	-409.2	82.6	0.481
KClO ₃ (s)	-397.7	-296.3	143.1	0.0700
KClO ₄ (s)	-432.8	-303.2	151.0	0.0129
Compound	H _f ⁰ kJ mol ⁻¹	G _f ⁰ kJ mol ⁻¹	S ⁰ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
KBr(s)	-393.8	-380.7	95.9	0.570
KBrO ₃ (s)	-360.2	-271.2	149.2	0.0488
KBrO ₄ (s)	-287.9	-174.5	170.1	
KI(s)	-327.9	-324.9	106.3	0.892
KIO ₃ (s)	-501.4	-418.4	151.5	0.0429
KIO ₄ (s)	-467.2	-361.4	176.0	0.00223
K ₂ O(s)	-361.4	-----	-----	soluble as KOH
KO ₂ (s)	-284.9	-239.5	116.7	0.00239
KOH(s)	-424.8	-379.1	78.9	1.71
KOH·2H ₂ O(s)	-1051.0	-887.4	151.0	2.12
K ₂ CO ₃ (s)	-1151.0	-1063.6	155.5	0.811
KHCO ₃ (s)	-963.2	-863.6	115.5	0.362
KNO ₂ (s)	-369.8	-306.6	152.1	3.60
KNO ₃ (s)	-494.6	-349.9	133.1	0.375
KCN(s)	-113.0	-101.9	128.5	1.10

KSCN(s)	-200.2	-178.3	124.3	2.46
K ₂ S(s)	-380.7	-364.0	104.6	soluble
K ₂ SO ₄ (s)	-1437.8	-1321.4	175.6	0.0691
KHSO ₄ (s)	-1160.6	-1031.4	138.1	0.378
KH ₂ PO ₄ (s)	-1568.3	-1415.9	134.9	0.109
KMnO ₄ (s)	-837.2	-737.6	171.7	0.0483
K ₂ CrO ₄ (s)	-1403.7	-1295.8	200.1	0.335
K ₂ Cr ₂ O ₇ (s)	-2061.4	-1882.0	291.2	0.0510
KAl(SO ₄) ₂ (s)	-2470.2	-2240.1	204.6	
KAl(SO ₄) ₂ ·12H ₂ O(s)	-6061.8	-5141.7	687.4	0.0302
KCr(SO ₄) ₂ ·12H ₂ O(s)	-5777.3	-----	-----	0.0441
K ₃ Fe(CN) ₆ (s)	-249.8	-129.7	426.1	0.148
K ₄ Fe(CN) ₆ (s)	-594.1	-453.1	418.8	0.0738
K ₄ Fe(CN) ₆ ·3H ₂ O(s)	-1466.5	-1169.0	593.7	0.0857

Rubidium

Rb ⁺ ₁ (g)	490.1	-----	164.2	
RbH(s)	-52.1	-32.2	-----	
Compound	H _f ^θ kJ mol ⁻¹	G _f ^θ kJ mol ⁻¹	S ^θ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
RbF(s)	-557.7	-523.4	82.1	2.88
RbCl(s)	-435.3	-407.8	95.9	0.781
RbClO ₃ (s)	-402.9	-300.4	151.9	0.0296
RbClO ₄ (s)	-437.2	-307.7	164.0	0.00270
RbBr(s)	-394.6	-381.8	110.0	0.701
RbBrO ₃ (s)	-367.3	-278.1	161.1	0.137
RbI(s)	-333.8	-328.9	118.4	0.770
RbIO ₃ (s)	-----	-426.3	-----	0.00806
RbOH(s)	-418.2	-----	84.1	1.69
RbOH·H ₂ O(s)	-748.9	-----	-----	
RbOH·2H ₂ O(s)	-1053.2	-----	-----	
Rb ₂ CO ₃ (s)	-1136.0	-1051.0	181.4	1.95
RbHCO ₃ (s)	-936.2	-893.6	121.3	0.788
RbNO ₃ (s)	-495.1	-395.8	147.3	0.445
Rb ₂ S(s)	-360.7	-339.0	134.0	very soluble
Rb ₂ SO ₄ (s)	-1435.6	-1317.0	197.4	0.190
RbHSO ₄ (s)	-1158.9	-1030.1	-----	soluble

Scandium

Sc ³⁺ (g)	4627.0	-----	156.3	
ScF ₃ (s)	-1629.2	-1555.6	92.0	
ScCl ₃ (s)	-925.1	-858.0	127.2	very soluble
Sc ₂ O ₃ (s)	-1908.8	-1819.4	77.0	soluble

Silicon

Si(s)	0	0	19.0	
SiH ₄ (g)	34.3	56.9	204.5	insoluble

SiF ₄ (g)	-1614.9	-1572.7	282.4	decomposes
SiCl ₄ (l)	-687.0	-619.9	239.7	decomposes
SiCl ₄ (g)	-657.0	-617.0	330.6	decomposes
SiBr ₄ (l)	-457.3	-443.9	277.8	decomposes
SiBr ₄ (g)	-415.4	-431.8	377.8	
SiO(g)	-99.6	-126.3	211.5	
SiO ₂ (s) quartz	-910.9	-856.7	41.8	
SiO ₂ (s)	-909.5	-855.9	42.7	0.000200
Compound	H _f ⁰ kJ mol ⁻¹	G _f ⁰ kJ mol ⁻¹	S ⁰ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
SiO ₂ (s)	-909.1	-855.3	43.5	
SiC(s)	-62.8	-60.2	16.5	insoluble
SiS ₂ (s)	-207.1	-175.3	66.9	decomposes
Si ⁴⁺ (g)	10428.5	-----	229.8	

Silver

Ag(s)	0	0	42.6	
Ag ⁺¹ (g)	1019.2	-----	167.2	
Ag ⁺¹ (aq)	105.2	77.1	72.7	
AgF(s)	-204.6	-186.6	80.1	1.42
AgF·2H ₂ O(s)	-800.8	-671.1	174.9	
AgF·4H ₂ O(s)	-1388.3	-1147.3	268.0	
AgCl(s)	-127.1	-109.8	96.2	1.35 x 10 ⁻⁶
AgClO ₃ (s)	-25.5	61.7	149.4	0.0522
AgClO ₄ (s)	-31.1	77.0	-----	2.69
AgBr(s)	-100.4	-96.9	107.1	7.18 x 10 ⁻⁸
AgBrO ₃ (s)	-27.2	54.4	152.7	0.000831
AgI(s)	-61.8	-66.2	115.5	0.111
Ag ₂ O(s)	-31.0	-11.2	121.3	0.0000200
Ag ₂ CO ₃ (s)	-505.8	-436.8	167.4	0.0000120
AgNO ₃ (s)	-124.4	-33.5	140.9	1.42
AgCN(s)	146.0	156.9	107.2	0.0000525
Ag ₂ S(s)	-29.4	-39.5	150.6	2.48 x 10 ⁻¹⁶
Ag ₂ SO ₄ (s)	-715.9	-618.5	200.4	0.00183
Ag ₂ CrO ₄ (s)	-712.1	-621.7	216.7	0.0000992

Sodium

Na(s)	0	0	51.0	
Na ⁺¹ (g)	609.0	-----	147.9	
Na ⁺¹ (aq)	-240.1	-261.9	59.0	
NaH(s)	-56.1	-33.5	40.0	decomposes
NaF(s)	-573.6	-543.5	51.5	0.0987
NaCl(s)	-411.2	-384.2	72.1	0.615
NaClO ₃ (s)	-365.8	-262.2	123.4	0.742
Compound	H _f ⁰ kJ mol ⁻¹	G _f ⁰ kJ mol ⁻¹	S ⁰ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
NaClO ₄ (s)	-383.3	-254.9	142.3	soluble

NaBr(s)	-361.1	-349.0	86.8	0.919
NaBr·H ₂ O(s)	-951.9	-828.4	179.1	0.572
NaBrO ₃ (s)	-344.1	-242.8	128.9	0.182
NaI(s)	-287.8	-286.1	98.5	1.23
NaIO ₃ (s)	-481.8	-----	135.1	0.0675
NaIO ₃ ·H ₂ O(s)	-779.5	-634.1	162.3	
NaIO ₃ ·5H ₂ O(s)	-1952.3	-----	-----	
Na ₂ O(s)	-414.5	-375.5	75.1	decomposes
Na ₂ O ₂ (s)	-510.9	-447.7	95.0	decomposes
NaOH(s)	-425.6	-379.5	64.5	1.05
NaOH·H ₂ O(s)	-734.5	-629.4	99.5	1.97
Na ₂ CO ₃ (s)	-1130.7	-1044.5	135.0	0.0660
Na ₂ CO ₃ ·10H ₂ O(s)	-4081.3	-3428.2	564.0	0.103
NaHCO ₃ (s)	-950.8	-851.0	101.7	0.122
NaNO ₂ (s)	-358.7	-284.6	103.8	1.23
NaNO ₂ (s) nitre	-467.9	-367.1	116.5	1.08
NaCN(s)	-87.5	-76.4	115.6	1.29
Na ₂ S(s)	-364.8	-349.8	83.7	0.253
Na ₂ SO ₄ (s)	-1387.1	-1270.2	149.6	0.0303
Na ₂ SO ₄ ·10H ₂ O(s)	-4327.3	-3647.4	592.0	0.197
NaHSO ₄ (s)	-1125.5	-992.9	113.0	0.238
Na ₂ S ₂ O ₃ (s)	-1123.0	-1028.0	155.0	0.316
Na ₂ S ₂ O ₃ ·5H ₂ O(s)	-2607.9	-2230.1	372.4	0.480
Na ₃ PO ₄ (s)	-1917.4	-1788.9	173.8	
Na ₂ SiO ₃ (s)	-1554.9	-1461.0	113.8	0.839
Na ₂ B ₄ O ₇ (s)	-3291.1	-3096.2	189.2	0.00527
Na ₂ B ₄ O ₇ ·10H ₂ O(s)	-6288.6	-5516.6	585.5	0.0160
NaNH ₂ (s)	-123.8	-64.0	76.9	decomposes

Strontium

Compound	H _f ^θ kJ mol ⁻¹	G _f ^θ kJ mol ⁻¹	S ^θ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
Sr ²⁺ (g)	1790.6	-----	164.6	
SrF ₂ (s)	-1216.3	-1164.8	82.1	0.0000950
SrCl ₂ (s)	-828.9	-781.2	114.9	0.0100
SrCl ₂ ·H ₂ O(s)	-1136.8	-1036.4	172.0	
SrCl ₂ ·2H ₂ O(s)	-1438.0	-1282.0	218.0	
SrCl ₂ ·6H ₂ O(s)	-2623.8	-2241.2	390.8	
Sr(ClO ₄) ₂ (s)	-762.8	-----	247.1	1.082
SrBr ₂ (s)	-717.6	-697.1	135.1	0.433
SrI ₂ (s)	-558.1	-562.3	159.0	0.484
SrI ₂ ·H ₂ O(s)	-886.0	-----	-----	
SrI ₂ ·2H ₂ O(s)	-1182.4	-----	-----	
SrI ₂ ·6H ₂ O(s)	-2388.6	-----	-----	
Sr(IO ₃) ₂ (s)	-1019.2	-855.2	234.0	6.86 x 10 ⁻⁵

SrO(s)	-592.0	-561.9	54.4	0.00827
Sr(OH) ₂ (s)	-959.0	-869.4	88.0	0.00337
Sr(OH) ₂ ·8H ₂ O(s)	-3352.2	-----	-----	0.00655
SrCO ₃ (s)	-1220.1	-1104.4	97.1	7.38 x 10 ⁻⁶
Sr(HCO ₃) ₂ (aq)	-1927.9	-1731.3	150.6	0.000568
Sr(NO ₃) ₂ (s)	-978.2	-780.1	194.6	0.155
Sr(NO ₃) ₂ ·4H ₂ O(s)	-2154.8	-1730.7	369.0	0.213
SrS(s)	-453.1	-448.5	68.2	insoluble; decomposes
SrSO ₄ (s)	-1453.1	-1341.0	117.0	7.11 x 10 ⁻⁵

Sulphur

S _(s) (rhombic)	0	0	31.8	
S ²⁻ (aq)	33.1	85.8	-14.6	
SF ₄ (g)	-774.9	-731.4	291.9	decomposes
SF ₆ (g)	-1209.0	-1105.4	291.7	0.00370
SCl ₂ (g)	-19.7	-----	282.2	
SCl ₄ (l)	-56.1	-----	-----	decomposes
S ₂ Cl ₂ (s)	-59.4	4.2	-----	decomposes
SOCl ₂ (l)	-245.6	-197.9	307.9	decomposes
SO ₂ Cl ₂ (l)	-394.1	-305.0	216.7	decomposes

Compound	H _f ⁰ kJ mol ⁻¹	G _f ⁰ kJ mol ⁻¹	S ⁰ J mol ⁻¹ K ⁻¹	m _{sat} mol/100 g H ₂ O
SO ₂ (g)	-296.8	-300.2	248.1	0.166
SO ₃ (l)	-441.0	-368.4	95.6	
SO ₃ (g)	-396.0	-370.0	256.0	
S(g)	278.8	238.3	167.8	
S ₂ (g)	128.4	79.3	228.1	
S ₈ (g)	102.3	49.7	430.9	

Tin

Sn _(s) (white)	0	0	51.6	
Sn ²⁺ (g)	2434.9	-----	168.4	
Sn ²⁺ (aq)	-8.8	-27.2	-17.0	
Sn ⁴⁺ (g)	9323.2	-----	168.4	
SnH ₄ (g)	162.8	188.2	227.6	
SnCl ₂ (s)	-325.1	-----	-----	1.42
SnCl ₂ ·2H ₂ O(s)	-921.3	-787.8	-----	decomposes
SnCl ₄ (l)	-511.3	-440.2	258.6	soluble; decomposes
SnBr ₂ (s)	-243.5	-250.6	146.0	soluble; decomposes
SnBr ₄ (s)	-377.4	-350.2	264.4	decomposes
SnBr ₄ ·8H ₂ O(s)	-276.8	-----	-----	
SnI ₂ (s)	-143.5	-145.2	168.6	0.00263
SnO(s)	-285.8	-256.9	56.5	5.00 x 10 ⁻⁷
SnO ₂ (s)	-580.7	-519.7	52.3	1.40 x 10 ⁻¹¹
SnS(s)	-100.0	-98.3	77.0	1.3 x 10 ⁻⁸

Sn(SO₄)₂(s)	-1629.2	-1443.0	155.2	
Titanium				
Ti²⁺(g)	2450.6	-----	-----	
Ti³⁺(g)	9290.2	-----	-----	
TiH₂(s)	-119.7	-80.3	29.1	
TiCl₂(s)	-513.8	-464.4	87.4	decomposes
TiCl₃(s)	-720.9	-653.5	139.7	soluble
TiCl₄(s)	-804.2	-737.2	252.3	decomposes
TiBr₂(s)	-402.0	-375.0	130.1	soluble
TiBr₃(s)	-548.5	-523.8	176.6	
	H_f⁰	G_f⁰	S⁰	m_{sat}
Compound	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
TiBr₄(s)	-616.7	-589.5	243.5	decomposes
TiI₂(s)	-263.0	-270.1	147.7	decomposes
TiI₄(s)	-375.7	-371.5	249.4	very soluble
TiO₂(s)	-939.7	-884.5	49.9	insoluble
Ti₂O₃(s)	-1520.9	-1434.3	78.9	insoluble
Tungsten				
W⁺¹(g)	1625.9	-----	-----	
WF₆(l)	-1747.7	-1631.4	251.5	decomposes
WCl₂(s)	-255.0	-213.6	130.2	decomposes
WCl₄(s)	-467.0	-303.1	344.5	decomposes
WCl₆(s)	-682.5	-548.9	254.0	decomposes
WBr₆(s)	-348.5	-328.0	472.0	insoluble
WO₃(s) wolframite	-842.9	-764.1	75.9	insoluble
WS₂(s)	-209.0	-----	84.0	insoluble
WC(s)	-40.5	-40.2	35.6	insoluble
Uranium				
UF₆(g)	-2112.9	-2029.3	379.7	decomposes
UCl₂(s)	-75.3	-80.3	79.0	
UCl₂O₂(s)	-1263.1	-1159.0	150.5	0.939
UO₂(s)	-1129.7	-1075.3	77.8	3.00 x 10⁻⁷
UO₃(s)	-1263.6	-1184.1	98.6	3.95 x 10⁻⁶
U₂C₃(s)	-205.0	-201.0	105.0	
UO₂(NO₃)₂(s)	-1377.4	-1142.7	276.1	
UO₂(NO₃)₂·6H₂O(s)	-3197.8	-2615.0	505.6	0.322
US₂(s)	-502.0	-531.7	110.5	
Vanadium				
V²⁺(g)	2590.5	-----	169.4	
V³⁺(g)	5430.5	-----	171.5	
V⁴⁺(g)	9943.3	-----	169.3	
VF₄(s)	-1403.3	-----	-----	
VF₅(l)	-1480.3	-1373.2	175.7	

VF₅(g)	-1433.8	-1369.8	320.8	
Compound	H_f⁰	G_f⁰	S⁰	m_{sat}
	kJ mol⁻¹	kJ mol⁻¹	J mol⁻¹ K⁻¹	mol/100 g H₂O
VCl ₂ (s)	-452.0	-406.0	97.1	
VCl ₃ (s)	-580.7	-511.3	131.0	
VCl ₄ (l)	-569.4	-503.7	255.2	
VBr ₂ (s)	-365.3	-----	126.0	
VBr ₃ (s)	-433.5	-----	142.0	
VBr ₄ (g)	-336.8	-----	335.0	
VI ₂ (s)	-251.5	-----	143.1	
VO(s)	-431.8	-404.2	38.9	
V ₂ O ₃ (s)	-1228.0	-1139.3	98.3	
V ₂ O ₅ (s)	-1550.6	-1419.6	131.0	
Xenon				
XeF ₂ (s)	-133.9	-62.8	133.9	
XeF ₄ (s)	-261.5	-121.3	146.4	
XeF ₆ (s)	-380.7	-----	-----	
XeO ₃ (s)	401.7	-----	-----	
Zinc				
Zn(s)	0	0	41.6	
Zn ²⁺ (g)	2782.7	-----	160.9	
Zn ²⁺ (aq)	-153.9	-147.1	-112.1	
ZnF ₂ (s)	-764.4	-449.5	73.7	
ZnCl ₂ (s)	-415.1	-369.4	111.5	
ZnBr ₂ (s)	-328.7	-312.1	138.5	
ZnI ₂ (s)	-208.0	-208.9	161.1	
ZnO(s)	-348.3	-318.3	43.6	
ZnCO ₃ (s)	-812.8	-731.6	82.4	
Zn(NO ₃) ₂ (s)	-483.7	-----	-----	
Zn(NO ₃) ₂ ·6H ₂ O(s)	-2306.6	-1773.1	456.9	
ZnS(s) wurtzite	-192.6	-187.0	57.7	
ZnS(s) blende	-206.0	-201.3	65.3	
ZnSO ₄ (s)	-982.8	-874.5	119.7	
ZnSO ₄ ·7H ₂ O(s)	-3077.8	-2563.1	388.7	