

B. Standard Thermodynamic Quantities for Selected Substances at 25 °C

Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
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Aluminum

Al(s)	0	0	28.32
Al(g)	330.0	289.4	164.6
Al ³⁺ (aq)	−538.4	−483	−325
AlCl ₃ (s)	−704.2	−628.8	109.3
Al ₂ O ₃ (s)	−1675.7	−1582.3	50.9

Barium

Ba(s)	0	0	62.5
Ba(g)	180.0	146.0	170.2
Ba ²⁺ (aq)	−537.6	−560.8	9.6
BaCO ₃ (s)	−1213.0	−1134.4	112.1
BaCl ₂ (s)	−855.0	−806.7	123.7
BaO(s)	−548.0	−520.3	72.1
Ba(OH) ₂ (s)	−944.7		
BaSO ₄ (s)	−1473.2	−1362.2	132.2

Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
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Beryllium

Be(s)	0	0	9.5
BeO(s)	−609.4	−580.1	13.8
Be(OH) ₂ (s)	−902.5	−815.0	45.5

Bismuth

Bi(s)	0	0	56.7
BiCl ₃ (s)	−379.1	−315.0	177.0
Bi ₂ O ₃ (s)	−573.9	−493.7	151.5
Bi ₂ S ₃ (s)	−143.1	−140.6	200.4

Boron

B(s)	0	0	5.9
B(g)	565.0	521.0	153.4
BCl ₃ (g)	−403.8	−388.7	290.1
BF ₃ (g)	−1136.0	−1119.4	254.4

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Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)	Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
B ₂ H ₆ (g)	36.4	87.6	232.1	C ₂ H ₅ OH(<i>l</i>)	−277.6	−174.8	160.7
B ₂ O ₃ (<i>s</i>)	−1273.5	−1194.3	54.0	C ₂ H ₅ OH(g)	−234.8	−167.9	281.6
H ₃ BO ₃ (<i>s</i>)	−1094.3	−968.9	90.0	C ₂ H ₃ Cl			
Bromine				(g, vinyl chloride)	37.2	53.6	264.0
Br(g)	111.9	82.4	175.0	C ₂ H ₄ Cl ₂			
Br ₂ (<i>l</i>)	0	0	152.2	(<i>l</i> , dichloroethane)	−166.8	−79.6	208.5
Br ₂ (<i>g</i>)	30.9	3.1	245.5	C ₂ H ₄ O			
Br [−] (<i>aq</i>)	−121.4	−102.8	80.71	(g, acetaldehyde)	−166.2	−133.0	263.8
HBr(g)	−36.3	−53.4	198.7	C ₂ H ₄ O ₂			
Cadmium				(<i>l</i> , acetic acid)	−484.3	−389.9	159.8
Cd(<i>s</i>)	0	0	51.8	C ₃ H ₈ (g)	−103.85	−23.4	270.3
Cd(g)	111.8	77.3	167.7	C ₃ H ₆ O			
Cd ²⁺ (<i>aq</i>)	−75.9	−77.6	−73.2	(<i>l</i> , acetone)	−248.4	−155.6	199.8
CdCl ₂ (<i>s</i>)	−391.5	−343.9	115.3	C ₃ H ₇ OH			
CdO(<i>s</i>)	−258.4	−228.7	54.8	(<i>l</i> , isopropanol)	−318.1		181.1
CdS(<i>s</i>)	−161.9	−156.5	64.9	C ₄ H ₁₀ (<i>l</i>)	−147.3	−15.0	231.0
CdSO ₄ (<i>s</i>)	−933.3	−822.7	123.0	C ₄ H ₁₀ (<i>g</i>)	−125.7	−15.71	310.0
Calcium				C ₆ H ₆ (<i>l</i>)	49.1	124.5	173.4
Ca(<i>s</i>)	0	0	41.6	C ₆ H ₅ NH ₂			
Ca(g)	177.8	144.0	154.9	(<i>l</i> , aniline)	31.6	149.2	191.9
Ca ²⁺ (<i>aq</i>)	−542.8	−553.6	−53.1	C ₆ H ₅ OH			
CaC ₂ (<i>s</i>)	−59.8	−64.9	70.0	(<i>s</i> , phenol)	−165.1	−50.4	144.0
CaCO ₃ (<i>s</i>)	−1207.6	−1129.1	91.7	C ₆ H ₁₂ O ₆			
CaCl ₂ (<i>s</i>)	−795.4	−748.8	108.4	(<i>s</i> , glucose)	−1273.3	−910.4	212.1
CaF ₂ (<i>s</i>)	−1228.0	−1175.6	68.5	C ₁₀ H ₈			
CaH ₂ (<i>s</i>)	−181.5	−142.5	41.4	(<i>s</i> , naphthalene)	78.5	201.6	167.4
Ca(NO ₃) ₂ (<i>s</i>)	−938.2	−742.8	193.2	C ₁₂ H ₂₂ O ₁₁			
CaO(<i>s</i>)	−634.9	−603.3	38.1	(<i>s</i> , sucrose)	−2226.1	−1544.3	360.24
Ca(OH) ₂ (<i>s</i>)	−985.2	−897.5	83.4	CO(g)	−110.5	−137.2	197.7
CaSO ₄ (<i>s</i>)	−1434.5	−1322.0	106.5	CO ₂ (g)	−393.5	−394.4	213.8
Ca ₃ (PO ₄) ₂ (<i>s</i>)	−4120.8	−3884.7	236.0	CO ₂ (<i>aq</i>)	−413.8	−386.0	117.6
Carbon				CO ₃ ^{2−} (<i>aq</i>)	−677.1	−527.8	−56.9
C(<i>s</i> , graphite)	0	0	5.7	HCO ₃ [−] (<i>aq</i>)	−692.0	−586.8	91.2
C(<i>s</i> , diamond)	1.88	2.9	2.4	H ₂ CO ₃ (<i>aq</i>)	−699.7	−623.2	187.4
C(g)	716.7	671.3	158.1	CN [−] (<i>aq</i>)	151	166	118
CH ₄ (g)	−74.6	−50.5	186.3	HCN(<i>l</i>)	108.9	125.0	112.8
CH ₃ Cl(g)	−81.9	−60.2	234.6	HCN(g)	135.1	124.7	201.8
CH ₂ Cl ₂ (g)	−95.4		270.2	CS ₂ (<i>l</i>)	89.0	64.6	151.3
CH ₂ Cl ₂ (<i>l</i>)	−124.2	−63.2	177.8	CS ₂ (g)	116.7	67.1	237.8
CHCl ₃ (<i>l</i>)	−134.1	−73.7	201.7	COCl ₂ (g)	−219.1	−204.9	283.5
CCl ₄ (g)	−95.7	−62.3	309.7	C ₆₀ (<i>s</i>)	2327.0	2302.0	426.0
CCl ₄ (<i>l</i>)	−128.2	−66.4	216.4	Cesium			
CH ₂ O(g)	−108.6	−102.5	218.8	Cs(<i>s</i>)	0	0	85.2
CH ₂ O ₂				Cs(g)	76.5	49.6	175.6
(<i>l</i> , formic acid)	−425.0	−361.4	129.0	Cs ⁺ (<i>aq</i>)	−258.0	−292.0	132.1
CH ₃ NH ₂				CsBr(<i>s</i>)	−400	−387	117
(g, methylamine)	−22.5	32.7	242.9	CsCl(<i>s</i>)	−438	−414	101.2
CH ₃ OH(<i>l</i>)	−238.6	−166.6	126.8	CsF(<i>s</i>)	−553.5	−525.5	92.8
CH ₃ OH(g)	−201.0	−162.3	239.9	CsI(<i>s</i>)	−342	−337	127
C ₂ H ₂ (g)	227.4	209.9	200.9	Chlorine			
C ₂ H ₄ (g)	52.4	68.4	219.3	Cl(g)	121.3	105.3	165.2
C ₂ H ₆ (g)	−84.68	−32.0	229.2	Cl ₂ (g)	0	0	223.1
				Cl [−] (<i>aq</i>)	−167.1	−131.2	56.6
				HCl(g)	−92.3	−95.3	186.9
				HCl(aq)	−167.2	−131.2	56.5

Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)	Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
ClO ₂ (g)	102.5	120.5	256.8	Fe ²⁺ (aq)	−87.9	−84.94	113.4
Cl ₂ O(g)	80.3	97.9	266.2	Fe ³⁺ (aq)	−47.69	−10.54	293.3
Chromium				FeCO ₃ (s)	−740.6	−666.7	92.9
Cr(s)	0	0	23.8	FeCl ₂ (s)	−341.8	−302.3	118.0
Cr(g)	396.6	351.8	174.5	FeCl ₃ (s)	−399.5	−334.0	142.3
Cr ³⁺ (aq)	−1971			FeO(s)	−272.0	−255.2	60.75
CrO ₄ ^{2−} (aq)	−872.2	−717.1	44	Fe(OH) ₃ (s)	−823.0	−696.5	106.7
Cr ₂ O ₃ (s)	−1139.7	−1058.1	81.2	FeS ₂ (s)	−178.2	−166.9	52.9
Cr ₂ O ₇ ^{2−} (aq)	−1476	−1279	238	Fe ₂ O ₃ (s)	−824.2	−742.2	87.4
Cobalt				Fe ₃ O ₄ (s)	−1118.4	−1015.4	146.4
Co(s)	0	0	30.0	Lead			
Co(g)	424.7	380.3	179.5	Pb(s)	0	0	64.8
CoO(s)	−237.9	−214.2	53.0	Pb(g)	195.2	162.2	175.4
Co(OH) ₂ (s)	−539.7	−454.3	79.0	Pb ²⁺ (aq)	0.92	−24.4	18.5
Copper				PbBr ₂ (s)	−278.7	−261.9	161.5
Cu(s)	0	0	33.2	PbCO ₃ (s)	−699.1	−625.5	131.0
Cu(g)	337.4	297.7	166.4	PbCl ₂ (s)	−359.4	−314.1	136.0
Cu ⁺ (aq)	51.9	50.2	−26	PbI ₂ (s)	−175.5	−173.6	174.9
Cu ²⁺ (aq)	64.9	65.5	−98	Pb(NO ₃) ₂ (s)	−451.9		
CuCl(s)	−137.2	−119.9	86.2	PbO(s)	−217.3	−187.9	68.7
CuCl ₂ (s)	−220.1	−175.7	108.1	PbO ₂ (s)	−277.4	−217.3	68.6
CuO(s)	−157.3	−129.7	42.6	PbS(s)	−100.4	−98.7	91.2
CuS(s)	−53.1	−53.6	66.5	PbSO ₄ (s)	−920.0	−813.0	148.5
CuSO ₄ (s)	−771.4	−662.2	109.2	Lithium			
Cu ₂ O(s)	−168.6	−146.0	93.1	Li(s)	0	0	29.1
Cu ₂ S(s)	−79.5	−86.2	120.9	Li(g)	159.3	126.6	138.8
Fluorine				Li ⁺ (aq)	−278.47	−293.3	12.24
F(g)	79.38	62.3	158.75	LiBr(s)	−351.2	−342.0	74.3
F ₂ (g)	0	0	202.79	LiCl(s)	−408.6	−384.4	59.3
F [−] (aq)	−335.35	−278.8	−13.8	LiF(s)	−616.0	−587.7	35.7
HF(g)	−273.3	−275.4	173.8	LiI(s)	−270.4	−270.3	86.8
Gold				LiNO ₃ (s)	−483.1	−381.1	90.0
Au(s)	0	0	47.4	LiOH(s)	−487.5	−441.5	42.8
Au(g)	366.1	326.3	180.5	Li ₂ O(s)	−597.9	−561.2	37.6
Helium				Magnesium			
He(g)	0	0	126.2	Mg(s)	0	0	32.7
Hydrogen				Mg(g)	147.1	112.5	148.6
H(g)	218.0	203.3	114.7	Mg ²⁺ (aq)	−467.0	−455.4	−137
H ⁺ (aq)	0	0	0	MgCl ₂ (s)	−641.3	−591.8	89.6
H ⁺ (g)	1536.3	1517.1	108.9	MgCO ₃ (s)	−1095.8	−1012.1	65.7
H ₂ (g)	0	0	130.7	MgF ₂ (s)	−1124.2	−1071.1	57.2
Iodine				MgO(s)	−601.6	−569.3	27.0
I(g)	106.76	70.2	180.79	Mg(OH) ₂ (s)	−924.5	−833.5	63.2
I ₂ (s)	0	0	116.14	MgSO ₄ (s)	−1284.9	−1170.6	91.6
I ₂ (g)	62.42	19.3	260.69	Mg ₃ N ₂ (s)	−461	−401	88
I [−] (aq)	−56.78	−51.57	106.45	Manganese			
HI(g)	26.5	1.7	206.6	Mn(s)	0	0	32.0
Iron				Mn(g)	280.7	238.5	173.7
Fe(s)	0	0	27.3	Mn ²⁺ (aq)	−219.4	−225.6	−78.8
Fe(g)	416.3	370.7	180.5	MnO(s)	−385.2	−362.9	59.7

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Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)	Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
MnO ₂ (s)	−520.0	−465.1	53.1	H ₂ O(l)	−285.8	−237.1	70.0
MnO ₄ [−] (aq)	−529.9	−436.2	190.6	H ₂ O(g)	−241.8	−228.6	188.8
Mercury				H ₂ O ₂ (l)	−187.8	−120.4	109.6
Hg(l)	0	0	75.9	H ₂ O ₂ (g)	−136.3	−105.6	232.7
Hg(g)	61.4	31.8	175.0	Phosphorus			
Hg ²⁺ (aq)	170.21	164.4	−36.19	P(s, white)	0	0	41.1
Hg ₂ ²⁺ (aq)	166.87	153.5	65.74	P(s, red)	−17.6	−12.1	22.8
HgCl ₂ (s)	−224.3	−178.6	146.0	P(g)	316.5	280.1	163.2
HgO(s)	−90.8	−58.5	70.3	P ₂ (g)	144.0	103.5	218.1
HgS(s)	−58.2	−50.6	82.4	P ₄ (g)	58.9	24.4	280.0
Hg ₂ Cl ₂ (s)	−265.4	−210.7	191.6	PCl ₃ (l)	−319.7	−272.3	217.1
Nickel				PCl ₃ (g)	−287.0	−267.8	311.8
Ni(s)	0	0	29.9	PCl ₅ (s)	−443.5		
Ni(g)	429.7	384.5	182.2	PCl ₅ (g)	−374.9	−305.0	364.6
NiCl ₂ (s)	−305.3	−259.0	97.7	PF ₅ (g)	−1594.4	−1520.7	300.8
NiO(s)	−239.7	−211.7	37.99	PH ₃ (g)	5.4	13.5	210.2
NiS(s)	−82.0	−79.5	53.0	POCl ₃ (l)	−597.1	−520.8	222.5
Nitrogen				POCl ₃ (g)	−558.5	−512.9	325.5
N(g)	472.7	455.5	153.3	PO ₄ ^{3−} (aq)	−1277.4	−1018.7	−220.5
N ₂ (g)	0	0	191.6	HPO ₄ ^{2−} (aq)	−1292.1	−1089.2	−33.5
NF ₃ (g)	−132.1	−90.6	260.8	H ₂ PO ₄ [−] (aq)	−1296.3	−1130.2	90.4
NH ₃ (g)	−45.9	−16.4	192.8	H ₃ PO ₄ (s)	−1284.4	−1124.3	110.5
NH ₃ (aq)	−80.29	−26.50	111.3	H ₃ PO ₄ (aq)	−1288.3	−1142.6	158.2
NH ₄ ⁺ (aq)	−133.26	−79.31	111.17	P ₄ O ₆ (s)	−1640.1		
NH ₄ Br(s)	−270.8	−175.2	113.0	P ₄ O ₁₀ (s)	−2984	−2698	228.9
NH ₄ Cl(s)	−314.4	−202.9	94.6	Platinum			
NH ₄ CN(s)	0.4			Pt(s)	0	0	41.6
NH ₄ F(s)	−464.0	−348.7	72.0	Pt(g)	565.3	520.5	192.4
NH ₄ HCO ₃ (s)	−849.4	−665.9	120.9	Potassium			
NH ₄ I(s)	−201.4	−112.5	117.0	K(s)	0	0	64.7
NH ₄ NO ₃ (s)	−365.6	−183.9	151.1	K(g)	89.0	60.5	160.3
NH ₄ NO ₃ (aq)	−339.9	−190.6	259.8	K ⁺ (aq)	−252.14	−283.3	101.2
HNO ₃ (g)	−133.9	−73.5	266.9	KBr(s)	−393.8	−380.7	95.9
HNO ₃ (aq)	−207	−110.9	146	KCN(s)	−113.0	−101.9	128.5
NO(g)	91.3	87.6	210.8	KCl(s)	−436.5	−408.5	82.6
NO ₂ (g)	33.2	51.3	240.1	KClO ₃ (s)	−397.7	−296.3	143.1
NO ₃ [−] (aq)	−206.85	−110.2	146.70	KClO ₄ (s)	−432.8	−303.1	151.0
NOBr(g)	82.2	82.4	273.7	KF(s)	−567.3	−537.8	66.6
NOCl(g)	51.7	66.1	261.7	KI(s)	−327.9	−324.9	106.3
N ₂ H ₄ (l)	50.6	149.3	121.2	KNO ₃ (s)	−494.6	−394.9	133.1
N ₂ H ₄ (g)	95.4	159.4	238.5	KOH(s)	−424.6	−379.4	81.2
N ₂ O(g)	81.6	103.7	220.0	KOH(aq)	−482.4	−440.5	91.6
N ₂ O ₄ (l)	−19.5	97.5	209.2	KO ₂ (s)	−284.9	−239.4	116.7
N ₂ O ₄ (g)	11.1	99.8	304.4	K ₂ CO ₃ (s)	−1151.0	−1063.5	155.5
N ₂ O ₅ (s)	−43.1	113.9	178.2	K ₂ O(s)	−361.5	−322.1	94.14
N ₂ O ₅ (g)	13.3	117.1	355.7	K ₂ O ₂ (s)	−494.1	−425.1	102.1
Oxygen				K ₂ SO ₄ (s)	−1437.8	−1321.4	175.6
O(g)	249.2	231.7	161.1	Rubidium			
O ₂ (g)	0	0	205.2	Rb(s)	0	0	76.8
O ₃ (g)	142.7	163.2	238.9	Rb(g)	80.9	53.1	170.1
OH [−] (aq)	−230.02	−157.3	−10.90	Rb ⁺ (aq)	−251.12	−283.1	121.75

Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)	Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
RbBr(s)	−394.6	−381.8	110.0	Na ₂ O(s)	−414.2	−375.5	75.1
RbCl(s)	−435.4	−407.8	95.9	Na ₂ O ₂ (s)	−510.9	−447.7	95.0
RbClO ₃ (s)	−392.4	−292.0	152	Na ₂ SO ₄ (s)	−1387.1	−1270.2	149.6
RbF(s)	−557.7			Na ₃ PO ₄ (s)	−1917	−1789	173.8
RbI(s)	−333.8	−328.9	118.4	Strontium			
Scandium				Sr(s)	0	0	55.0
Sc(s)	0	0	34.6	Sr(g)	164.4	130.9	164.6
Sc(g)	377.8	336.0	174.8	Sr ²⁺ (aq)	−545.51	−557.3	−39
Selenium				SrCl ₂ (s)	−828.9	−781.1	114.9
Se(s, gray)	0	0	42.4	SrCO ₃ (s)	−1220.1	−1140.1	97.1
Se(g)	227.1	187.0	176.7	SrO(s)	−592.0	−561.9	54.4
H ₂ Se(g)	29.7	15.9	219.0	SrSO ₄ (s)	−1453.1	−1340.9	117.0
Silicon				Sulfur			
Si(s)	0	0	18.8	S(s, rhombic)	0	0	32.1
Si(g)	450.0	405.5	168.0	S(s, monoclinic)	0.3	0.096	32.6
SiCl ₄ (l)	−687.0	−619.8	239.7	S(g)	277.2	236.7	167.8
SiF ₄ (g)	−1615.0	−1572.8	282.8	S ₂ (g)	128.6	79.7	228.2
SiH ₄ (g)	34.3	56.9	204.6	S ₈ (g)	102.3	49.7	430.9
SiO ₂ (s, quartz)	−910.7	−856.3	41.5	S ^{2−} (aq)	41.8	83.7	22
Si ₂ H ₆ (g)	80.3	127.3	272.7	SF ₆ (g)	−1220.5	−1116.5	291.5
Silver				HS [−] (aq)	−17.7	12.4	62.0
Ag(s)	0	0	42.6	H ₂ S(g)	−20.6	−33.4	205.8
Ag(g)	284.9	246.0	173.0	H ₂ S(aq)	−39.4	−27.7	122
Ag ⁺ (aq)	105.79	77.11	73.45	SOCl ₂ (l)	−245.6		
AgBr(s)	−100.4	−96.9	107.1	SO ₂ (g)	−296.8	−300.1	248.2
AgCl(s)	−127.0	−109.8	96.3	SO ₃ (g)	−395.7	−371.1	256.8
AgF(s)	−204.6	−185	84	SO ₄ ^{2−} (aq)	−909.3	−744.6	18.5
AgI(s)	−61.8	−66.2	115.5	HSO ₄ [−] (aq)	−886.5	−754.4	129.5
AgNO ₃ (s)	−124.4	−33.4	140.9	H ₂ SO ₄ (l)	−814.0	−690.0	156.9
Ag ₂ O(s)	−31.1	−11.2	121.3	H ₂ SO ₄ (aq)	−909.3	−744.6	18.5
Ag ₂ S(s)	−32.6	−40.7	144.0	S ₂ O ₃ ^{2−} (aq)	−648.5	−522.5	67
Ag ₂ SO ₄ (s)	−715.9	−618.4	200.4	Tin			
Sodium				Sn(s, white)	0	0	51.2
Na(s)	0	0	51.3	Sn(s, gray)	−2.1	0.1	44.1
Na(g)	107.5	77.0	153.7	Sn(g)	301.2	266.2	168.5
Na ⁺ (aq)	−240.34	−261.9	58.45	SnCl ₄ (l)	−511.3	−440.1	258.6
NaBr(s)	−361.1	−349.0	86.8	SnCl ₄ (g)	−471.5	−432.2	365.8
NaCl(s)	−411.2	−384.1	72.1	SnO(s)	−280.7	−251.9	57.2
NaCl(aq)	−407.2	−393.1	115.5	SnO ₂ (s)	−577.6	−515.8	49.0
NaClO ₃ (s)	−365.8	−262.3	123.4	Titanium			
NaF(s)	−576.6	−546.3	51.1	Ti(s)	0	0	30.7
NaHCO ₃ (s)	−950.8	−851.0	101.7	Ti(g)	473.0	428.4	180.3
NaHSO ₄ (s)	−1125.5	−992.8	113.0	TiCl ₄ (l)	−804.2	−737.2	252.3
NaI(s)	−287.8	−286.1	98.5	TiCl ₄ (g)	−763.2	−726.3	353.2
NaNO ₃ (s)	−467.9	−367.0	116.5	TiO ₂ (s)	−944.0	−888.8	50.6
NaNO ₃ (aq)	−447.5	−373.2	205.4	Tungsten			
NaOH(s)	−425.8	−379.7	64.4	W(s)	0	0	32.6
NaOH(aq)	−470.1	−419.2	48.2	W(g)	849.4	807.1	174.0
NaO ₂ (s)	−260.2	−218.4	115.9	WO ₃ (s)	−842.9	−764.0	75.9
Na ₂ CO ₃ (s)	−1130.7	−1044.4	135.0				

(continued on the next page)

Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
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Uranium

U(<i>s</i>)	0	0	50.2
U(<i>g</i>)	533.0	488.4	199.8
UF ₆ (<i>s</i>)	−2197.0	−2068.5	227.6
UF ₆ (<i>g</i>)	−2147.4	−2063.7	377.9
UO ₂ (<i>s</i>)	−1085.0	−1031.8	77.0

Vanadium

V(<i>s</i>)	0	0	28.9
V(<i>g</i>)	514.2	754.4	182.3

Substance	ΔH_f° (kJ/mol)	ΔG_f° (kJ/mol)	S° (J/mol · K)
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Zinc

Zn(<i>s</i>)	0	0	41.6
Zn(<i>g</i>)	130.4	94.8	161.0
Zn ²⁺ (<i>aq</i>)	−153.39	−147.1	−109.8
ZnCl ₂ (<i>s</i>)	−415.1	−369.4	111.5
ZnO(<i>s</i>)	−350.5	−320.5	43.7
ZnS			
(<i>s</i> , zinc blende)	−206.0	−201.3	57.7
ZnSO ₄ (<i>s</i>)	−982.8	−871.5	110.5