

Substance Std Heat of Formation (kJ/mol)

Ag(g)	284.9
Ag(s)	0
Ag ⁺ (aq)	105.8
Ag ₂ CO ₃ (s)	-505.8
Ag ₂ O(s)	-31.1
Ag ₂ S(s)	-32.6
AgBr(s)	-100.4
AgCl(s)	-127
AgCN(s)	146
AgF(s)	-204.6
AgI(s)	-61.8
AgNO ₃ (s)	-124.4
Al(g)	330
Al(OH) ₃ (s)	-1277
Al(OH) ₄ ⁻ (aq)	-1490
Al(s)	0
Al ₂ O ₃ (s)	-1675.7
AlBr ₃ (s)	-527.2
AlCl ₃ (s)	-704.5
AlF ₃ (s)	-1510.4
AlI ₃ (s)	-302.9
AlPO ₄ (s)	-1733.8
Ar(g)	0
B(g)	565
B(s)	0
B ₂ S ₃ (s)	-240.6
Ba(g)	180
Ba(s)	0
BaBr ₂ (s)	-757.3
BaCl ₂ (s)	-855
BaCO ₃ (s)	-1213
BaF ₂ (s)	-1207.1
BaH ₂ (s)	-177
BaI ₂ (s)	-602.1
BaO(s)	-548
BaSO ₄ (s)	-1473.2
Be(g)	324
Be(OH) ₂ (s)	-902.5
Be(s)	0
BeBr ₂ (s)	-353.5
BeCl ₂ (s)	-490.4
BeF ₂ (s)	-1026.8
BeI ₂ (s)	-192.5
BeO(s)	-609.4
BeSO ₄ (s)	-1205.2
BH(g)	442.7

BH ₃ (g)	89.2
Bi(g)	207.1
Bi(s)	0
Bi ₂ O ₃ (s)	-573.9
BiCl ₃ (s)	-379.1
Br ⁻ (aq)	-121.4
Br(g)	111.9
Br ₂ (g)	30.9
Br ₂ (l)	0
BrCl(g)	14.6
BrF(g)	-93.8
BrF ₃ (g)	-1136
C(g)	716.7
C(s, diamond)	1.9
C(s, graphite)	0
Ca(g)	177.8
Ca(OH) ₂ (s)	-985.2
Ca(s)	0
CaCl ₂ (s)	-795.4
CaCN(s)	-184.5
CaCO ₃ (s, aragonite)	-1207.8
CaCO ₃ (s, calcite)	-1207.6
CaF ₂ (s)	-1228
CaH ₂ (s)	-181.5
CaI ₂ (s)	-533.5
CaO(s)	-634.9
CaSO ₄ (s)	-1434.5
CBr ₄ (g)	83.9
CBr ₄ (s)	29.4
CCl ₂ F ₂ (g)	-477.4
CCl ₂ O(g)	-219.1
CCl ₄ (g)	-95.7
CCl ₄ (l)	-128.2
Cd(g)	111.8
Cd(s)	0
CdBr ₂ (s)	-316.2
CdCl ₂ (s)	-391.5
CdCO ₃ (s)	-750.6
CdF ₂ (s)	-700.4
CdS(s)	-161.9
CdSO ₄ (s)	-933.3
CF ₄ (g)	-933.6
Cl ⁻ (aq)	-167.1
Cl(g)	121.3
Cl ₂ (g)	0
Cl ₂ O(g)	80.3
ClF(g)	-50.3

ClF3(g)	-163.2
ClO2(g)	89.1
CO(g)	-110.5
Co(g)	424.7
Co(s)	0
CO2(g)	-393.5
CoCl2(s)	-312.5
Cr(g)	396.6
Cr(s)	0
Cr2O3(s)	-1139.7
CrCl2(s)	-395.4
CrCl3(s)	-556.5
CrO2(g)	-598
CrO3(g)	-292.9
Cs(g)	76.5
Cs(s)	0
CS2(g)	116.7
CS2(l)	89
CsCl(s)	-443
Cu(g)	337.4
Cu(s)	0
Cu2O(s)	-168.6
Cu2S(s)	-79.5
CuBr(s)	-104.6
CuBr2(s)	-141.8
CuCl(s)	-137.2
CuCl2(s)	-220.1
CuCN(s)	96.2
CuO(s)	-157.3
CuS(s)	-53.1
CuSO4(s)	-771.4
F-(aq)	-335.4
F(g)	79.4
F2(g)	0
F2O(g)	24.5
FB(g)	-122.2
Fe(g)	416.3
Fe(s)	0
Fe2+(aq)	-89.1
Fe2O3(s)	-824.2
Fe3+(aq)	-48.5
Fe3C(s)	25.1
Fe3O4(s)	-1118.4
FeBr2(s)	-249.8
FeBr3(s)	-268.2
FeCl2(s)	-341.8
FeCl3(s)	-399.5

FeCO ₃ (s)	-740.6
FeO(s)	-272
FeS ₂ (s)	-178.2
FO(g)	109
H(g)	218
H ⁺ (aq)	0
H ₂ (g)	0
H ₂ O(g)	-241.8
H ₂ O(l)	-285.8
H ₂ O ₂ (g)	-136.3
H ₂ O ₂ (l)	-187.8
H ₂ S(g)	-20.6
H ₂ Se(g)	29.7
H ₂ SO ₄ (aq)	-909.3
H ₂ SO ₄ (l)	-814
H ₃ PO ₄ (l)	-1271.7
H ₃ PO ₄ (s)	-1284.4
HBr(aq)	-121.6
HBr(g)	-36.3
HCl(aq)	-167.2
HCl(g)	-92.3
HCN(g)	135.1
HCN(l)	108.9
He(g)	0
HF(aq)	-332.6
HF(g)	-273.3
Hg(g)	61.4
Hg(l)	0
Hg ₂ (g)	108.8
Hg ₂ Br ₂ (s)	-206.9
Hg ₂ Cl ₂ (s)	-265.4
Hg ₂ I ₂ (s)	-121.3
Hg ₂ SO ₄ (s)	-743.1
HgBr ₂ (s)	-170.7
HgCl ₂ (s)	-224.3
HgI ₂ (s)	-105.4
HgO(s)	-90.8
HgS(s, red)	-58.2
HgSO ₄ (s)	-707.5
HI(aq)	-55.2
HI(g)	26.5
HIO ₃ (s)	-230.1
HNO ₂ (g)	-79.5
HNO ₃ (aq)	-207.4
HNO ₃ (g)	-133.9
HNO ₃ (l)	-174.1
I ⁻ (aq)	-56.8

I(g)	106.8
I ₂ (g)	62.4
I ₂ (s)	0
IBr(g)	40.8
ICl(g)	17.8
IF(g)	-95.7
K(g)	89
K(s)	0
K ₂ CO ₃ (s)	-1151
K ₂ O(s)	-361.5
K ₂ O ₂ (s)	-494.1
K ₂ SO ₄ (s)	-1437.8
KBr(s)	-393.8
KCl(s)	-436.5
KClO ₃ (s)	-397.7
KF(s)	-567.3
KI(s)	-327.9
KMnO ₄ (s)	-837.2
KNO ₂ (s)	-369.8
KNO ₃ (s)	-494.6
Kr(g)	0
KSCN(s)	-200.2
Li(g)	159.3
Li(s)	0
Li ⁺ (aq)	-278.5
Li ₂ O(s)	-597.9
LiBr(s)	-351.2
LiCl(s)	-408.6
LiF(s)	-616
LiI(s)	-270.4
LiNO ₃ (s)	-483.1
LiOH(s)	-487.5
Mg(g)	147.1
Mg(OH) ₂ (s)	-924.5
Mg(s)	0
MgBr ₂ (s)	-524.3
MgCl ₂ (s)	-641.3
MgF ₂ (s)	-1124.2
MgO(s)	-601.6
MgS(s)	-346
MgSO ₄ (s)	-1284.9
Mn(g)	280.7
Mn(s)	0
MnBr ₂ (s)	-384.9
MnCl ₂ (s)	-481.3
MnO(s)	-385.2
MnO ₂ (s)	-520

MnO ₄ ⁻ (aq)	-541.4
Mo(g)	658.1
Mo(s)	0
MoO ₂ (s)	-588.9
MoO ₃ (s)	-745.1
MoS ₂ (s)	-235.1
MoS ₃ (s)	-364
N(g)	472.7
N ₂ (g)	0
N ₂ H ₄ (g)	95.4
N ₂ H ₄ (l)	50.6
N ₂ O(g)	81.6
N ₂ O ₄ (g)	11.1
N ₂ O ₄ (l)	-19.5
Na(g)	107.5
Na(s)	0
Na ⁺ (aq)	-240.2
Na ₂ CO ₃ (s)	-1130.7
Na ₂ O(s)	-414.2
Na ₂ O ₂ (s)	-510.9
Na ₂ SO ₄ (s)	-1387.1
NaBr(aq)	-361.7
NaBr(g)	-143.1
NaBr(s)	-361.1
NaCl(aq)	-407.3
NaCl(s)	-411.2
NaCN(s)	-87.5
NaF(aq)	-572.8
NaF(s)	-576.6
NaH(s)	-56.3
NaN ₃ (s)	21.7
NaNO ₃ (aq)	-447.5
NaNO ₃ (s)	-467.9
NaO ₂ (s)	-260.2
NaOH(s)	-425.8
Ne(g)	0
NF ₃ (g)	-132.1
NH ₃ (g)	-45.9
NH ₄ ⁺ (aq)	-133.3
NH ₄ Cl(s)	-314.4
NH ₄ NO ₃ (s)	-365.6
NH ₄ OH(l)	-361.2
(NH ₄) ₂ SO ₄	-1180.9
Ni(g)	429.7
Ni(OH) ₂ (s)	-529.7
Ni(s)	0
Ni ₂ O ₃ (s)	-489.5

NiBr ₂ (s)	-212.1
NiCl ₂ (s)	-305.3
NiF ₂ (s)	-651.4
NO(g)	91.3
NO ₂ (g)	33.2
O(g)	249.2
O ₂ (g)	0
O ₃ (g)	142.7
OH-(aq)	-230
Os(g)	791
Os(s)	0
OsO ₄ (g)	-337.2
OsO ₄ (s)	-394.1
P(g, white)	316.5
P(s, black)	-39.3
P(s, red)	-17.6
P(s, white)	0
P ₂ (g)	144
P ₄ (g)	58.9
Pb(g)	195.2
Pb(NO ₃) ₂ (s)	-416.3
Pb(NO ₃) ₂ (l)	-451.9
Pb(s)	0
PbCl ₂ (s)	-359.4
PbCO ₃ (s)	-699.1
PbO(s, red)	-219
PbO(s, yellow)	-217.3
PbO ₂ (s)	-277.4
PbS(s)	-100.4
PbSO ₄ (s)	-920
PCl ₃ (g)	-287
PCl ₃ (l)	-319.7
PCl ₅ (g)	-374.9
PH ₃ (g)	5.4
POCl ₃ (g)	-558.5
POCl ₃ (l)	-597.1
Rb(g)	80.9
Rb(s)	0
RbCl(s)	-435.4
S(g, rhombic)	277.2
S(s, rhombic)	0
Se(g, gray)	227.1
Se(s, gray)	0
Si(g)	450
Si(s)	0
SiC(s, cubic)	-65.3
SiC(s, hexagonal)	-62.8

SiCl ₄ (g)	-657
SiCl ₄ (l)	-687
SiH ₄ (g)	34.3
Sn(g, white)	301
Sn(s, gray)	-2.1
Sn(s, white)	0
SnCl ₄ (g)	-471.5
SnCl ₄ (l)	-511.3
SnO ₂ (s)	-557.6
SO ₂ (g)	-296.8
SO ₃ (g)	-395.7
SO ₄ ²⁻ (aq)	-909.3
SOCl ₂ (g)	-212.5
Ti(g)	473
Ti(s)	0
TiCl ₂ (s)	-513.8
TiCl ₃ (s)	-720.9
TiCl ₄ (g)	-763
TiCl ₄ (l)	-804.2
TiO ₂ (s)	-944
U(g)	533
U(s)	0
UF ₄ (g)	-1598.7
UF ₄ (s)	-1914.2
UF ₆ (g)	-2147.4
UF ₆ (s)	-2197
UO ₂ (g)	-465.7
UO ₂ (s)	-1085
V(g)	514.2
V(s)	0
V ₂ O ₅ (s)	-1550.6
VCl ₃ (s)	-580.7
VCl ₄ (g)	-525.5
VCl ₄ (l)	-569.4
Xe(g)	0
Zn(g)	130.4
Zn(NO ₃) ₂ (s)	-483.7
Zn(s)	0
ZnBr ₂ (s)	-328.7
ZnCl ₂ (s)	-415.1
ZnF ₂ (s)	-764.4
ZnI ₂ (s)	-208
ZnS(s, spha)	-206
ZnSO ₄ (s)	-982.8
Zr(g)	608.8
Zr(s)	0
ZrCl ₂ (s)	-502

ZrCl4(s) -980.5