

CHEMISTRY 6-12 REFERENCE SHEET

Molal Freezing-Point and Boiling-Point Constants

Solvent	Normal f.p. (°C)	Molal f.p. Constant, K _f (°C/molal)	Normal b.p. (°C)	Molal b.p. Constant, K _b (°C/molal)
acetic acid	16.1	3.90	118.5	3.07
acetone	-94.8	--	56.00	1.71
aniline	-6.1	5.87	184.4	3.22
benzene	5.48	5.12	80.15	2.53
carbon disulfide	-111.5	3.80	46.3	2.34
carbon tetrachloride	-22.96	--	76.50	5.03
ethanol	-114.5	--	78.26	1.22
ether	-116.3	1.79	34.42	2.02
naphthalene	80.2	6.9	218.0	5.65
phenol	40.9	7.27	181.8	3.56
water	0.00	1.86	100.0	0.51

Heats of Formation (kJ/mol) at 25°C and 1 atm

AgBr _(s)	-99.5	C ₂ H _{2(g)}	+226.7	H ₂ O _(l)	-285.8	NH ₄ Cl _(s)	-315.4
AgCl _(s)	-127.0	C ₂ H _{4(g)}	+52.3	H ₂ O _{2(l)}	-187.6	NH ₄ NO _{3(s)}	-365.1
AgI _(s)	-62.4	C ₂ H _{6(g)}	-84.7	H ₂ S _(g)	-20.1	NO _(g)	+90.4
Ag ₂ O _(s)	-30.6	C ₃ H _{8(g)}	-103.8	H ₂ SO _{4(l)}	-811.3	NO _{2(g)}	+33.9
Ag ₂ S _(s)	-31.8	n-C ₄ H _{10(g)}	-124.7	HgO _(s)	-90.7	NiO _(s)	-244.3
Al ₂ O _{3(s)}	-1669.8	n-C ₅ H _{12(l)}	-173.1	HgS _(s)	-58.2	PbBr _{2(s)}	-277.0
BaCl _{2(s)}	-860.1	C ₂ H ₅ OH _(l)	-277.6	KBr _(s)	-392.2	PbCl _{2(s)}	-359.2
BaCO _{3(s)}	-1218.8	CoO _(s)	-239.3	KCl _(s)	-435.9	PbO _(s)	-217.9
BaO _(s)	-558.1	Cr ₂ O _{3(s)}	-1128.4	KClO _{3(s)}	-391.4	PbO _{2(s)}	-276.6
BaSO _{4(s)}	-1465.2	CuO _(s)	-155.2	KF _(s)	-562.6	Pb ₃ O _{4(s)}	-734.7
CaCl _{2(s)}	-795.0	Cu ₂ O _(s)	-166.7	MgCl _{2(s)}	-641.8	PbCl _{3(g)}	-306.4
CaCO _{3(s)}	-1207.0	CuS _(s)	-48.5	MgCO _{3(s)}	-1113.0	PbCl _{5(g)}	-398.9
CaO _(s)	-635.5	CuSO _{4(s)}	-769.9	MgO _(s)	-601.8	SiO _{2(s)}	-859.4
Ca(OH) _{2(s)}	-986.6	Fe ₂ O _{3(s)}	-822.2	Mg(OH) _{2(s)}	-924.7	SnCl _{2(s)}	-349.8
CaSO _{4(s)}	-1432.7	Fe ₃ O _{4(s)}	-1120.9	MgSO _{4(s)}	-1278.2	SnCl _{4(l)}	-545.2
CCl _{4(l)}	-139.5	HBr _(g)	-36.2	MnO _(s)	-384.9	SnO _(s)	-286.2
CH _{4(g)}	-74.8	HCl _(g)	-92.3	MnO _{2(s)}	-519.7	SnO _{2(s)}	-580.7
CHCl _{3(l)}	-131.8	HF _(g)	-268.6	NaCl _(s)	-411.0	SO _{2(g)}	-296.1
CH ₃ OH _(l)	-238.6	HI _(g)	+25.9	NaF _(s)	-569.0	SO _{3(g)}	-395.2
CO _(g)	-110.5	HNO _{3(l)}	-173.2	NaOH _(s)	-426.7	ZnO _(s)	-348.0
CO _{2(g)}	-393.5	H ₂ O _(g)	-241.8	NH _{3(g)}	-46.2	ZnS _(s)	-202.9

Vapor Pressure (mmHg) of Water at Various Temperatures (°C)

Temp	Pressure	Temp	Pressure	Temp	Pressure	Temp	Pressure
0	4.6	18	15.5	28	28.3	70	233.7
5	6.5	19	16.5	29	30.0	75	289.1
10	9.2	20	17.5	30	31.8	80	355.1
11	9.8	21	18.7	35	42.2	85	433.6
12	10.5	22	19.8	40	55.3	90	525.8
13	11.2	23	21.1	45	71.9	95	633.9
14	12.0	24	22.4	50	92.5	100	760.0
15	12.8	25	23.8	55	118.0	105	906.
16	13.6	26	25.2	60	149.4		
17	14.5	27	26.7	65	187.5		

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Standard Reduction Potentials in Aqueous Solutions	Standard Potential, E°(V)
$F_{2(g)} + 2 e^- \rightleftharpoons 2 F^-_{(aq)}$	2.87
$S_2O_8^{2-}_{(aq)} + 2 e^- \rightleftharpoons 2 SO_4^{2-}_{(aq)}$	2.01
$H_2O_{2(aq)} + 2 H^+_{(aq)} + 2 e^- \rightleftharpoons 2 H_2O_{(l)}$	1.78
$MnO_4^-_{(aq)} + 8 H^+_{(aq)} + 5 e^- \rightleftharpoons Mn^{2+}_{(aq)} + 4 H_2O_{(l)}$	1.49
$Cl_{2(g)} + 2 e^- \rightleftharpoons 2 Cl^-_{(aq)}$	1.36
$Cr_2O_7^{2-}_{(aq)} + 14 H^+_{(aq)} + 6 e^- \rightleftharpoons 2 Cr^{3+}_{(aq)} + 7 H_2O_{(l)}$	1.33
$O_{2(g)} + 4 H^+_{(aq)} + 4 e^- \rightleftharpoons 2 H_2O_{(l)}$	1.23
$Br_{2(l)} + 2 e^- \rightleftharpoons 2 Br^-_{(aq)}$	1.09
$NO_3^-_{(aq)} + 4 H^+_{(aq)} + 3 e^- \rightleftharpoons NO_{(g)} + 2 H_2O_{(l)}$	0.96
$2 Hg^{2+}_{(aq)} + 2 e^- \rightleftharpoons Hg_2^{2+}_{(aq)}$	0.90
$ClO^-_{(aq)} + H_2O_{(l)} + 2 e^- \rightleftharpoons Cl^-_{(aq)} + 2 OH^-_{(aq)}$	0.81
$Hg^{2+}_{(aq)} + 2 e^- \rightleftharpoons Hg_{(l)}$	0.85
$Ag^+_{(aq)} + e^- \rightleftharpoons Ag_{(s)}$	0.80
$Hg_2^{2+}_{(aq)} + 2 e^- \rightleftharpoons 2 Hg_{(l)}$	0.80
$Fe^{3+}_{(aq)} + e^- \rightleftharpoons Fe^{2+}_{(aq)}$	0.77
$O_{2(g)} + 2 H^+_{(aq)} + 2 e^- \rightleftharpoons H_2O_{2(aq)}$	0.70
$I_{2(s)} + 2 e^- \rightleftharpoons 2 I^-_{(aq)}$	0.54
$Cu^+_{(aq)} + e^- \rightleftharpoons Cu_{(s)}$	0.52
$IO^-_{(aq)} + H_2O_{(l)} + 2 e^- \rightleftharpoons I^-_{(aq)} + 2 OH^-_{(aq)}$	0.49
$Cu^{2+}_{(aq)} + 2 e^- \rightleftharpoons Cu_{(s)}$	0.34
$Cu^{2+}_{(aq)} + e^- \rightleftharpoons Cu^+_{(aq)}$	0.15
$Sn^{4+}_{(aq)} + 2 e^- \rightleftharpoons Sn^{2+}_{(aq)}$	0.15
$2 H^+_{(aq)} + 2 e^- \rightleftharpoons H_{2(g)}$	0.00
$Fe^{3+}_{(aq)} + 3 e^- \rightleftharpoons Fe_{(s)}$	-0.04
$Pb^{2+}_{(aq)} + 2 e^- \rightleftharpoons Pb_{(s)}$	-0.13
$Sn^{2+}_{(aq)} + 2 e^- \rightleftharpoons Sn_{(s)}$	-0.14
$Ni^{2+}_{(aq)} + 2 e^- \rightleftharpoons Ni_{(s)}$	-0.26
$PbSO_{4(s)} + 2 e^- \rightleftharpoons Pb_{(s)} + SO_4^{2-}_{(aq)}$	-0.36
$Cd^{2+}_{(aq)} + 2 e^- \rightleftharpoons Cd_{(s)}$	-0.40
$Fe^{2+}_{(aq)} + 2 e^- \rightleftharpoons Fe_{(s)}$	-0.45
$Cr^{3+}_{(aq)} + 3 e^- \rightleftharpoons Cr_{(s)}$	-0.74
$Zn^{2+}_{(aq)} + 2 e^- \rightleftharpoons Zn_{(s)}$	-0.76
$2 H_2O_{(l)} + 2 e^- \rightleftharpoons H_{2(g)} + 2 OH^-_{(aq)}$	-0.83
$Mn^{2+}_{(aq)} + 2 e^- \rightleftharpoons Mn_{(s)}$	-1.19
$Al^{3+}_{(aq)} + 3 e^- \rightleftharpoons Al_{(s)}$	-1.66
$Mg^{2+}_{(aq)} + 2 e^- \rightleftharpoons Mg_{(s)}$	-2.37
$Na^+_{(aq)} + e^- \rightleftharpoons Na_{(s)}$	-2.71
$Li^+_{(aq)} + e^- \rightleftharpoons Li_{(s)}$	-3.04