

Table 14.3
Standard Molar Entropies (J/K) of Elements and Compounds at 25°C and 1 atm

ELEMENTS							
Ag(s)	42.7	Co(s)	28.5	I ₂ (s)	116.7	O ₂ (g)	205.0
Al(s)	28.3	Cr(s)	23.8	K(s)	63.6	Pb(s)	64.9
Ba(s)	67	Cu(s)	33.3	Mg(s)	32.5	P ₄ (s)	177.4
Br ₂ (l)	152.3	F ₂ (g)	203.3	Mn(s)	31.8	Si(s)	31.9
C(s)	5.7	Fe(s)	27.2	N ₂ (g)	191.5	Sn(s)	51.5
Ca(s)	41.6	H ₂ (g)	130.6	Na(s)	51.0	Zn(s)	41.6
Cl ₂ (g)	222.9	Hg(l)	77.4	Ni(s)	30.1		
COMPOUNDS							
AgBr(s)	107.1	C ₂ H ₂ (g)	200.8	H ₂ O(l)	69.9	NH ₄ Cl(s)	94.6
AgCl(s)	96.1	C ₂ H ₄ (g)	219.5	H ₂ O ₂ (l)	88.6	NH ₄ NO ₃ (s)	151.0
AgI(s)	114.2	C ₂ H ₆ (g)	229.5	H ₂ S(g)	205.6	NO(g)	210.6
Ag ₂ O(s)	121.7	C ₃ H ₈ (g)	269.9	H ₂ SO ₄ (l)	156.9	NO ₂ (g)	240.5
Ag ₂ S(s)	145.6	n-C ₄ H ₁₀ (g)	310.0	HgO(s)	72.0	NiO(s)	38.6
Al ₂ O ₃ (s)	51.0	n-C ₅ H ₁₂ (l)	262.8	HgS(s)	77.8	PbBr ₂ (s)	161.5
BaCl ₂ (s)	126	C ₂ H ₅ OH(l)	160.7	KBr(s)	96.4	PbCl ₂ (s)	136.4
BaCO ₃ (s)	112.1	CuO(s)	43.9	KCl(s)	82.7	PbO(s)	69.5
BaO(s)	70.3	Cr ₂ O ₃ (s)	81.2	KClO ₃ (s)	143.0	PbO ₂ (s)	76.6
BaSO ₄ (s)	132.2	CuO(s)	43.5	KF(s)	66.6	Pb ₃ O ₄ (s)	212.3
CaCl ₂ (s)	113.8	Cu ₂ O(s)	100.8	MgCl ₂ (s)	89.5	PCl ₃ (g)	311.7
CaCO ₃ (s)	92.9	CuS(s)	66.5	MgCO ₃ (s)	65.7	PCl ₅ (g)	352.7
CaO(s)	39.7	CuSO ₄ (s)	113.4	MgO(s)	26.8	SiO ₂ (s)	41.8
Ca(OH) ₂ (s)	76.1	Fe ₂ O ₃ (s)	90.0	Mg(OH) ₂ (s)	63.1	SnCl ₂ (s)	122.6
CaSO ₄ (s)	106.7	Fe ₃ O ₄ (s)	146.4	MgSO ₄ (s)	91.6	SnCl ₄ (l)	258.6
CCL ₄ (l)	214.4	HBr(g)	198.5	MnO(s)	60.2	SnO(s)	56.5
CH ₄ (g)	186.2	HCl(g)	186.7	MnO ₂ (s)	53.1	SnO ₂ (s)	52.3
CHCl ₃ (l)	202.9	HF(g)	173.5	NaCl(s)	72.4	SO ₂ (g)	248.5
CH ₃ OH(l)	126.8	HI(g)	206.3	NaF(s)	58.6	SO ₃ (g)	256.2
CO(g)	197.9	HNO ₃ (l)	155.6	NaOH(s)	52.3	ZnO(s)	43.9
CO ₂ (g)	213.6	H ₂ O(g)	188.7	NH ₃ (g)	192.5	ZnS(s)	57.7

Table 14.4
Standard Molar Entropies (J/K) of Aqueous Ions at 25°C, 1 M

CATIONS		ANIONS	
Ag ⁺ (aq)	73.9	Br ⁻ (aq)	80.7
Al ³⁺ (aq)	-313.4	Cl ⁻ (aq)	55.1
Ba ²⁺ (aq)	13	ClO ₃ ⁻ (aq)	162.3
Ca ²⁺ (aq)	-55.2	ClO ₄ ⁻ (aq)	182.0
Cd ²⁺ (aq)	-61.1	CO ₃ ²⁻ (aq)	-53.1
Cu ²⁺ (aq)	-98.7	CrO ₄ ²⁻ (aq)	38.5
Fe ²⁺ (aq)	-113.4	F ⁻ (aq)	-9.6
Fe ³⁺ (aq)	-293.3	HCO ₃ ⁻ (aq)	95.0
H ⁺ (aq)	0.0	H ₂ PO ₄ ⁻ (aq)	89.1
K ⁺ (aq)	102.5	HPO ₄ ²⁻ (aq)	-36.0
Li ⁺ (aq)	14.2	I ⁻ (aq)	109.4
Mg ²⁺ (aq)	-118.0	MnO ₄ ⁻ (aq)	190.0
Mn ²⁺ (aq)	-73.6	NO ₃ ⁻ (aq)	146.4
Na ⁺ (aq)	60.2	OH ⁻ (aq)	-10.5
NH ₄ ⁺ (aq)	112.8	PO ₄ ³⁻ (aq)	-218
Ni ²⁺ (aq)	-159.4	S ²⁻ (aq)	22.2
Pb ²⁺ (aq)	21.3	SO ₄ ²⁻ (aq)	17.2
Sn ²⁺ (aq)	-24.7		
Zn ²⁺ (aq)	-106.5		

Table 5.2
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	PCl ₃ (g)	-306.4
CaCO ₃ (s)	-1207.0	CuS(s)	-48.5	MgCO ₃ (s)	-1113	PCl 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

Table 5.3
Heats of Formation (kJ/mol) at 25°C, 1 M

CATIONS				ANIONS			
Ag ⁺ (aq)	+105.9	K ⁺ (aq)	-251.2	Br ⁻ (aq)	-120.9	H ₂ PO ₄ ⁻ (aq)	-1302.5
Al ³⁺ (aq)	-524.7	Li ⁺ (aq)	-278.5	Cl ⁻ (aq)	-167.4	HPO ₄ ²⁻ (aq)	-1298.7
Ba ²⁺ (aq)	-538.4	Mg ²⁺ (aq)	-462.0	ClO ₃ ⁻ (aq)	-98.3	I ⁻ (aq)	-55.9
Ca ²⁺ (aq)	-543.0	Mn ²⁺ (aq)	-218.8	ClO ₄ ⁻ (aq)	-131.4	MnO ₄ ⁻ (aq)	-518.4
Cd ²⁺ (aq)	-72.4	Na ⁺ (aq)	-239.7	CO ₃ ²⁻ (aq)	-676.3	NO ₃ ⁻ (aq)	-206.6
Cu ²⁺ (aq)	+64.4	NH ₄ ⁺ (aq)	-132.8	CrO ₄ ²⁻ (aq)	-863.2	OH ⁻ (aq)	-229.9
Fe ²⁺ (aq)	-87.9	Ni ²⁺ (aq)	-64.0	F ⁻ (aq)	-329.1	PO ₄ ³⁻ (aq)	-1284.1
Fe ³⁺ (aq)	-47.7	Pb ²⁺ (aq)	+1.6	HCO ₃ ⁻ (aq)	-691.1	S ²⁻ (aq)	+41.8
H ⁺ (aq)	0.0	Sn ²⁺ (aq)	-10.0			SO ₄ ²⁻ (aq)	-907.5
		Zn ²⁺ (aq)	-152.4				