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STANDARD THERMOCHEMICAL FUNCTIONS

Enthalpy of formation h_f , Gibbs function of formation g_f , and absolute entropy s , at the standard state of $T=298.15$ K and $p=100$ kPa. In alphabetical order by the chemical formula.

Substance	Formula (state)	h_f kJ/mol	g_f kJ/mol	s J/(mol K)
Aluminium	Al(s)	0	0	28
Aluminium hydroxide	Al(OH) ₃ (s)	-1280	-1146	85
Aluminium oxide	Al ₂ O ₃ (s)	-1680	-1580	51
Carbon (graphite)	C(s)	0	0	5.74
Carbon (diamond)	C(s)	1.90	2.89	2.38
Methane	CH ₄ (g)	-74.85	-50.79	186.16
Methanol (ideal vapour state)	CH ₄ O(g)	-200.7	-162	239.7
Methanol	CH ₄ O(l)	-238.81	-166.29	126.8
Acetylene	C ₂ H ₂ (g)	226.73	209.17	200.8
Ethylene	C ₂ H ₄ (g)	52.28	68.12	219.8
Ethane	C ₂ H ₆ (g)	-84.68	-32.89	229.5
Ethanol (ideal vapour state)	C ₂ H ₆ O(g)	-238.4	-169	272
Ethanol	C ₂ H ₆ O(l)	-277.7	-174.9	160.7
DME (dimethyl ether)	C ₂ H ₆ O(g)	-184.10	-112.60	266.4
Propylene (propene)	C ₃ H ₆ (g)	20.41	62.72	267
n-Propane	C ₃ H ₈ (g)	-103.85	-25	270
n-Propane (ideal liquid state)*	C ₃ H ₈ (l)	-121.2	-18	194
n-Butane	C ₄ H ₁₀ (g)	-126.15	-17.9	310.0
n-Butane (ideal liquid state)*	C ₄ H ₁₀ (l)	-146	-18	240
Isobutane (2-methylpropane)	C ₄ H ₁₀ (g)	-134	-20	295
Isobutane (ideal liquid state)*	C ₄ H ₁₀ (l)	-154	-18.5	225
Ether (DEE ideal vapour state)	C ₄ H ₁₀ O(g)	-252.7	-137	342
Ether (DEE, diethyl ether)	C ₄ H ₁₀ O(l)	-271.2	-145	253
n-Pentane (ideal vapour state)	C ₅ H ₁₂ (g)	-146.44	-8	348.4
n-Pentane	C ₅ H ₁₂ (l)	-173	-9	263
Benzene (ideal vapour state)	C ₆ H ₆ (g)	82.6	130	269.3
Benzene	C ₆ H ₆ (l)	49.10	120	173.3
Glucose	C ₆ H ₁₂ O ₆ (s)	-1268	-910	212
n-Hexane (ideal vapour state)	C ₆ H ₁₄ (g)	-167	0.4	387
n-Hexane	C ₆ H ₁₄ (l)	-198.8	-4	296
n-Heptane (ideal vapour state)	C ₇ H ₁₆ (g)	-180	16	428
n-Heptane	C ₇ H ₁₆ (l)	-225	1	328
n-Octane (ideal vapour state)	C ₈ H ₁₈ (g)	-208	17	464
n-Octane	C ₈ H ₁₈ (l)	-250	6	361
iso-Octane (ideal vapour state)	C ₈ H ₁₈ (g)	-224	12.3	428
iso-Octane	C ₈ H ₁₈ (l)	-260	5.8	329
Naphthalene	C ₁₀ H ₈ (s)	76	199	167

n-Decane	C ₁₀ H ₂₂ (l)	-250	34.4	540
Sucrose	C ₁₂ H ₂₂ O ₁₁ (s)	-2222	-1545	360
n-Dodecene-1 (ideal vapour state)	C ₁₂ H ₂₄ (g)	-165	147	589
n-Dodecene-1	C ₁₂ H ₂₄ (l)	-226	117	485
n-Dodecane (ideal vapour state)	C ₁₂ H ₂₆ (g)	-291	50.2	623
n-Dodecane	C ₁₂ H ₂₆ (l)	-351	28	493
n-Hexadecane (cetane)	C ₁₆ H ₃₄ (l)	-456	58.5	586
Carbon monoxide	CO(g)	-110.53	-137.15	197.6
Carbon dioxide	CO ₂ (g)	-393.52	-394.38	213.67
Urea	CO(NH ₂) ₂ (s)	-333.5	-197.3	104.6
Iron	Fe(s)	0	0	27
Iron (II) oxide	FeO(s)	-267	-257	59
Iron (III) oxide	Fe ₂ O ₃ (s)	-822	-791	90
Iron (II)-(III) oxide	Fe ₃ O ₄ (s)	-1120	-1015	146
Hydrogen atomic	H(g)	218.00	203.29	114.61
Hydrogen	H ₂ (g)	0	0	130.57
Nitric acid (ideal vapour state)	HNO ₃ (g)	-134	-74	267
Nitric acid	HNO ₃ (l)	-174	-81	156
Water (ideal vapour state)	H ₂ O(g)	-241.82	-228.59	188.72
Water	H ₂ O(l)	-285.83	-237.18	69.95
Hydrogen peroxide (ideal vapour state)	H ₂ O ₂ (g)	-136.31	-105.60	232.63
Hydrogen peroxide	H ₂ O ₂ (l)	-188	-120	110
Nitrogen atomic	N(g)	472.68	455.51	153.19
Nitrogen	N ₂ (g)	0	0	191.50
Nitrogen monoxide	NO(g)	90.25	86.57	210.65
Nitrogen dioxide	NO ₂ (g)	33.18	51.30	239.95
di-Nitrogen oxide	N ₂ O(g)	82.1	104.2	220
di-Nitrogen oxide (ideal liquid state)*	N ₂ O(l)	69.8	113	148.5
di-Nitrogen tetroxide	N ₂ O ₄ (g)	9.16	97.9	304.2
di-Nitrogen tetroxide (ideal liquid state)*	N ₂ O ₄ (l)	-19.6	97.4	209.2
Ammonia	NH ₃ (g)	-46.19	-16.59	192.33
Ammonia (ideal liquid state)*	NH ₃ (l)	-66.8	-11.2	104.8
Ammonium perchlorate (AP)	NH ₄ ClO ₄ (s)	-295	-89	184
Hydrazine (ideal vapour state)	N ₂ H ₄ (g)	95.4	159	238
Hydrazine	N ₂ H ₄ (l)	50.63	149.3	121.21
Monomethyl hydrazine (MMH)	N ₂ H ₃ CH ₃ (l)	54.14	180	166
Unsymmetrical dimethyl hydrazine (UDMH)	N ₂ H ₂ (CH ₃) ₂ (l)	48.3	205	200
Oxygen atomic	O(g)	249.17	231.77	160.95
Oxygen	O ₂ (g)	0	0	205.04
Ozone	O ₃ (g)	142.4	162.9	238.80
Hydroxyl	OH(g)	39.46	34.28	183.75
Sulfur (rhombic)	S(s)	0	0	31.80
Sulfur dioxide	SO ₂ (g)	-296.83	-300.19	248.11
Sulfur trioxide	SO ₃ (g)	-395.8	-371.0	256.8

* Those substances are gases at 100 kPa and 25 °C, but often used as compressed liquids.

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