

TABLE A-14 ENTHALPY OF FORMATION

Substance	State	ΔH_f	Substance	State	ΔH_f
ammonia	<i>g</i>	−45.9	lead(IV) oxide	<i>s</i>	−274.5
ammonium chloride	<i>s</i>	−314.4	lead(II) nitrate	<i>s</i>	−451.9
ammonium sulfate	<i>s</i>	−1180.9	lead(II) sulfate	<i>s</i>	−919.94
barium chloride	<i>s</i>	−858.6	lithium chloride	<i>s</i>	−408.6
barium nitrate	<i>s</i>	−768.2	lithium nitrate	<i>s</i>	−483.1
barium sulfate	<i>s</i>	−1473.2	magnesium chloride	<i>s</i>	−641.5
benzene	<i>g</i>	+82.88	magnesium oxide	<i>s</i>	−601.6
benzene	<i>l</i>	+49.080	magnesium sulfate	<i>s</i>	−1261.79
calcium carbonate	<i>s</i>	−1207.6	manganese(IV) oxide	<i>s</i>	−520.0
calcium chloride	<i>s</i>	−795.4	manganese(II) sulfate	<i>s</i>	−1065.3
calcium hydroxide	<i>s</i>	−983.2	mercury(I) chloride	<i>s</i>	−264.2
calcium nitrate	<i>s</i>	−938.2	mercury(II) chloride	<i>s</i>	−230.0
calcium oxide	<i>s</i>	−634.9	mercury(II) oxide (red)	<i>s</i>	−90.8
calcium sulfate	<i>s</i>	−1434.5	methane	<i>g</i>	−74.9
carbon (diamond)	<i>s</i>	+1.9	nitrogen dioxide	<i>g</i>	+33.2
carbon (graphite)	<i>s</i>	0.00	nitrogen monoxide	<i>g</i>	+90.29
carbon dioxide	<i>g</i>	−393.5	dinitrogen monoxide	<i>g</i>	+82.1
carbon monoxide	<i>g</i>	−110.5	dinitrogen tetroxide	<i>g</i>	+9.2
copper(II) nitrate	<i>s</i>	−302.9	oxygen (O ₂)	<i>g</i>	0.00
copper(II) oxide	<i>s</i>	−157.3	ozone (O ₃)	<i>g</i>	+142.7
copper(II) sulfate	<i>s</i>	−771.4	tetraphosphorus decoxide	<i>s</i>	−3009.9
ethane	<i>g</i>	−83.8	potassium bromide	<i>s</i>	−393.8
ethyne (acetylene)	<i>g</i>	+228.2	potassium chloride	<i>s</i>	−436.49
hydrogen (H ₂)	<i>g</i>	0.00	potassium hydroxide	<i>s</i>	−424.58
hydrogen bromide	<i>g</i>	−36.29	potassium nitrate	<i>s</i>	−494.6
hydrogen chloride	<i>g</i>	−92.3	potassium sulfate	<i>s</i>	−1437.8
hydrogen fluoride	<i>g</i>	−273.3	silicon dioxide (quartz)	<i>s</i>	−910.7
hydrogen iodide	<i>g</i>	+26.5	silver chloride	<i>s</i>	−127.01 ± 0.5
hydrogen oxide (water)	<i>g</i>	−241.8	silver nitrate	<i>s</i>	−120.5
hydrogen oxide (water)	<i>l</i>	−285.8	silver sulfide	<i>s</i>	−32.59
hydrogen peroxide	<i>g</i>	−136.3	sodium bromide	<i>s</i>	−361.8
hydrogen peroxide	<i>l</i>	−187.8	sodium chloride	<i>s</i>	−385.9
hydrogen sulfide	<i>g</i>	−20.6	sodium hydroxide	<i>s</i>	−425.9
iodine (I ₂)	<i>s</i>	0.00	sodium nitrate	<i>s</i>	−467.9
iodine (I ₂)	<i>g</i>	+62.4	sodium sulfate	<i>l</i>	−1387.1
iron(II) chloride	<i>s</i>	−399.4	sulfur dioxide	<i>g</i>	−296.8
iron(II) oxide	<i>s</i>	−272.0	sulfur trioxide	<i>g</i>	−395.7
iron(III) oxide	<i>s</i>	−824.2	tin(IV) chloride	<i>l</i>	−511.3
iron(II) sulfate	<i>s</i>	−928.4	zinc nitrate	<i>s</i>	−483.7
iron(II) sulfide	<i>s</i>	−100.0	zinc oxide	<i>s</i>	−350.5
lead(II) oxide	<i>s</i>	−217.3	zinc sulfate	<i>s</i>	−980.14

ΔH_f is enthalpy of formation of the given substance from its elements. All values of ΔH_f are expressed as kJ/mol at 25°C. Negative values of ΔH_f indicate exothermic reactions. *s* = solid, *l* = liquid, *g* = gas