

Table B.10 Atomic Heat Capacities for Kopp's Rule^a

Element	$C_{pa}[\text{J}/(\text{g}\cdot\text{atom}\cdot^\circ\text{C})]$	
	Solids	Liquids
C	7.5	12
H	9.6	18
B	11	20
Si	16	24
O	17	25
F	21	29
P	23	31
S	26	31
All Others	26	33

^aD. M. Himmelblau, *Basic Principles and Calculations in Chemical Engineering*, 3rd Edition, Prentice-Hall, Englewood Cliffs, NJ, 1974, p. 270.

Table B.11 Integral Heats of Solution and Mixing at 25°C

$r(\text{mol H}_2\text{O/mol solute})$	$(\Delta\hat{H}_s)_{\text{HCl(g)}}[\text{kJ/mol HCl}]$	$(\Delta\hat{H}_s)_{\text{NaOH(s)}}[\text{kJ/mol NaOH}]$	$(\Delta\hat{H}_m)_{\text{H}_2\text{SO}_4}[\text{kJ/mol H}_2\text{SO}_4]$
0.5	—	—	−15.73
1	−26.22	—	−28.07
1.5	—	—	−36.90
2	−48.82	—	−41.92
3	−56.85	−28.87	−48.99
4	−61.20	−34.43	−54.06
5	−64.05	−37.74	−58.03
10	−69.49	−42.51	−67.03
20	−71.78	−42.84	—
25	—	—	−72.30
30	−72.59	−42.72	—
40	−73.00	−42.59	—
50	−73.26	−42.51	−73.34
100	−73.85	−42.34	−73.97
200	−74.20	−42.26	—
500	−74.52	−42.38	−76.73
1 000	−74.68	−42.47	−78.57
2 000	−74.82	−42.55	—
5 000	−74.93	−42.68	−84.43
10 000	−74.99	−42.72	−87.07
50 000	−75.08	−42.80	—
100 000	−75.10	—	−93.64
500 000	—	—	−95.31
∞	−75.14	−42.89	−96.19

^aFrom J. C. Whitwell and R. K. Toner, *Conservation of Mass and Energy*, pp. 344–346. Copyright © 1969 by McGraw-Hill, Inc. Used with permission of McGraw-Hill.