Stoner[91] has shown that the total and Pauli susceptibilities are related by

$$1/\chi_t = (1/\chi_P) + \theta, \qquad (13.4)$$

where θ is called the interaction term. If one knows θ, then it is possible to determine χ_P and, thus, γ from the measured χ_t. In general θ cannot be evaluated explicitly. The value of γ for technetium, however, was evaluated by making use of this equation. Nelson *et al.*[92] have measured the magnetic susceptibility of technetium and rhenium from 78° to 402°K (−195° to 129°C). The reviewer obtained the value of χ_t for technetium and rhenium at 0°K (−273°C) by extrapolation of their data. By using the known γ value for rhenium and χ_t at 0°K it was possible to determine θ for rhenium. The θ value for technetium was assumed to be equal to that of rhenium, which then permitted an evaluation of χ_P and γ of technetium. The value of γ obtained by this procedure is 4.06 mj/g-at/deg², which is a reasonable number. If one makes the assumption that χ_t at 0°K (−273°C) is equal to χ_P, then a γ equal to 21.5 mj/g-at/deg² is obtained, which is very unreasonable.

The γ values for promethium and gadolinium were estimated to be the same as for lanthanum and lutetium. The value of γ for europium was assumed to be equal to the mean value of barium and ytterbium. The γ values for francium and actinium were estimated from plots of the known electronic specific heat constants of their respective cogeners versus the period number. The γ values for radium and protactinium were assumed to be equal to the mean value of the alkaline-earth metals and the mean value of thorium and uranium, respectively. The γ value for neptunium was assumed to be the same as that for uranium.

14. Heat Capacity at Constant Pressure

The heat capacity at constant pressure at 298°K (25°C) is shown in Table XIV. This value, C_p, is the usual quantity measured experimentally rather than the heat capacity at constant volume, C_v. For those involved in making thermodynamic calculations, C_p is of direct importance, but for those involved in studying the fundamental properties of solids, C_v, which must be calculated from the experimental value of C_p, is more useful.

The values of C_p are taken primarily from the reviews of Kelley[54] and of Stull and Sinke.[53] If more recent data were available to the reviewer, they are included in Table XIV. Since Stull and Sinke estimated the heat capacities of those elements for which no experimental values existed,

[91] E. C. Stoner, *Proc. Roy. Soc.* **A154**, 656 (1936).

[92] C. M. Nelson, G. E. Boyd, and W. T. Smith, Jr., *J. Am. Chem. Soc.* **76**, 348 (1954).

Table XIV. Heat Capacity at Constant Pressure and at Constant Volume and the Dilation Term[a]

Element	C_p (cal/g-at/deg)	Ref.	$A \times 10^5$ (g-at/cal)	C_v^l (cal/g-at/deg)	$C_v = C_v^l + C_v^e$ (cal/g-at/deg)
3 Li	5.65	1	2.056	5.34	5.46
4 Be	3.93	1, 2	0.9041	3.50	3.51
5 B	2.64	1, 2	1.666	2.52	2.61
6 C(g)	2.06	1, 2	0.1301	2.06	2.06
6 C(d)	1.462	3	0.2676	1.44	1.44
11 Na	6.745	1, 2	3.821	6.13	6.23
12 Mg	5.92	1, 2	2.011	5.62	5.71
13 Al	5.82	1, 2	2.445	5.48	5.57
14 Si	4.64	4	0.1124	4.62	4.63
15 P(w)	5.63	1	6.883	(4.98)[b]	4.98
15 P(r)	4.98	1, 2	(9.698)[b]	(4.26)[b]	(4.26)[b]
16 S(r)	5.40	1, 2	9.280	(4.59)[b]	4.59
16 S(m)	5.65	1	—	—	—
19 K	7.07	1	4.297	6.28	6.43
20 Ca	6.29	1, 2	1.086	5.96	6.16
21 Sc	6.09	5	(0.5004)[b]	(5.27)[b]	(6.03)[b]
22 Ti	5.98	1, 2	0.5316	5.68	5.92
23 V	5.905	1, 2	0.5756	5.20	5.85
24 Cr	5.57	1, 2	0.6731	5.40	5.51
25 Mn	6.285	1, 2	1.221	5.54	6.14
26 Fe	5.98	1, 2	0.9830	5.52	5.88
27 Co	5.95	1	1.196	5.49	5.82
28 Ni	6.23	1, 2	1.098	5.58	6.10
29 Cu	5.855	1, 2	1.630	5.65	5.69
30 Zn	6.07	1, 2	2.824	5.71	5.76
31 Ga	6.18	1	1.240	6.00	6.04
32 Ge	5.47	4	0.2518	5.45	5.45
33 As	5.895	1, 2	0.0579	(5.88)[b]	5.89
34 Se	6.075	1, 2	1.186	5.94	5.94
35 Rb	7.36	1	5.433	6.30	6.48
38 Sr	6.30	1, 2	0.8541	5.94	6.20
39 Y	6.34	6, 7	0.5608	5.55	6.27
40 Zr	6.12	1	0.2231	5.89	6.10
41 Nb	5.965	1, 2	0.5566	5.36	5.91
42 Mo	5.695	1, 2	0.4186	5.51	5.66
43 Tc	(5.80)[c]	—	(1.066)[b]	(5.40)[b]	(5.69)[b]
44 Ru	5.80	1	1.472	5.42	5.65
45 Rh	6.00	1	0.9456	5.57	5.90
46 Pd	6.21	1	1.185	5.36	6.07
47 Ag	6.095	1, 2	2.208	5.80	5.85
48 Cd	6.215	1, 2	3.168	5.80	5.85
49 In	6.39	1	3.357	5.86	5.98
50 Sn(g)	6.16	1	0.3627	5.75	5.75
50 Sn(w)	6.30	1, 2	2.151	5.92	6.05
51 Sb	6.03	1, 2	0.4198	(5.98)[b]	5.98
52 Te	6.145	1, 2	0.7542	6.06	6.06