TABLE XXIII. ENTROPIES OF FUSION AND VAPORIZATION—*Continued*

Element	ΔS_f (e.u./g-at)	ΔS_v (e.u./g-at)
57 La	1.24	26.3
58 Ce	1.16	23.3
59 Pr	1.37	22.3
60 Nd	1.32	23.1
61 Pm	(1.48)[a]	(22.1)[a]
62 Sm	1.53	(22.1)[a]
63 Eu	2.01	18.1
64 Gd	1.54	(22.1)[a]
65 Tb	1.51	(22.1)[a]
66 Dy	(1.48)[a]	19.7
67 Ho	1.95	19.3
68 Er	(1.48)[a]	(22.1)[a]
69 Tm	2.32	21.9
70 Yb	1.67	(18.1)[a]
71 Lu	(1.48)[a]	(22.1)[a]
72 Hf	(1.76)[a]	29.8
73 Ta	(1.76)[a]	31.2
74 W	2.31	31.8
75 Re	(2.29)[a]	28.0
76 Os	(2.29)[a]	33.4
77 Ir	(2.29)[a]	29.6
78 Pt	2.30	29.8
79 Au	2.21	24.8
80 Hg	2.34	22.6
81 Tl	1.77	19.9
82 Pb	1.90	21.2
83 Bi	4.77	24.0
84 Po	(1.76)[a]	23.8
87 Fr	(1.76)[a]	(15.8)[a]
88 Ra	(1.76)[a]	(19.9)[a]
89 Ac	(2.29)[a]	(25.5)[a]
90 Th	(1.76)[a]	(25.5)[a]
91 Pa	(1.76)[a]	(25.5)[a]
92 U	(1.76)[a]	27.7
93 Np	(1.76)[a]	(25.5)[a]
94 Pu	0.74	21.6

[a] Estimated value; see text for further discussion.

The variation of the entropy of fusion for the rare earths is given in Fig. 30a. It is seen that ΔS_f slowly increases with increasing atomic number. The estimated entropies were assumed to be equal to the mean value for these metals and, therefore, deviate from the line drawn through the

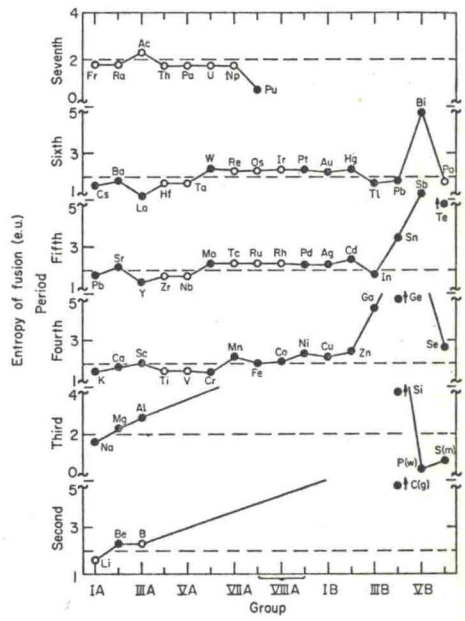

FIG. 29. Entropy of fusion of all of the elements considered in this review with the exception of the rare-earth metals. The horizontal dashed line represents Richard's constant, 2.0 e.u. Open points are estimated data.

points. The high ΔS_f values for holmium and thulium are probably due to the fact that the measured heat of fusion includes both the α–β heat of transition and the heat of fusion, because the α–β transformation lies so near the melting point that these two heats cannot be resolved experimentally. The value for europium is also anomalous, but the reason for its behavior is not clear. It should be mentioned that europium has only one allotropic form, body-centered cubic, but the other rare earths have a close-packed structure which transforms, usually within 100°C of their melting points, to the body-centered cubic modification. Perhaps this may be a partial explanation for this anomaly.

Estimated Data. From the above-mentioned crystal-structure dependence of the entropy of fusion, ΔS_f was estimated to be 1.76 e.u. for the body-centered cubic elements titanium, vanadium, zirconium, niobium,