TABLE VII. ATOMIC VOLUME[a]

Element	Atomic volume (cm³/g-at)	Element	Atomic volume (cm³/g-at)
3 Li	13.02	50 Sn(g)	20.59
4 Be	4.891	50 Sn(w)	16.30
5 B	4.388[b]	51 Sb	18.21
6 C(g)	5.260[c]	52 Te	20.46
6 C(d)	3.397[c]	55 Cs	69.19
11 Na	23.79	56 Ba	38.08
12 Mg	14.00	57 La	22.54[e]
13 Al	10.00	58 Ce(α)	17.03
14 Si	12.07	58 Ce(γ)	20.69[g]
15 P(w)	13.96	59 Pr	20.82[e]
15 P(r)	13.18[d]	60 Nd	20.59[e]
15 P(b)	11.51[d]	61 Pm	(20.33)[h]
16 S(r)	17.41	62 Sm	19.95[e]
16 S(m)	16.36[d]	63 Eu	28.98[e]
19 K	45.61	64 Gd	19.94[e]
20 Ca	26.19	65 Tb	19.26[e]
21 Sc	15.06[e]	66 Dy	18.99[e]
22 Ti	12.01	67 Ho	18.75[e]
23 V	8.365	68 Er	18.46[e]
24 Cr	7.231	69 Tm	18.13[e]
25 Mn	7.357	70 Yb	24.87[e]
26 Fe	7.094	71 Lu	17.77[e]
27 Co	6.689	72 Hf	13.45
28 Ni	6.593	73 Ta	10.80
29 Cu	7.114	74 W	9.551
30 Zn	9.165	75 Re	8.860
31 Ga	11.81	76 Os	8.441
32 Ge	13.64	77 Ir	8.524
33 As	12.96	78 Pt	9.094
34 Se	16.43	79 Au	10.22
37 Rb	56.07	80 Hg	14.09
38 Sr	33.93	81 Tl	17.22
39 Y	19.88[e]	82 Pb	18.27
40 Zr	14.02	83 Bi	21.33
41 Nb	10.83	84 Po	22.53
42 Mo	9.387	87 Fr	(73.0)[h]
43 Tc	8.635[f]	88 Ra	(38.8)[h]
44 Ru	8.178	89 Ac	22.56
45 Rh	8.292	90 Th	19.79
46 Pd	8.879	91 Pa	15.03
47 Ag	10.27	92 U	13.16
48 Cd	13.00	93 Np	13.11
49 In	15.73	94 Pu	12.06

[a] The atomic volumes were calculated from the lattice constants of the elements as listed by Pearson[1] unless otherwise noted.

[b] Calculated from X-ray density given by Du Mond *et al.*[2] for the α-(rhombohedral)-boron modification.

[c] Calculated from the lattice constants given by Hodgman.[3]

[d] Calculated from the pycnometric density given by Hodgman.[3]

[e] Atomic volumes as given by Gschneidner.[4]

[f] Calculated from lattice constants given by Lam *et al.*[6]

[g] Atomic volume given by Gschneidner *et al.*[5]

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

References for Table VII

1. W. B. Pearson, "Handbook of Lattice Spacings and Structures of Metals." Pergamon Press, New York, 1958.
2. J. W. M. Du Mond, E. R. Cohen, A. G. McNish, J. H. Palm, K. Lonsdale, and G. D. Rieck, *in* "International Tables for X-Ray Crystallography, III, Physical and Chemical Tables," p. 39. Kynoch, Birmingham, England, 1962.
3. C. D. Hodgman, ed., "Handbook of Chemistry and Physics," 43rd ed. Chem. Rubber. Publ. Co., Cleveland, Ohio, 1961–1962.
4. K. A. Gschneidner, Jr., "Rare Earth Alloys." Van Nostrand, Princeton, New Jersey, 1961.
5. K. A. Gschneidner, Jr., R. O. Elliott and R. R. McDonald, *Phys. Chem. Solids* **23**, 555 (1962).
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IV. Atomic Volume

The atomic volume is used in many calculations involving solid state physics and physical metallurgy and, therefore, it is one of the more important quantities. In this compilation the atomic volume was needed to calculate the heat capacity at constant volume (Section 15), the Debye temperature from the Lindemann equation (Section 17), the Leibfried and Bragg numbers (Section 26), the Grüneisen constant (Section 28) and the size factor (Section 29).

The atomic volume (Table VII) was calculated from the lattice constant(s) of the pure element, except for the three phosphorus and two sulfur allotropes. For these five substances the atomic volume was obtained by dividing the atomic weight by the pycnometric density.

The variation of the atomic volume with the atomic number for the elements of the fourth, fifth, and sixth periods of the Periodic Table are shown in Fig. 11. It is seen that the atomic volume decreases smoothly as one proceeds from the alkali metals to about the location where the *d* level is slightly more than half filled, after which the volume increases as one approaches the end of the period. As mentioned in earlier discussions concerning the variation of some of these properties as a function of