

TABLE XVIII. COMPARISON OF DEBYE TEMPERATURES

Element	$\theta_{298}^E/\theta_{298}^S$	$\theta_m^R/\theta_{298}^S$	$\theta_m^D/\theta_{298}^S$	$\theta_{298}^I/\theta_{298}^S$
3 Li	0.781	0.795	—	0.683
4 Be	1.326	—	—	—
6 C(d)	1.073	—	0.992	0.923
11 Na	1.058	1.323	—	0.736
12 Mg	1.100	1.082	—	0.930
13 Al	1.033	1.082	1.000	0.982
14 Si	0.832	—	—	0.802
19 K	0.770	1.480	—	—
20 Ca	0.904	—	—	—
21 Sc	—	0.578	—	—
22 Ti	0.982	0.900	0.711	—
23 V	1.010	—	—	0.864
24 Cr	1.071	1.167	—	1.355
25 Mn	1.270	—	—	—
26 Fe	1.249	1.324	1.121	1.083
27 Co	1.155	1.039	—	—
28 Ni	1.284	0.794	1.174	0.988
29 Cu	1.071	1.084	1.032	0.994
31 Ga	0.371	—	—	—
32 Ge	0.802	—	—	0.702
33 As	—	0.764	—	—
37 Rb	0.932	1.271	—	—
38 Sr	0.899	1.155	—	—
39 Y	1.168	0.939	—	—
40 Zr	0.924	1.124	—	—
41 Nb	1.262	—	—	—
42 Mo	1.204	—	1.029	1.032
44 Ru	1.234	1.027	—	0.822
45 Rh	1.366	1.126	—	—
46 Pd	0.960	0.982	1.091	—
47 Ag	0.964	0.991	0.946	0.955
48 Cd	0.724	0.715	—	—
49 In	0.659	1.535	—	—
50 Sn(w)	1.082	1.235	—	—
51 Sb	0.935	1.205	—	—
55 Cs	0.930	1.047	—	—
56 Ba	0.836	1.147	—	—
57 La	1.104	—	—	—
58 Ce(γ)	0.978	—	—	—
59 Pr	1.043	—	—	—
60 Nd	0.993	—	—	—
62 Sm	0.912	—	—	—
64 Gd	1.116	—	—	—
65 Tb	1.095	—	—	—

TABLE XVIII. COMPARISON OF DEBYE TEMPERATURES—Continued

Element	$\theta_{298}^E/\theta_{298}^S$	$\theta_m^R/\theta_{298}^S$	$\theta_m^D/\theta_{298}^S$	$\theta_{298}^I/\theta_{298}^S$
66 Dy	1.139	—	—	—
67 Ho	1.137	—	—	—
68 Er	1.172	—	—	—
72 Hf	0.850	—	—	—
73 Ta	1.142	1.013	1.200	—
74 W	1.186	1.151	0.994	—
75 Re	1.531	1.127	—	—
76 Os	1.078	—	—	—
77 Ir	1.816	1.386	—	—
78 Pt	1.018	1.044	1.036	0.671
79 Au	0.899	1.062	1.028	—
80 Hg	1.815	0.402	—	—
81 Tl	0.573	1.458	—	—
82 Pb	0.931	1.023	1.011	0.770
83 Bi	0.974	0.535	—	—
90 Th	1.580	1.680	—	—
94 Pu	1.011	—	—	—

(Section 19). In general, the temperatures range between $\sim 20^\circ\text{K}$ and $\sim 400^\circ\text{K}$, and thus the θ_m^D values correspond more closely to θ_{298}^S than to θ_0^S .

Examination of the data given in Table XVII indicates that the values obtained from several sources are in very good agreement, usually within $\pm 10^\circ\text{K}$. The θ_m^D values range from a minimum of 88°K for lead to a maximum of 1860°K for diamond. A comparison of θ_m^D and θ_{298}^S values is given in Table XVIII. These data show that two-thirds of the θ_m^D values lie within $\pm 10\%$ of the corresponding θ_{298}^S values, and that four-fifths of them lie within $\pm 20\%$. This represents the best agreement between Debye temperatures measured by different techniques, except for the θ_0^S and θ_0^E values. Further examination reveals that θ_m^D is larger than θ_{298}^S for two-thirds of the values listed here. From these observations one would conclude that, in general, θ_m^D is slightly larger than θ_{298}^S .

21. DEBYE TEMPERATURE FROM X-RAY INTENSITY DATA

The determination of the Debye temperature from X-ray intensity data is described quite thoroughly by Herbstein⁹⁶ and Ibers *et al.*¹¹⁰ For

¹¹⁰ J. A. Ibers, D. H. Templeton, B. K. Vainshtein, G. E. Bacon, and K. Lonsdale, in "International Tables for X-Ray Crystallography, III, Physical and Chemical Tables," p. 237. Kynoch, Birmingham, England, 1962.