

T (°C)	P_v (bar)	L (kJ/mol)
-40	0.00013	51.16
-20	0.00103	51.13
0	0.00611	51.07
0.01	0.00612	45.05
25	0.0317	43.99
50	0.1234	42.92
100	1.013	40.66
150	4.757	38.09
200	15.54	34.96
250	39.74	30.90
300	85.84	25.30
350	165.2	16.09
374	220.6	0.00

Figure 5.11. Phase diagram for H₂O (not to scale). The table gives the vapor pressure and molar latent heat for the solid-gas transformation (first three entries) and the liquid-gas transformation (remaining entries). Data from Keenan et al. (1978) and Lide (1994).

Problem 5.30. Sketch qualitatively accurate graphs of G vs. T for the three phases of H₂O (ice, water, and steam) at atmospheric pressure. Put all three graphs on the same set of axes, and label the temperatures 0°C and 100°C. How would the graphs differ at a pressure of 0.001 bar?

Problem 5.31. Sketch qualitatively accurate graphs of G vs. P for the three phases of H₂O (ice, water, and steam) at 0°C. Put all three graphs on the same set of axes, and label the point corresponding to atmospheric pressure. How would the graphs differ at slightly higher temperatures?

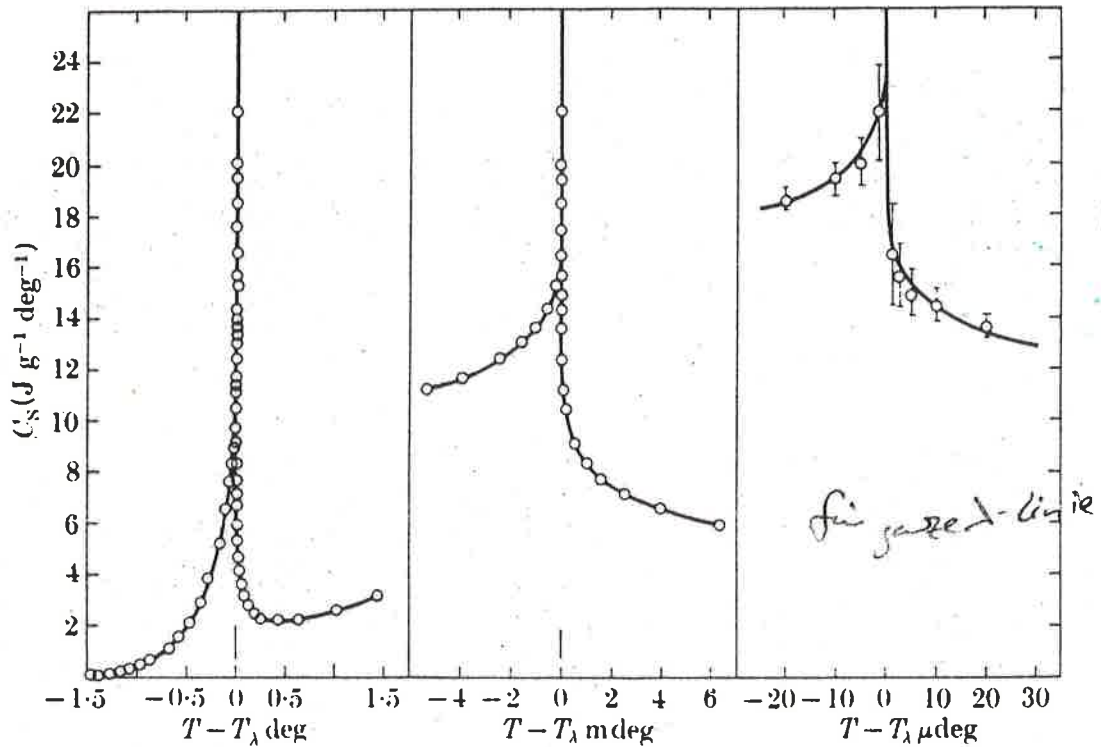


FIG. 1.16. Specific heat of ^4He as a function of $T - T_\lambda$ in K. Notice that the shape of the specific heat curve is rather like the Greek letter λ , whence the origin of the term ' λ -transition'. The fact that the specific heat is only about ten times its 'normal' value even at temperatures only a few microdegrees from T_λ is correlated with the fact that the critical-point exponent is extremely small (in fact, α is probably zero, corresponding to a logarithmic divergence). The width of the small vertical line just above the origin indicates the portion of the diagram that is expanded in width in the curve directly to the right. After Buckingham and Fairbank (1965). [E. Stanley]

[H.E. Stanley, "Introduction to Phase Transitions and Critical Phenomena"]

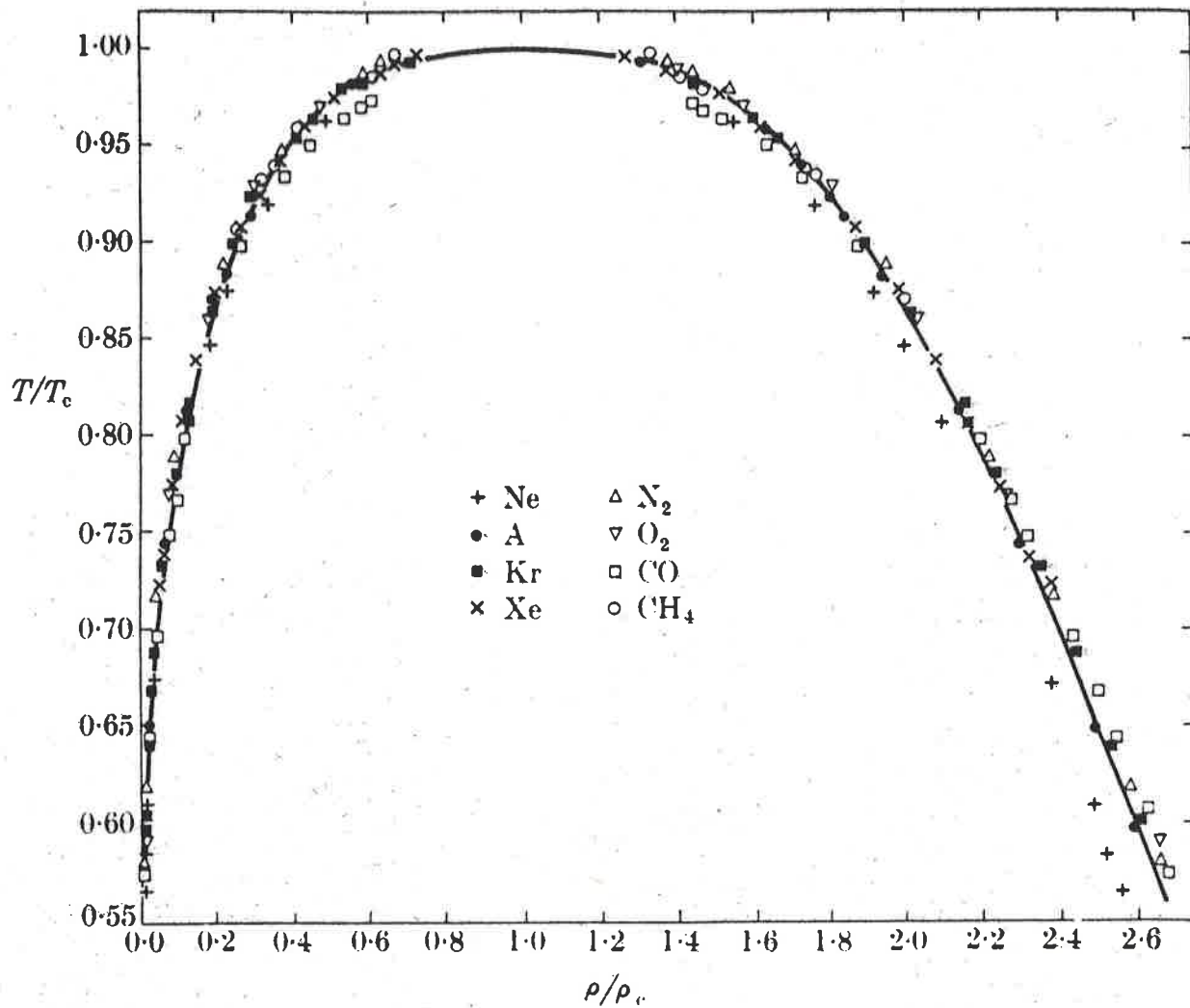


FIG. 1.8. Measurements on eight fluids of the coexistence curve (a reflection of the $P\rho T$ surface in the ρT plane analogous to Fig. 1.3). The solid curve corresponds to a fit to a cubic equation, i.e. to the choice $\beta = \frac{1}{3}$, where $\rho - \rho_c \sim (-\epsilon)^\beta$. From Guggenheim (1945).

[E. Stanley]

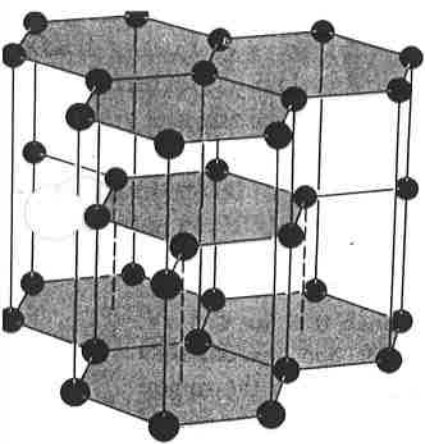


Figure 15.17
 Crystal structure of graphite (not to scale). The distance between the top and bottom planes is almost 4.8 times the nearest-neighbor distance within planes.

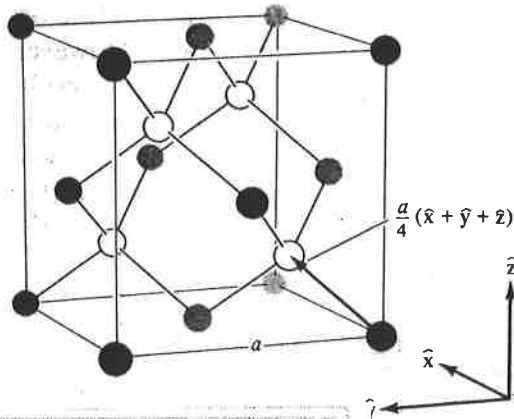
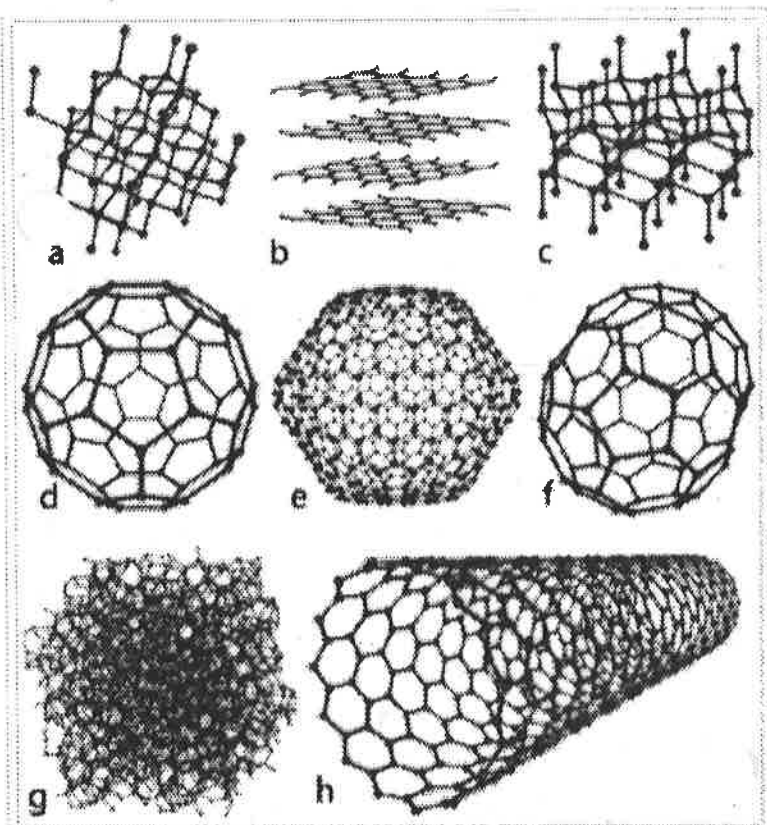
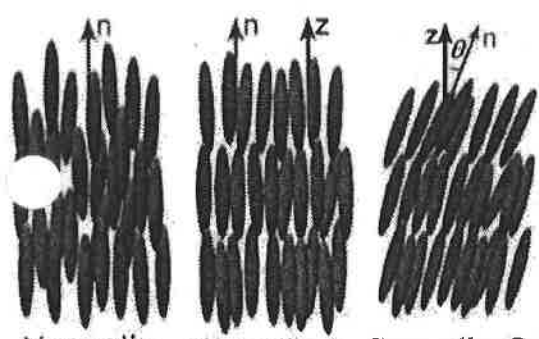


Figure 4.18
 Conventional cubic cell of the diamond lattice. For clarity, sites corresponding to one of the two interpenetrating face-centered cubic lattices are unshaded. (In the zincblende structure the shaded sites are occupied by one kind of ion, and the unshaded by another.) Nearest-neighbor bonds have been drawn in. The four nearest neighbors of each point form the vertices of a regular tetrahedron.



Eight allotropes of carbon: a) Diamond, b) Graphite, c) Lonsdaleite, d) C_{60} (Buckminsterfullerene or buckyball), e) C_{540} , f) C_{70} , g) Amorphous carbon, and h) single-walled carbon nanotube or buckytube.



Nematic (N) Smectic A (SmA) Smectic C (SmC)

Figure 2. Standard thermotropic liquid crystal phases arranged from left to right in order of increasing order and decreasing temperature.

SiO₂

