

$(\partial S/\partial V)_T$ can be obtained from the experimental results by numerical differentiation. By using Mills & Grilly's p - V - T data and equation (7) we can then obtain the pressure at constant molar volume as a function of temperature, i.e. the isochores

$$p(T) = p_m - \int_T^{T_m} (\partial S/\partial V)_T dT, \quad (8)$$

$$p_m = p(T_m), \quad V = \text{const.}$$

The isochores are given in tables 6 and 7 for rounded values of the molar volume. The columns of these tables give immediately the isotherms, i.e. $p = p(V)$ at constant temperature.

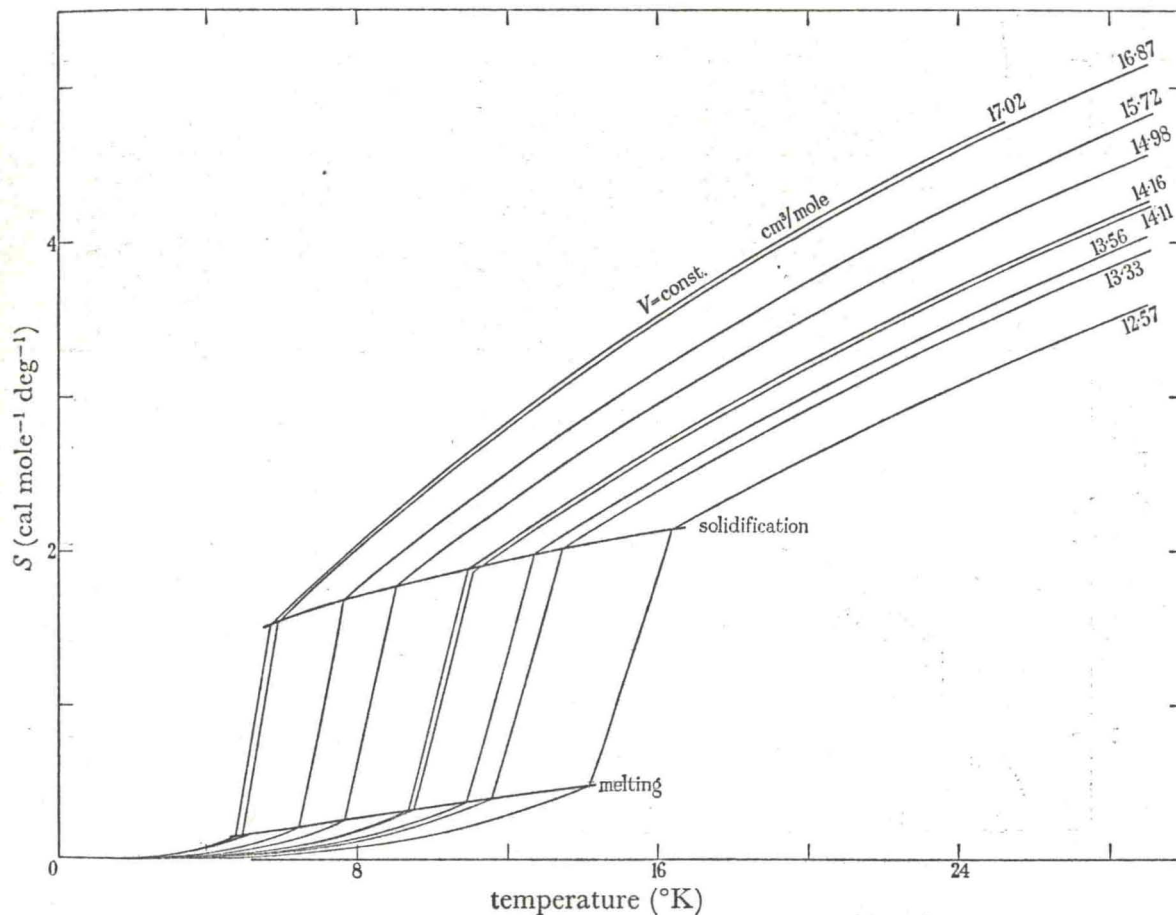


FIGURE 10. The lattice entropy of ^3He . The numbered lines are lines of constant volume.

3.6.2. Compressibility

We have calculated the compressibility of solid ^4He and ^3He at 0°K from the 0°K isotherm

$$\beta = -\frac{1}{V} \left(\frac{\partial V}{\partial p} \right)_{T=0} \quad (9)$$

β is given at rounded values of molar volume in table 8.

3.6.3. Thermal expansion coefficient

The volume thermal expansion coefficient, α , can be obtained from the thermodynamical relation

$$\alpha = \beta(\partial p/\partial T)_V \quad (10)$$

α for solid ^4He and ^3He is given as a function of temperature and molar volume in table 9.