\(\frac{\chi_{\parallel}}{\chi_{\perp}}\) ratios had been tabulated for room temperature measurements for some materials (51). However, recent measurements have been extended to low temperature ranges for selected materials (4, 5, 8, 52, 53, 54, 55, 56).

Examples of the dependence of \(\frac{\chi_{\parallel}}{\chi_{\perp}}\) with temperature for a few materials are shown in Fig. 1. It is seen that although the ratio is usually constant over some range of temperature, there is no readily evident trend to be distinguished. Few theoretical predictions of the effects of anisotropy have been attempted. One by Wooster (10) attempted to associate the geometry of the crystal structure for those crystals with approximately equivalent bonds throughout to the anisotropy in the thermal conductivity. Each bond was defined by the angles \(\theta_i\) it made with the three principal axes. He postulated that the ratios of the quantities \(r_i = \sum_{r=1}^{N} \cos^2 \theta_{ri}\) where \(r\) represents the \(r^{th}\) bond, \(i = 1, 2, 3\) for the principal axes, and \(n\) = the number of bonds would be the same as the ratios of the conductivities \(\chi_i\). Application of this theory produced satisfactory predictions on a selected few crystals at room temperature but not on all materials tested. Various other authors (4, 7, 8, 9) have also attempted to explain anisotropy. Generally, under the relaxation time solution to the Boltzmann equation, the problem has been to predict the anisotropy in the phonon velocity and relaxation time, and to determine the relative contribution of each in the anisotropy of the thermal conductivity. Snitzer and Mingins (9) proposed that the anisotropy could be accounted for in the phonon spectrum by attributing an additive portion to \(w(q)\) which was directionally dependent. However, they concluded that even with a small anisotropy

\[\text{These ratios are for hexagonal, tetragonal, and trigonal crystals.}\]

\[\text{Numbers in parentheses in this figure refer to references in the bibliography.}\]