distribution function is considered to change only slightly during a collision, so that perturbation techniques can be employed. For a complete review of this technique see Klemens (30,31). The second method is a variational technique using trial functions in which the entropy production is maximized in a collision process. This method leads to an underestimate of the thermal conductivity and because of the nature of the trial functions does not lead to generalized results. The method has been used by Liebfried and Schlomann (39) and Ziman (40). For a review of this technique see Goldsmid (36).

To use the relaxation time solutions to the Boltzmann equation it is necessary to know the frequency and temperature dependence of the physical scattering mechanisms in real crystals. Much effort is directed at prediction of the relaxation times characteristic of various identifiable scattering processes. The following table lists some of these processes and the frequency dependence of the relaxation times. (See Table 2.)

Boundary scattering has been discussed by Casimir (27) and Berman, et al. (28,29). The phonon-phonon scattering processes are detailed in Klemens (31,35) and Herring (46). Information about imperfection and impurity scattering is found in Klemens (31,35), Toxen (47,48), Walker and Pohl (45), Holland (41), and Carruthers (32). Electron-electron scattering is explained in Rosenberg and Mendelssohn (37). Resonance scattering has recently been found by Walker and Pohl (45), Wagner (42), and Klein (49). Evidence of electron-phonon scattering is presented by Griffen and Carruthers (44) and Ziman (50).

Anisotropic Effects

Until recently there had been relatively few anisotropic thermal conductivity measurements over a range of temperatures, although