Planck Institute of Chemistry (Otto Hahn Institute) in Mainz. This is not surprising, as these samples consist predominantly of olivine, and terrestrial olivines show no fluorescence either, probably because of their high iron content.

As many terrestrial feldspars show that fluorescence is of organic origin, it would be interesting to test meteorites consisting predominantly of feldspar (anorthite), if such exist. I should be grateful for any information as to whether such meteorites are known and whether I could have a small sample.

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The Liquid Friction Constant

One of the more pressing problems in the kinetic theory of non-uniform liquids is the determination of the appropriate friction constant, β, in terms of the arguments of particle dynamics[1,2]. Although loosely termed a friction constant, β is more correctly a tensor quantity : it is likely (on clear physical grounds) to have its largest value in the region of melting and to decrease steadily towards the condensation region, although how strongly is not fully clear[2]. Any accurate calculation of β, made without serious approximation, offers extreme mathematical difficulties that have not yet been overcome. A rough theoretical estimate of the order of magnitude of β may, however, be possible in the melting region without a direct appeal to the full mathematical details of the theory of non-equilibria, as will now be shown. The method involves a relation proposed by Prof. E. N. da C. Andrade in Nature[3] some time ago.

According to Andrade, the viscosity, η, thermal conductivity, k, and specific heat at constant volume, C_v, for a non-metallic monatomic liquid at the melting point, are related according to the expression :

$$k = A\eta C_v \qquad (1)$$

Here A, a constant, is approximately unity : for liquid argon, Andrade finds A to be about 0.8. In what follows I shall accept this relation as being true.

Current ideas of liquid non-equilibria describe the irreversible movement to equilibrium in terms of β alone[4] : in particular, liquid viscosity and thermal conductivity are derived in the forms :

$$\eta = \beta X_1 \text{ and } \beta k = X_2$$

where X_1 and X_2 are functions derivable from a knowledge of the liquid equilibrium structure. It follows then that the ratio η/k is given by :

$$\frac{\eta}{k} = \beta^2 \frac{X_1}{X_2} \qquad (2)$$

Alternatively, C_v is known to be given by $C_v = \left.\dfrac{\partial U}{\partial T}\right|_v$,

where U is the internal energy, related by the well-established principles of statistical mechanics to the free energy, F, and the partition function Z according to :

$$F = -kT \log (\lambda Z); \quad h^{3N}\lambda = (2\pi mkT)^{3N/2} \qquad (3)$$

the symbols in λ having their usual meaning.

Combining (1), (2) and (3), there results an expression for β :

$$\beta \sim \left(-T \frac{X_1}{X_2} \frac{\partial^2 F}{\partial T^2} \right)^{-1\,2} \qquad (4)$$

where $\sqrt{A}$ has been assumed equal to unity. If X_1, X_2 and F are known numerically, (4) can be expected to give an estimate of the order of magnitude of β in the region where its value is largest, that is, in the neighbourhood of the melting point. A comparison with the independent value of β in the vapour region will then give some information about the mean dependence of β on the temperature.

In the absence of any full theory of melting, it is probably sufficient to assume that the liquid short-range order is adequately represented by the pair distribution, $n^{(2)}$, even in the neighbourhood of the melting temperature. If this is accepted, the functions X_1 and X_2 may be calculated[5,6] if $n^{(2)}$ is known[7]. On the other hand, with $n^{(2)}$ known, I have recently shown how the liquid free-energy for some temperature T can be determined by the mathematical procedure of variable interparticle coupling[8]. Consequently, if $n^{(2)}$ is known, β can be determined from (4) directly without appeal to experimental data. The reliability of the value of β so derived will depend upon the adequacy of $n^{(2)}$ as a representation of the liquid structure in the melting region ; however, (4) will still apply even if distributions of higher order are also important.

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Orientation of Stearic Acid Monolayers on Silver Single Crystals

Electron diffraction has been used to study stearic acid monolayers adsorbed by retraction from n-hexadecane solution on a flat (111) face of a silver single crystal. The crystal was prepared by evaporating silver on to a heated mica substrate[1].

Fig. 1 shows the diffraction pattern of the silver substrate in the $1\bar{1}0$ azimuth. The elongation of diffraction spots into streaks normal to the edge of the shadow shows the surface to be very flat. This should be compared with Fig. 2, which shows the diffraction pattern when a stearic acid monolayer has been retracted on the silver, with the crystal in the same azimuth. The silver pattern has been reduced in intensity and additional streaks appear half-way between the substrate pattern. Fig. 3 shows a diffraction pattern with the silver in the $2\bar{1}\bar{1}$ azimuth with further extra streaks due to the monolayer.

These patterns are different from any previously observed from monolayers adsorbed on polycrystalline substrates, which have certainly been rough on a molecular scale and have shown only layer lines indicating orientation of the hydrocarbon chains approximately perpendicular to the substrate. They