atom diameter, crystallization of a eutectic requires chemical diffusive motion over several atom diameters.

In ionic melts one would expect a similar strong glass-forming tendency in low melting eutectics. This expectation is confirmed by the observations of Dietzel and Poegel[8], who showed that the glass-forming tendency of the calcium nitrate–potassium nitrate system is greatest for solutions of near eutectic composition. J. D. Mackenzie (personal communication) has shown that these solutions are mainly ionic in character.

M. H. Cohen

University of Chicago,
Chicago, Illinois.

D. Turnbull

General Electric Research Laboratory,
Schenectady, New York.

[1] Cohen, M. H., and Turnbull, D., *J. Chem. Phys.*, **31**, 1164 (1959).
[2] Turnbull, D., and Cohen, M. H., *J. Chem. Phys.* (in the press).
[3] Turnbull, D., and Cohen, M. H., "Modern Aspects of the Vitreous State", edit. by Mackenzie, J. D. (Butterworths) (in the press).
[4] Zachariasen, W. H., *J. Amer. Chem. Soc.*, **58**, 3841 (1932).
[5] Klement, W., Willens, R. H., and Duwez, P., *Nature*, **187**, 869 (1960).
[6] Hansen, M., "Aufbau der Zweistofflegierungen" (Springer, Berlin 1936).
[7] Hilsch, R., "Non-Crystalline Solids", edit. by Fréchette, V. D., 348 (J. Wiley and Sons, New York, 1960).
[8] Dietzel, A., and Poegel, H. J., Proc. Intern. Cong. Glass, 3 (Venice, 1953).

Ultra-Violet Absorption Spectrum of Water

On further examination, the absorption peaks of water recently discussed[1] have been found to be inherent in the instrumental technique used. The fall in the values of optical density at the lower wave-lengths is the normal stray-light effect under these conditions, but the 'fine structure' is now thought to be due to the oxygen absorption in the factory-sealed monochromator and inadequate compensation within the instrument when the slit automatically opens and closes on passing through the wave-lengths at the oxygen absorption peaks.

The water spectrum in the far ultra-violet to 185 mμ as shown by Barrett and Mansell[2] has been confirmed in this Laboratory by a grating instrument (Optika *C.F.*4) which has just been installed.

R. M. Golding

Dominion Laboratory,
Department of Scientific and Industrial Research,
Wellington, New Zealand.

[1] *Nature*, **186**, 308; **187**, 138 (1960).
[2] *Nature*, **187**, 138 (1960).

METALLURGY

Microhardness and Other Properties of Magnesium Compounds with the Calcium Fluoride Structure

Relations have previously been proposed[1,2] between hardness and latent heat of fusion, L_f, for pure metals. This communication shows that a relation also holds for the series of intermetallic compounds Mg_2Si, Mg_2Sn and Mg_2Pb, and by using the results for these compounds, L_f for Mg_2Ge is obtained by interpolation.

The four compounds form an isomorphous series from the covalent semiconductor Mg_2Si to the nearly metallic Mg_2Pb. On electrochemical grounds the bond-strength, and therefore also the mechanical strengths, would be expected to decrease in the same order. Fig. 1 shows that this is indeed the case for microhardness, while degree of brittleness (as indicated by cracking near the impression) also decreases in this order. Alloys near the composition of the respective phases were melted and slowly cooled to form large idiomorphic grains; the microstructures of the four alloys were remarkably similar. Impressions were made on a freshly polished surface with a diamond pyramid indenter under 50 gm. load. Great care was necessary in the preparation of these surfaces as all the compounds tarnish rapidly in moist air, the rate of attack increasing from Mg_2Si to Mg_2Pb.

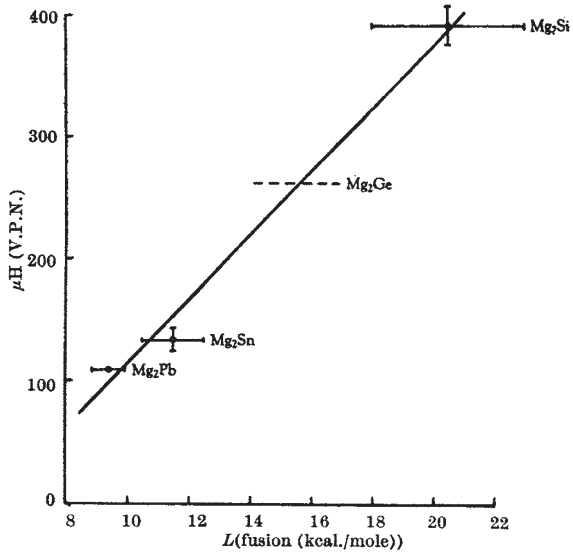

Fig. 1. Relation between microhardness and heat of fusion

In Fig. 1 it may be seen that the hardness-level of Mg_2Ge should intercept the curve at $L_f = 15{\cdot}5$ kcal./mole, and it is suggested that this would be accurate to $\pm 1{\cdot}5$ kcal./mole. No data have been found in the literature to verify this value.

That these compounds do in fact form a physico-chemical series is shown by Fig. 2, where the microhardness is seen to be a function of the interatomic distance, r, between unlike atoms. The relation is of the form given by Goldschmidt[3]:

$$H = S \cdot \frac{e_A \cdot e_B}{r^m}$$

where S and m are constants, and e_A and e_B the valency of the two atoms. The slope m seems to

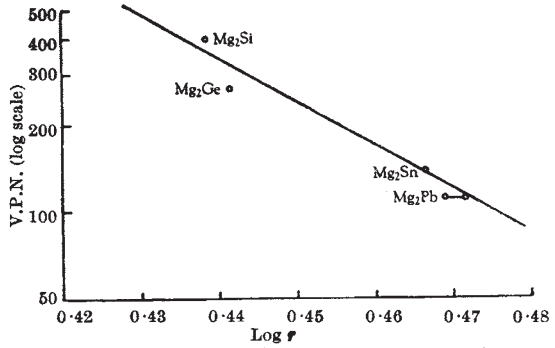

Fig. 2. Relation between microhardness and interatomic distance