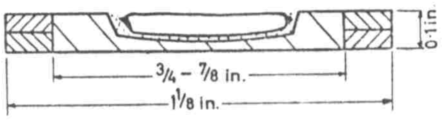
The analcite or phillipsite may also be formed at 225° and 15 kb, starting with a water plus 1 : 1 : 3 mixture (Na_2O : Al_2O_3 : $3SiO_2$). The containment of the very volatile CS_2 also is possible, although sealing into the tubes is more difficult, for the polymerisation reaction (Bridgman[8]) above 42 kb at 100—200°.

Internal heating

Thick wafers also permit a form of resistance heating similar to that used in the belt-type and tetrahedral-ram pressure apparatuses. In this modification (Fig. 8) the cell thickness before compression is 0·125 in., but it will have a lenticular shape after the run with centre thickness 0·08 in. and edge thickness 0·065 in. approximately. It is obvious from the appearance and variable hardness of the wafer that the pressure is greatest in the centre over a flat capsule about $\frac{5}{8}$ in. in diameter and that the outer portion of the wafer provides in effect a graded pressure seal to the edges of the anvil flats. The heating strip is arranged in this space as shown in Fig. 8. With this method it has been possible to contain briefly molten platinum and iron, and on occasion silica, at pressures of the order of 30—60 kb with pyrophyllite wafers as the pressure medium. There appear to be many potentialities for valuable synthesis work with this system, but precise measurement of temperature and pressure is unlikely.



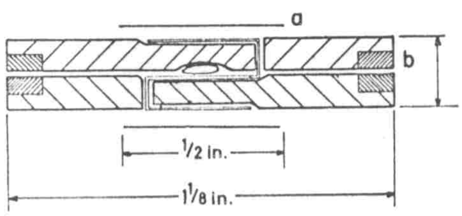


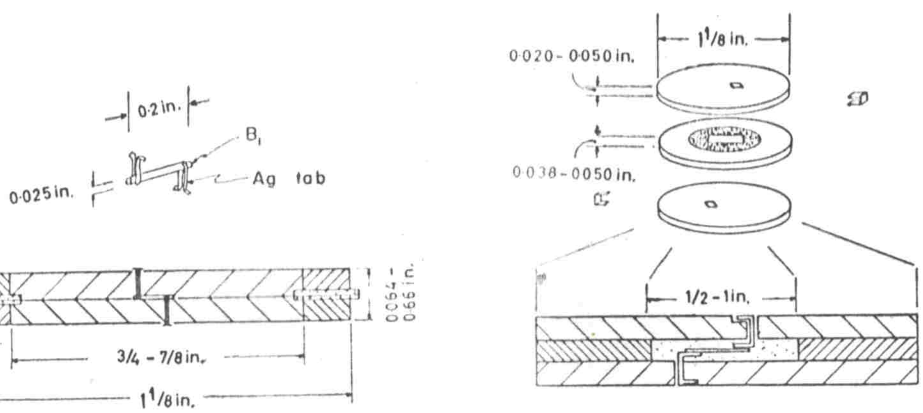
Fig. 7 (left). *Sample assembly for use with sealed tubes for hydrothermal work at opposed-anvil pressures*
Pyrophyllite is used as a pressure medium

Fig. 8 (right) *Sample assembly incorporating a resistance furnace in the form of a strip for use in syntheses at high temperatures and pressures*

(a) platinum foils for electrical contacts (b) nickel rings enclosing pyrophyllite wafers

Electrical measurements at pressure

Bridgman's work with electrical resistance measurements in the anvil pressure system is well known. In the course of similar work in this laboratory (Myers *et al.*[9]) sample assembly modifications such as those shown in Fig. 9 have been most useful in providing reproducible measurements of changes of resistance under pressure. The major differences with Bridgman's assembly is the use of metal-containing rings instead of pipestone or lavite, and an overall thinner sample. The recognition of the importance of the sample thickness and the accommodation to the radial pressure gradient are the important new features.



(a) (b)

Fig. 9. *Two sample assemblies used for electrical resistance and calibration studies*