is drawn on Fig. 4a and compared with the data measured on the creep curves. The accuracy of the fit is quite satisfactory. Fig. 4b gives a plot of σ_Y/T against log t_D compared to a set of parallel straight lines calculated from Equation 3, using the constants given in Table I and a mean value of $\Delta\epsilon_D$ taken equal to 3%. The fit is acceptable except for the lowest values of the stresses related to 80°C where $\Delta\epsilon_D$ becomes much greater than 3%. We believe that this region of experimental conditions belongs to the edge of range I. This assumption is in agreement with the results of Matz *et al.* [8], who found that at 90°C the delay time becomes independent of the stress for values greater than $t_D = 10^3$ sec.

In conclusion, it appears that:

(1) the tensile creep yield behaviour of polycarbonate may be compared to the tension yield behaviour, provided one takes as the yield point the inflexion of the creep curve;

(2) the yield behaviour of polycarbonate may, therefore, be described by an Eyring-type equation over ten decades of strain-rate, in a range of temperatures, from room temperature to 80°C;

(3) within this range, the delay time can also be approximated by an Eyring-type equation having the same constants A, C and Q as the former one.

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Observation of microprecipitates in PbTe single crystals

The presence of microprecipitates has long been assumed in the lead chalcogenides. However, direct observation, although very difficult, has been achieved for PbSe by transmission electron microscopy of thinned crystals [1]. Similar experiments on PbTe have proved inconclusive [2] but the presence of precipitates in evaporated PbTe [3, 4] and PbS [3] films has been demonstrated.

Attempts to thin PbTe crystals for transmission electron microscopy have proved difficult. However, platinum-shadowed carbon replicas can be readily produced and allow the speedy examination of the topography of large surface areas provided that a sufficient number of separate replicas are made over the required area. Therefore, replication was used to examine and assess the quality of freshly cleaved single crystals of PbTe taken from large Bridgman grown ingots. The ingots were grown from a melt containing 0.5 at. % excess tellurium so that tellurium rich (i.e. p-type) material was obtained over the whole length [5]. Samples were taken from various positions along the ingot so that the effects of the variation in tellurium content could be assessed. This is possible because ingots become progressively rich in tellurium as one proceeds from the front (first end to freeze, FETF) to the rear (last end to freeze, LETF) [5]. Many ingots were examined along their lengths both before and after etching to produce dislocation etch pits [6]. In order to eliminate mosaics, that is, low-angle grain boundaries, ingots were regrown after removing the LETF [5]. As the latter was rich in tellurium, regrown ingots contained less tellurium than those grown only once.

Replicas of unetched surfaces consisted of cleavage steps and rivulets separated by microscopically flat regions similar in appearance to optical micrographs of identical areas at much smaller magnifications. Etched surfaces contained etch pits having square cross-sections indicating that the cleaved surface was a (100)

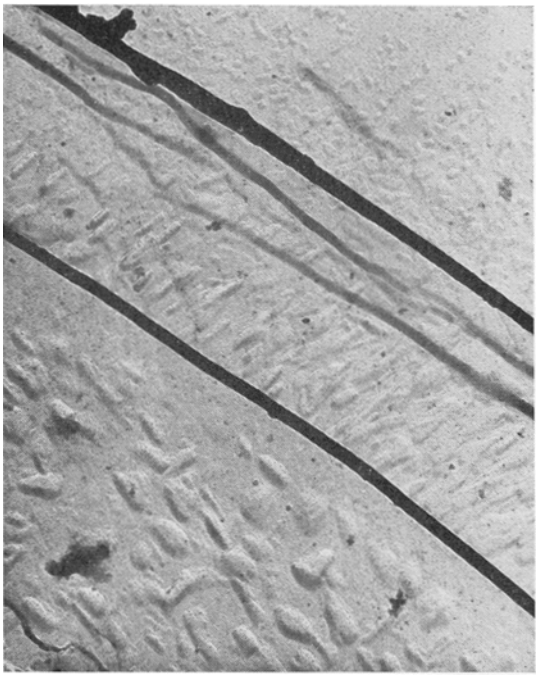

Figure 1 Platinum shadowed carbon replica of (100) cleavage plane of PbTe showing probable tellurium-rich microprecipitates, magnification × 30 000.

surface [5] which is in agreement with the known cleavage plane for PbTe.

Areas near the last end to freeze of an ingot grown only once were sometimes found to have clusters of cigar-shaped surface bumps (Fig. 1). It is suggested that these bumps have their long axes pointing in the ⟨100⟩ directions and represent tellurium-rich microprecipitates. The length and diameter of the precipitates was estimated to be of the order 1500 to 2000 Å and 500 to 1000 Å respectively. These dimensions suggest some of the precipitates are platelets; this is consistent with investigations on PbTe [3, 4] and PbS films [3], precipitates in the latter having dimensions 400 Å × 20 Å. However, others are more cylindrical in shape and are thus similar to the precipitates with approximate dimensions 6000 Å × 1500 Å detected in bulk PbSe [1]. Similar clusters to those shown in the figure were never seen in the ingots which were regrown, but single, smaller cigar-shaped precipitates were sometimes observed.

It is concluded that surface replication of cleaved PbTe allows the easy observation of particles which are thought to be tellurium-rich microprecipitates. It remains to corroborate measurements of this type with transmission electron microscopy of thinned crystals and possibly with reflection electron diffraction. However, because mosaic-free PbTe has so few precipitates it may prove difficult to locate them by either of these methods.

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Determination of the K, v diagram of epoxide resins

There is, at present, a great deal of interest in the determination of K, v diagrams of materials. The K, v diagram relates the velocity (v) of a crack to the stress intensity factor (K) which causes it to propagate. It provides a valuable method of investigating such effects as the environmentally assisted growth of subcritical cracks in glasses and ceramics; the dependence of fracture energy on crack velocity in viscoelastic polymers; and many other rate-dependent fracture phenomena.

Recently, Evans [1] has shown how the K, v diagrams of glasses and ceramics may be obtained rapidly and easily by a relaxation technique using the double-torsion specimen geometry first suggested by Outwater [2]. With this geometry the rate of change of compliance (C) with crack length (a) is constant. For such a