finding very much in line with the Brewer predictions.

Conclusions

The work described above has shown that at high temperatures platinum will react strongly with refractories such as alumina, zirconia and thoria when oxygen is effectively removed from the surrounding atmosphere. Magnesia is the only refractory so far examined which resists this type of decomposition, which can occur at temperatures as low as 1200°C.

The intensity and rate of these decomposition processes depends upon the geometry and environment of the reacting system. These subjects and their practical implications will be discussed in subsequent articles.

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Strength and Ductility of Iridium

CAUSES OF FABRICATION DIFFICULTIES

Iridium is harder and more difficult to work than any of the other face centred cubic metals and, although it has a high shear modulus and low Poisson's ratio, these factors alone do not account for the troublesome fabrication characteristics of this refractory noble metal.

The anomalous deformation behaviour of iridium has stimulated a good deal of investigation, and a recent paper (1) presents the results of tensile tests carried out in the Cavendish Laboratory at Cambridge on single crystal test pieces which were pulled at temperatures ranging from 20 to 2040°C.

Test pieces were prepared by electro-spark machining from zone-refined rods which had been remelted up to 25 times, in vacuum, to expel all the dissolved and entrapped gases. The critical resolved shear stress of these carefully refined crystals was approximately seven times higher than that of iridium of comparable purity, reported upon by Haasen (2) in 1965. The rate of work hardening was, however, much less. The Cambridge investigators find it difficult to account for these differences in terms of deformation mechanisms, and although microscopic deformation twinning was observed, the stress-strain curves showed that this had no significant effect upon the macroscopic behaviour.

Like all previous workers, therefore, the authors of the present paper conclude that the difficulty in fabricating iridium is associated with the presence of impurities. The segregation to grain boundaries of interstitial impurities is suggested as a possible reason for the poor ductility of polycrystalline iridium, although the capricious behaviour of single crystals still remains unexplained. Although the practical fabricator of iridium will find little in the paper to assist his activities, possible lines for future investigation can be discerned from the experimental results. It seems obvious, however, that a significant "breakthrough" has yet to be achieved.

A. S. D.

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