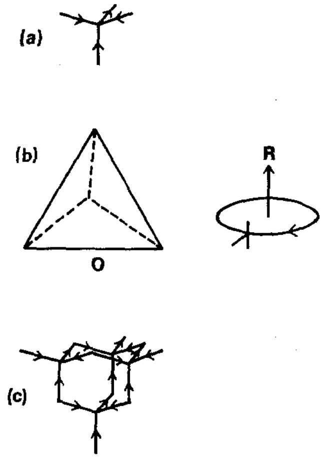

Figure 2 (a) Spatial distribution of fault vectors. (b) Convention for determining the sense of fault vectors. The positive direction of advance along the dislocation is arrowed. (c) Diamond lattice of fault vectors.

a T-junction of two faults, such as that at B in fig. 1. In order to satisfy the $\Sigma R = O$ node criterion, one fault must be terminated near the junction by a dislocation, i.e. the faults do not quite touch.

(e) A node with two vectors missing corresponds to a V-junction of stacking faults. To meet the node criterion, a dislocation whose Burgers vector equals the sum of the two missing vectors is required along the "stair-rod". Two V-junctions can be seen at C in fig. 1.

Acknowledgements

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The Structure of Thin Platinum Sheet

It has been shown, by Middleton, Pfeil, and Rhodes [1], that the mechanical properties of platinum prepared by powder-metallurgical methods differ considerably from those of platinum prepared by melting and casting. Betteridge [2], in examining laminated platinum sheet, made a similar observation. In both papers, the difference in properties is attributed either to a dispersion of porosity or to a dispersion of oxides formed from impurities in the platinum.

In the present investigation, material about 12 μm in thickness was prepared by cold rolling at room temperature, with frequent interstage anneals, the final reduction being about 20 to 30%. Three types of platinum were examined: pure cast material, pure sintered material, and sintered material containing about 0.5% of thoria. Thin foils for examination in the electron microscope were prepared by electropolishing in molten NaCl at a temperature just above the melting point of 801° C [3].

In considering the thin-foil microstructure of these specimens, it is important to remember that preparation by electropolishing has itself introduced a heat treatment at 801° C for about 15 to 30 min, producing thermal conditions sufficient to cause complete recovery in pure platinum. The foil prepared from cast material exhibited, indeed, a fully recovered structure, with a subgrain size of about 2 to 3 μm and there was frequent occurrence of narrow markings (twins?) with an average width of about 0.1 μm but varying in width up to 0.2 to 0.3 μm. The foil prepared from sintered material showed a much finer subgrain size (0.5 to 1 μm), and contained spheroidal defects, as shown in fig. 1. The density of defects varied widely in different regions of the foil: that shown in fig. 1 is typical of the average density. No twins were found in that material. The platinum containing 0.5% of thoria still had a fairly high dislocation density, indicating that the presence of thoria particles had retarded recovery.

From these results, it is possible to conclude that the difference in mechanical properties between cast and sintered platinum is due to the presence, in the sintered material, of spheroidal defects. If these defects were oxide particles, it could reasonably be expected that the microstructure of the sintered platinum would more closely resemble that of the platinum containing particles of thoria. It therefore seems most probable that the conclusion of prior workers,

Figure 1 Spheroidal defects and isolated dislocations in sintered and rolled platinum annealed at 801° C (× 80 000).

that there is a dispersion of porosity, is correct.

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Book Reviews

The Chemistry of Hydrometallurgical Processes

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Pp 160 (Spon, 1966) 50*s*

The stated objective of the author of this monograph is to cover the basic chemical theory of hydrometallurgy processes. This objective has been realised with fair success, although there is some unevenness in the general presentation and one serious omission, namely discussion of the chemical principles underlying the subject of solid-liquid separation processes in hydrometallurgy. Obviously, any hydrometallurgical process must contain one or more solid-liquid separation stages, and such operations are always expensive and often difficult to operate in a satisfactory manner. A discussion of the basic physico-chemical factors underlying liquid-solid separation processes would have been most welcome, e.g. what are the mechanisms of operation of the different types of flocculating agents?

The monograph is divided into seven chapters, of which the first four are of an introductory character. These present condensed fundamental discussions of equilibria in solutions, thermodynamics of reactions, and the kinetics of heterogeneous reactions. The main body of the book is made up of three chapters on, respectively, leaching reactions, methods of purification and separation, and the precipitation of metals and oxides by reduction. The relative lengths of these three chapters are in about the correct ratio to the corresponding importance of these topics in hydrometallurgy.

The chapter on leaching reactions commences with an account of the dissolution of metals (Au, Ag, Cu), which is a useful and interesting summary. This is followed by an account of the leaching of metal sulphides, which includes a full thermodynamic treatment. However, in between these sections is one on the leaching of silicate minerals which is totally inadequate. A section of one half page does not do justice to the importance of silicate minerals in hydrometallurgy! Similarly, the coverage given to the subject of bacterial leaching of ores is less than is warranted by the real importance of this subject. This chapter is completed with an interesting survey of reaction