Lattice Parameter Determinations

Until very recently the true high temperature structure of rhodium has been rather uncertain. Lattice parameter determinations have conflicted (6, 7) and have certainly not been sufficiently accurate to refute completely Rudnitsky's claim (8) that an allotropic modification occurred at 1030°C. Any existing uncertainty has been finally resolved by a paper emanating from the Department of Metallurgy at Oxford (9). This describes the design of two high temperature cameras with which accurate lattice parameters have been determined up to the melting point of rhodium. The face-centred cubic structure was observed up to 1960°C and the measurements provided no evidence whatever to suggest an allotropic modification. The mean coefficient of thermal expansion of rhodium varied from 8.8×10^{-6} per °C between 23 and 200°C to 12.4×10^{-6} for the range 20 - 1950°C.

These determinations on rhodium were made under completely inert atmospheric conditions and gave values for the lattice spacing very much lower than some previously reported. In view of the effect of dissolved oxygen on creep resistance, the possibility of oxygen contamination during X-ray work should not be neglected. It is conceivable, for example, that Bale's (6) determinations may have, in fact, been made on a dilute solution of oxygen in rhodium.

A. S. D.

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Platinum in Hydrogen Peroxide Production

AN IMPROVED ELECTROLYTIC PROCESS

The production of hydrogen peroxide on a very large scale is generally considered to be most economically carried out by the oxidation/reduction of anthraquinone. Smaller scale manufacture, however, is still by the older electrochemical processes which make use of the exceptionally high resistance of platinum to anodic oxidation.

Dr Joseph Müller, of Degussa, Rheinfelden/Baden, has recently described modifications to the Weissensteiner process—originally developed in 1905—which have resulted in substantial reductions in current consumption and space requirements. It is now believed to be the most economical of the electrochemical processes in operation (*Chemie-Ing. Techn.*, 1963, **35**, (5), 389–392).

Pure sulphuric acid is electrolysed using high anodic current densities to form persulphuric acid, which on hydrolysis forms hydrogen peroxide. The latter is distilled off. The anodes consist of silver wires sheathed with platinum 60 to 85 microns thick. Later modifications of these anodes employed a platinum wire 0.12 mm diameter, 10 metres long, welded on to a tantalum sheath 150 microns thick enclosing a 1.2 mm diameter silver wire. The silver core provides high conductivity for the electrode to enable a uniform potential to be used along its entire length. The tantalum sheath protects the silver core from attack by sulphuric acid and the platinum wire carries the current into the solution to be electrolysed.

Each anode operates at the centre of a narrow-bore tube of porous porcelain which acts as a diaphragm to separate the anode and cathode reactions. Most of the cells in operation have had lives exceeding ten years.