particles affect the recrystallisation dynamics, inhibit rearrangement of the dislocations on the grain boundaries and prevent the movement of the grain boundaries. Therefore, this dispersion hardened platinum possesses a stable fine grain structure at high temperature.

Conclusions

[1] The cold forming properties of the dispersion hardened platinum are between those of pure platinum and Pt-10Rh, thus it is easy to form wire at room temperature.

[2] The technology of melting dispersion hardened platinum is more complicated than that of pure platinum, since the melting equipment requires a better vacuum system and the incorporation of magnetic stirring.

[3] The thermal stability of the conventional Pt:Pt-Rh thermocouple is affected by the loss of oxide (platinum oxide and/or rhodium oxide) which forms at high temperatures, by diffusion, and by the chemical action between the thermocouple wire and the surrounding insulating material. The chemical action is limited by the following factors: (a) the affinity between platinum and contaminants from the insulating ceramic; (b) the surface area; (c) the rate of diffusion of oxygen and the metal vapour from the area in which they react (7). Thus, when the thermocouple is used at high temperatures for a long time, a difference will occur between the real temperature and the recorded values.

This difference was overcome by the new dispersion hardened Pt:Pt-10Rh thermocouple, due to the dispersion phase inhibiting the growth in the grain size in the hot environment. The thermocouple has a stable fine grain structure at high temperature, improved resistance to creep and a long service life. Additionally, the diameter of the wire could be reduced from 0.5 mm to 0.38 mm, making such thermocouples more economic.

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The Metallurgy of Iridium

Metallurgy and Mechanical Behaviour of Iridium

BY N. I. TIMOFEEV, A. V. YERMAKOV, V. A. DIMITRIEV AND P. E. PANFILOV,

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This book selectively reviews papers published over the past 30 years, with a few earlier texts, on the metallurgical and mechanical properties of iridium; roughly half the papers are Russian.

The book is in two sections, the first covering iridium refining, and pyrometallurgical methods for purification of this high melting point metal. This includes remelting scrap in an oxidising environment and electron beam melting/alloying. Iridium recovery after refining and the production of massive single crystals are described. The behaviour of impurities and alloying additions to iridium, in an inert atmosphere, as a function of atmosphere, pressure and temperature is analysed.

The second section examines the mechanical properties of iridium single crystals, including the mechanisms of deformation and fracture, with emphasis on the growth of cracks on the surface of massive single crystals and in thin crystalline iridium foils. Basic methods for working iridium, its alloys and their properties are described. There is discussion of grain structure development and the recrystallisation that occurs during iridium annealing. Finally, a range of applications of iridium, such as use as a container material, particularly for crucibles, and rolled sheet production are briefly mentioned.

The book may be purchased from Dr Sergei M. Pirogov, Ekaterinburg Non-Ferrous Metal Processing Plant, Lenin Ave., 8, 620014 Ekaterinburg, Russia, Fax: +7-3432-58-0739.