workers shows a rather erratic scatter within ±10°C of the new values.

Summing up, it is stressed that this study indicates that temperature measurements above 1000°C may be made every bit as accurately with the "Five-Twenty" couples as with platinum : 10 per cent rhodium-platinum couples, and that the former have a considerably higher range. They can be used continuously in air up to 1700°C with only a relatively slow and easily monitored change in calibration and cold junction compensation can normally be neglected.

Bedford's work is broadly confirmed by recent unpublished work in the Johnson Matthey laboratories. There are slight but systematic differences between the curves and the explanation of these most probably lies in the variation in composition of the alloys which although nominally 5 and 20 per cent rhodium-platinum naturally tend to vary slightly from these exact values. The real value of Bedford's work is that it proposes an acceptable table to which all manufacturers may conform, thus ensuring that matching characteristics are obtained. This has been done very successfully with the platinum versus 10 per cent and 13 per cent rhodium-platinum thermocouples where tables originally proposed by the National Physical Laboratory, London, and the National Bureau of Standards in Washington, U.S.A., are now the international standards.

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Crystallisation of Glasses Containing Platinum

A STUDY OF THE MECHANISM OF NUCLEATION

Glass of high strength can be produced by suitably controlling the process of crystallisation (1). Its formation can be better understood by studying the mechanism of the nucleation and crystallisation of glass.

Work has been carried out recently on this problem by R. L. Thakur of the Central Glass and Ceramics Research Institute of India with K. Tazikawa, T. Sakaino and T. Moriya, of the Tokyo Institute of Technology (2). They chose for their studies a eutectic composition glass of lithia-alumina-silica melting at 975°C, which is reasonably homogeneous after melting at 1400°C. Platinum was introduced as dilute platinum chloride solution. Tests were made on glasses with and without platinum as nucleating agent.

Differential thermal analysis was used to determine the transformation temperature, the nucleation and crystallisation temperatures, and the heat treatment necessary for the samples. The crystals were studied by electron microscopy and X-ray diffraction.

Glasses containing no platinum always commenced to crystallise from the surface inwards and there was no phase separation except at the interface with the part already crystallised. The crystals were much larger than when platinum was present.

The appearance of crystals in the platinum-containing glass was always preceded by phase separation, and crystallisation then took place throughout the whole mass. Heat treatment at 550°C produced complete nucleation within eight hours but nucleation remained incomplete at this temperature when no platinum was present even after eleven days.

A series of electron micrographs was produced that clearly indicated the phenomena described. The ability of platinum to act as a nucleating agent for the controlled crystallisation was fully confirmed and the paper is a valuable contribution to studies of the platinum metals for this purpose.

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