with the land, then reinforcing the joint with conductive cement before finally overglazing the entire resistance area. The whole detector is now effectively transformed into a monolithic structure, which vibration and mechanical shock fail to separate.

The overglaze performs a second and equally important function of electrically insulating the detector from unprotected sources of potential, e.g. exposed furnace windings. The insulation resistance is $>10M\Omega$ at 240V at room temperature and $>1M\Omega$ at 50V at 600°C.

The thermal response of the Thermafilm detector is superior to that of a conventional wire-wound platinum resistance detector when measured in accordance with BS 1904. Similarly self-heating is within the required specification and is typically +0.02°C/mW.

Finally, the Matthey Thermafilm temperature detector shows excellent linearity when compared with conventional resistance thermometers, and tests confirm the cyclic and long-term stability of earlier predictions after exposure to elevated temperatures.

Conclusion

The Matthey Thermafilm Resistance Thermometer is a novel temperature detector, developed from thick film technology to high standards of quality, eminently suitable as a low cost replacement for industrial platinum resistance thermometers and thermocouples. It is technically superior to a thermistor over a wider range of temperatures. It is ideally suited to automation for large quantity production and is currently being developed in tubular form.

References

1 C. W. Siemens, *Proc. Roy. Soc.*, 1871, **19**, 351
2 H. L. Callendar, *Phil. Trans.*, 1887, **178**, 160
3 L. Holland, (Editor), "Thin Film Microelectronics", Chapman & Hall Ltd, London, 1965; Chapter 1, pp. 12–13, plates 6 and 7 facing p. 33
4 R. W. Vest, Semi-annual Tech. Report (1/1/71–6/30/71) dated August 1st, 1971, "Conduction Mechanisms in Thick Film Microcircuits", p. 28

Platinum Alloys in Corrosive Environments

HIGH TEMPERATURE RESISTANCE TO MOLTEN GLASS AND AIR

The ability of platinum and its alloys to resist the corrosive effects of a wide variety of media that rapidly cause other metals to decay has been the basis of their use in many industries, and especially in the glass industry. However, the mechanism by which molten glass and air attempt to attack platinum alloys has not been completely worked out as yet. Certainly some platinum alloys resist attack better than others and so a report on Russian studies on three important platinum alloys is particularly interesting.

E. I. Rytvin and L. A. Medovoi (*Vliyanie Fiz.-Khim. Sredy Zharoproch. Metal. Mater.*, 1974, 87–94) investigated the corrosion of the alloys 10 per cent Rh–Pt, 10 per cent Rh–25 per cent Pd–Pt and 1.5 per cent Ru–10 per cent Rh–25 per cent Pd–Pt in air and in a molten glass of composition 54 per cent SiO_2, 14.5 per cent Al_2O_3, 10 per cent B_2O_3, 16 per cent CaO, 4 per cent MgO. The ductility and high temperature strength of the alloys were assessed by measuring the rate of sublimation and dissolution at 1400°C in the unstressed state and during creep induced by an initial stress of 0.5 kg/mm^2.

It was discovered that the corrosion which occurs is intergranular in nature. This is illustrated by a series of photomicrographs and the results are tabulated. It appears that the rate of intergranular corrosion mainly depends upon the alloying elements and that dissolution of the alloys in glass is slower when tensile stress is applied. Molten glass affects the high temperature strength and ductility of the platinum alloys so that, when the degree of intergranular corrosion is greater, then the reduction in the ductility of the platinum alloys also increases.

It can be concluded from examination of the results that 10 per cent rhodium-platinum is superior to either of the alloys containing palladium in its ability to withstand the corrosive conditions met with when in contact with molten glass, as well as when exposed to air at high temperature. F. J. S.