too reducing and both metals are precipitated. Nickel and cobalt showed differences in behaviour from the noble metals in that the potential of the reversible redox reaction and the metal deposition potential are very close together. Cobalt also shows an unusual peak shape.

This work is of special interest to those actively engaged in fused salt plating with platinum metals and goes a long way towards explaining some of the apparent anomalies that exist in the published literature of this electroplating art. J.H.F.N.

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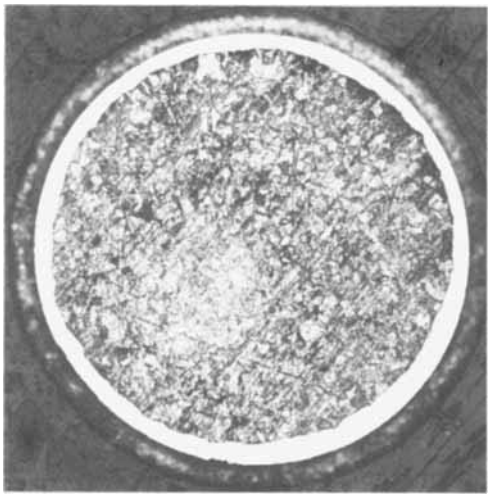
Platinum Plated Palladium Leadout Wires

Platinum resistance temperature detectors can be used with suitable electrical instruments to measure or control temperatures between −70 and 600°C, over which range the relationship between electrical resistance and temperature is approximately linear. Initially the platinum was used in the form of a wire coil but now thick film resistance detectors have been developed and are finding increasing industrial application, while in addition they have great potential for domestic use. These detectors comprise a resistance track of high purity platinum film bonded to an inert ceramic substrate and protected from the environment by a glaze. To achieve the required resistance only a thin particulate film is needed, and as both the production and the checking stages are largely automated the devices are relatively low cost items (W. D. J. Evans, *Platinum Metals Rev.*, 1981, **25**, (1), 2–11).

The ends of the thermometer resistance element, whether wire wound or thick film, have to be attached to the instrumentation in a reliable manner. A robust connection that will give long life free from corrosion at temperatures up to 600°C is required, while thermal e.m.f.s must be avoided where the leadout wires are joined to the device. In the past, platinum wire has invariably been used to make the initial connection but now a suitable cost effective alternative is available. Using a fused salt technique Johnson Matthey Metals Limited has produced a palladium-cored wire coated with platinum Typically, 20 microns of platinum is employed, this thickness of plating being both uniform and non porous, and the wire may be resistance welded to the usual base metal extension wires without difficulty. This material is now being used by Matthey Printed Products Limited on their Thermafilm® detectors, and it has proved to be an effective alternative to pure platinum.



The thickness and uniformity of the platinum coating may be checked by microscopical examination of cross-sections of the wire. The outer edge of the platinum is preserved by plating the wire with copper prior to sectioning, but this is partially removed when the polished specimen is chemically etched to differentiate between the platinum plating and the palladium core. The section here is reproduced at a magnification of approximately ×125

It is anticipated that fused salt platinum plated palladium will find additional applications where similar conditions are encountered, and similar properties required. D.J.N.