The Thermal Conductivity and Electrical Resistivity of Platinum

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Since the measurements of thermal conductivities and electrical resistivities of platinum and the other members of the platinum group of metals reported in this journal in 1962 (1), further measurements have been made at the National Physical Laboratory. Values were reported in 1963 (2) for measurements on the same sample of platinum up to 1200°K and for measurements on a half-inch sample over the range 300 to 1200°K. Recently measurements have been made on the original quarter-inch diameter sample down to 81°K. The experimental methods used need not be detailed here as they followed closely those previously described (3).

The present results are in good agreement at their upper temperature limit and with those obtained from 315°K upwards in the earlier measurements. The small but definite negative temperature coefficient is one respect in which these results differ from those of other workers.

The electrical resistivities of the specimen were also measured in order to calculate the Lorenz function $L = \frac{\lambda \rho}{T}$ where λ=thermal conductivity, ρ=electrical resistivity and T=absolute temperature. The new values of λ, ρ and L are given in the table.

Values of λ w cm^{-1} deg^{-1}, $10^6\rho$, ohm cm and 10^8 L, V^2 deg^{-2}, for Platinum between 100 and 500° K

Temperature °K	λ	$\rho \times 10^6$	$L \times 10^8$
100	0·78	2·8	2·18
200	0·77	6·9	2·67
300	0·74	10·92	2·69
400	0·73	14·72	2·69
500	0·73	18·4	2·69

Full details of this work, and of further determinations on four specimens of ruthenium, will shortly be published elsewhere (4).

References

1 R. W. Powell, R. P. Tye and Margaret J. Woodman, *Platinum Metals Rev.*, 1962, **6**, 138–143

2 R. W. Powell and R. P. Tye, *Br. J. Appl. Phys.*, 1963, **14**, 662–666; see also *Platinum Metals Rev.*, 1964, **8**, 13

3 R. W. Powell, R. P. Tye and Margaret J. Woodman, *J. Less-Common Metals*, 1963, **5**, 49–55

4 *Ibid.*, *J. Less-Common Metals*, in the press

Platinum Electrode in Miniature Battery

The Jet Propulsion Laboratory in California has produced for NASA a miniature battery capable of 1.5 volts and a short-circuit current of one milliampere. It has a core of three wafers – an inert platinum electrode, an electrolyte composed of an electron acceptor such as iodine and a donor such as perylene, and a dissimilar metal electrode such as magnesium. Test batteries endured 130°C successfully, were rechargeable and had indefinite shelf life. They should be insensitive to radiation and be sterilisable for use in spacecraft, where they would make the subsystems less dependent on the main power supply. Terrestrial applications envisaged include energising microelectronic circuits, as the cells could be incorporated directlyinto solid-state circuitry by standard techniques.