

ratio, on the low temperature values has also been examined. This leads to the conclusion that the accuracy of the recommended values lies within 10 per cent below 100K, but improves to less than 3 per cent between 100 and 300K and less than 2 per cent in the range 300 to 1200K. Above 1200K accuracy decreases to 10 per cent uncertainty. The recommended values are again summarised in the Table; the values above 100K have been corrected for expansion. Those given for temperatures above 1600K are based on data that leads to values of the Lorenz ratio that are

considered to be too high. More plausible values of the conductivity are given in the Table in brackets, but the author cautions that more measurements in this temperature range are needed.

The conference proceedings of "Thermal Conductivity 17" have been published by Plenum Press, New York, 1983 and readers of *Platinum Metals Review* are advised to refer to the original paper for a fuller description of the recommended values for both resistivity and conductivity, and for the basis on which they have been derived. C.W.C.

A Report of Fuel Cell Technology

The latest briefing of members of The Fuel Cell Users Group of the Electrical Utility Industry of the United States of America, which took place in Portland, Oregon in July, was designed to provide attendees with a thorough understanding of the status of technology development of the fuel cell. At the meeting it was apparent that, for a number of reasons, the move toward commercial exploitation of fuel cell technology was proceeding at a faster rate than in the past.

Although the 4.8MW phosphoric acid fuel cell power plant in New York is inactive the other demonstration plant built by United Technologies Corporation (U.T.C.), operated in Japan by the Tokyo Electric Power Company, successfully completed Phase 1 of the programme, that is the generation of 4.5MW of alternating current, in February. The unit ran for 100 hours during early June and the Phase 2 endurance test is continuing. While neither has been entirely satisfactory the experience gained has encouraged U.T.C. to proceed to the next stage of development. Twenty-three 11MW units of improved design are to be built and will be offered at competitive prices under guaranteed performance conditions. Additionally, in a programme sponsored by the Gas Research Institute, U.T.C. are manufacturing forty-nine 40kW fuel cells for on-site testing; four by the Department of Defense and the remainder by commercial participants. These phosphoric acid cells incorporate platinum-containing catalysts supplied by Johnson Matthey. To date the longest uninterrupted run has exceeded 75 days, and is continuing. It is important to note that these units are employed under actual working condi-

tions at sites that include a laundry, offices and sports clubs where the combined heat and electric power output, and the environmental acceptability of fuel cells are of great benefit.

The modular construction of fuel cell power plants provided the flexibility that will enable the power utilities to respond to changes in the predicted requirements for new and replacement generating capacity. The utilities are also seeking plant efficiency and reliability. With this in mind the Westinghouse Electric Corporation has now been given a contract by the Southern California Edison Company to design a 7.5MW fuel cell intended for the utility's transmission and distribution system.

The meeting was addressed by Mr. K. W. Maxwell, Managing Director of Rustenburg Platinum Mines who spoke of the large reserves that are available to meet the growing market for platinum, and the lead time that is necessary to establish new mining capacity. The known platinum reserves of the Merensky Reef are more than 300 million ounces, while beneath this is another platinum-bearing reef, known as UG2, which also contains in excess of 300 million ounces. It has been estimated that by the year 2000 the demand for platinum to be used in fuel cells for markets in the U.S.A. and Japan could amount to 580,000 ounces. A major investment of capital and a lead time of 18 to 30 months would be required to meet this demand. Rustenburg Platinum Mines is closely watching developments to ensure that sufficient platinum is available when it is required.

In view of the useful function performed by The Fuel Cell Users Group in North America, Johnson Matthey have suggested the formation of a similar group in Europe. G.J.K.A.