involves only the longer interatomic spacings (12) and although such spacings do exist in the c.p.h. metals (1), they are less commonly available than in the f.c.c. metals. Consequently, it might be expected that the c.p.h. metals would show a significantly lower activity for acetylene hydrogenation than the f.c.c. metals. This has been found not to be the case and these observations may also support the postulate that acetylene chemisorbs as a binuclear π-complex, rather than as a σ-1,2-diadsorbed species, since the former state will have less severe geometric restrictions. Such a conclusion may be substantiated by the observation that acetylene and ethylene when adsorbed on nickel films show positive surface potentials (13).

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High Temperature Resistance Furnaces

40 PER CENT RHODIUM-PLATINUM VERSUS RHODIUM

The rhodium-platinum equilibrium diagram has been known since about 1930, but metallurgists in general have been somewhat slow to appreciate its significance when they need to choose a material for winding resistance furnaces for operation at high temperatures.

For the last 20 years whenever it has been necessary to construct small furnaces operating in air at temperatures up to about 1800°C, rhodium has invariably been the first choice.

The original proposal to use rhodium for this purpose is to be found in a pamphlet issued by the National Physical Laboratory in August 1942, describing the technique of calibrating platinum : 13 per cent rhodium-platinum thermocouples for use in liquid steel.

A furnace was needed in which the tip of the couple could be heated slowly until the platinum arm melted, the molten bead gradually moving down the other arm of the couple. The furnace, which was rated at only about $\frac{1}{4}$ kilowatt, was made by winding rhodium strip on a sintered alumina tube, the winding being protected by a layer of pure alumina from the outer lagging.

The reason for the choice of rhodium as a winding is its high melting point, 1960°C. Rhodium wire or strip, however, is not particularly easy to make, it tends to be fibrous in structure, and is expensive. A brief reference to the rhodium-platinum diagram indicates that the melting point of rhodium is lowered only very slowly by additions of platinum; even with 60 per cent of platinum the liquidus temperature is lowered by only 25°C. It is thus possible to make very considerable economies with little sacrifice in performance by employing a 40 per cent rhodium-platinum alloy in place of rhodium whenever high temperature furnaces are to be constructed.

Recently attention has been given to improving the uniformity and ductility of 40 per cent rhodium-platinum wire and strip. Methods of manufacture have been developed which ensure a fine grain size even after long service at elevated temperatures, and as the characteristics of this alloy are more widely appreciated, it will find increased use for making small high temperature furnaces for operation in air.

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