Table II

Activity of some platinum-platinum metal alloys for the electrolytic evolution of oxygen (pH 1.28)

Alloying addition atomic per cent	Enhancement ratio at 1.8 V, nhe	Enhancement ratio at 1.9 V, nhe
0 (bright Pt)	1.00	1.00
1.9 Ru	—	2.5
3.8 Ru	—	1.0
9.3 Ru	—	1.8
1.1 Ir	—	1.9
2.0 Ir	—	2.2
5.1 Ir	—	2.2
10 Ir	—	1.9
1.6 Rh	2.5	—
3.7 Rh	2.7	—
9.1 Rh	4.5	—
17 Rh	7.9	—
1.6 Pd	—	1.4
3.6 Pd	—	1.4
8.8 Pd	—	1.1
20 Pd	—	1.6

platinum itself. Of the alloys studied rhodium-platinum appeared to be the most active either as cathode or anode. The reason for the improved electrocatalytic activity is not known. Synergistic effects are unlikely as all the alloys examined consisted of a single phase, although miscibility gaps do occur in some of the systems under *equilibrium* conditions. However, the latter are not usually obtained in practice. Application of the electron theory, with the catalytic activity of a metal depending on its d-character, may be applied with limited success to reactions involving simple sorption and desorption from the gas phase. Its application to electrocatalysis, where there exists a much more complicated state of affairs, does not seem either helpful or promising. A better knowledge of the electronic structure of metals and alloys in the condensed state, and of the effect of an applied field on the electrons, is desirable first.

One of us (E.W.B.) is indebted to the former Department of Scientific and Industrial Research for a research studentship under the tenure of which this work was executed.

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Thermodynamic Data for Platinum

A CRITICAL ANALYSIS

Platinum, it has only recently been recognised, exhibits a characteristic known as 'recoilless resonance' when bombarded by 99 keV gamma rays; so that measurements of the absorption of the radiation afford a means of studying what is termed the lattice dynamics of the metal. Analysis of the results of these experiments involves a term known as the Debye temperature θ_{DW}, which relates to the behaviour to be expected from an ideal, homogeneous, isotropic elastic body; and in a recent paper (1) J. R. Harris and his colleagues at Rutgers University, New Brunswick, New Jersey, have reported a value $\theta_{DW}=(234\pm6)$°K at 0°K. It is also possible to calculate the value of θ_{DW} from a knowledge of the specific heat, thermal expansion, and compressibility of the metal. J. L. Feldman and G. K. Horton, of the same University, have accordingly (2) made a critical examination of the available measurements, determining how closely they can be fitted into one curve for θ_{DW} from 0° to 300°K. The paper must be consulted for details. This analysis yields a value for θ_{DW} of (232 ± 3) at 0°K.

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