coefficients of hydrogen in several series of palladium alloys as obtained by this technique, and discussed the form of the relationships between diffusion coefficient and alloy composition.

Professor B. Baranowski, of the Polish Academy of Sciences, Warsaw, gave a general review concerning experimental problems in the study of the nickel/hydrogen system. An outline was presented of the development at Warsaw of high pressure apparatus, capable of attaining pressures up to about 16,000 atmospheres, which was necessary for studying the form of equilibrium p-c-T relationships over a wide range of hydrogen contents. Professor Baranowski then discussed measurements of lattice constants, thermoelectric power and electrical resistance concerning the nickel/hydrogen systems, and also presented information concerning measurements of changes of the electrical resistance of hyrided palladium in equilibrium with hydrogen gas at very high pressures.

Professor G. Wedler of the University of Erlangen gave a review of experimental studies with ultra-high vacuum techniques of changes of heat of adsorption, electrical resistance and work function of evaporated nickel films resulting from the adsorption of hydrogen and deuterium. Results from experiments in which very small amounts of either isotope were successively adsorbed or desorbed, suggested that at all coverages some but not all of either adsorbed isotope was readily exchangeable. In an analysis in which the existence of different forms of available adsorption sites on different crystal faces was considered, it was concluded that differences in such respects were not sufficient to have a great influence on the differential heat of adsorption, in keeping with its observed behaviour up to complete monolayer coverage.

Dr R. Rubin, of the European Atomic Energy Research Centre at Ispra, discussed the experimental problems in obtaining diffusion information from measurements of the coherent scattering of low energy neutrons by hydrogen in low concentrations in palladium, niobium, vanadium and tantalum. This technique seems uniquely valuable in indicating favoured crystallographic directions for interstitial jumps.

M. Mahnig of the University of Münster reviewed recent experimental data obtained at Münster concerning the effect of hydrogen on the magnetic properties of palladium and several palladium alloys, and on the Mössbauer spectra of palladium/tin and palladium/iron alloys. Results were discussed in terms of changes of the electron band structure of palladium.

Dr H. J. Bauer of the University of Munich reported extensive experimental information concerning changes of the ferromagnetic behaviour of thin foils of nickel and nickel/copper alloys on absorption of hydrogen by electrolysis. Conjoint measurements had also been made of changes of the electrical resistance and lattice parameters of the foils. Photomicrographs of changes of the appearance of the nickel foils during electrolysis were also presented.

## Hydrogen Diffusion through Rhodium-Palladium Alloys

Palladium alloys used for the purification of hydrogen by diffusion must not become deformed during the repeated thermal cycles to which they are subjected. Workers at the State Scientific Investigation and Planning Institute for the Rare Metal Industry, Moscow, have now shown (1) the effect of adding rhodium to stabilise alloys used in diffusion equipment by X-ray structural analyses of 1 per cent rhodium-palladium, 1 per cent rhodium-19 per cent silver-palladium and 10 per cent rhodium-palladium. Deformation of the two 1 per cent rhodium alloys after 20 to 800°C thermal cycles was shown to be due to an $\alpha \rightleftarrows \beta$ phase change, which altered their volume. 10 per cent rhodium-palladium, which is nearly as permeable to hydrogen as pure palladium, had no phase change, thus explaining its stability in such conditions. However, even 1 per cent rhodium addition significantly increased the stability of 20 per cent silver-palladium.

(1) A. A. Rodina, M. A. Gurevich and N. I. Doronicheva, *Zh. fiz. Khim.*, 1968, **42**, (7), 1822.