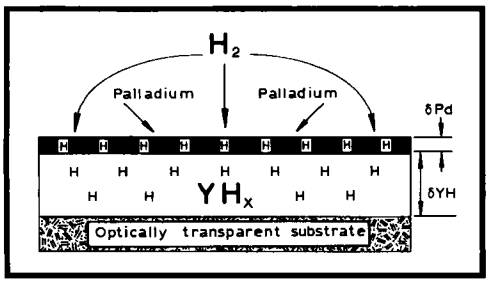
Rapid Hydrogen Permeation in Palladium and Palladium Alloys

Uses for the high values of the hydrogen diffusion coefficients and hydrogen solubilities in palladium, and their dependencies on temperature and hydrogen chemical potentials, are of continuing interest, as is shown by results of studies reported at two recent conferences.

Talloires Conference

This conference, on Palladium and Palladium Alloy Membranes Applied to Hydrogen Permeation and Reaction, was held at the Tufts University Research Centre in Talloires, Lac d'Annecy, France, from 19th to 20th August 1996. The central issues discussed were the addition of alloying materials to palladium alloys to avoid the structural deformations produced by hydride phase transitions during hydrogen absorptive and desorptive cyclic processes, and solving problems linked to reducing the effective thickness of thin, but still coherent palladium or palladium alloy films, on ceramic supported membranes.

Topics discussed included: membrane catalysis for reactive coupling, by V. N. Gryaznov, Academy of Sciences, Moscow; impurity gas effects on hydrogen permeation through Pd-Y (Gd) and Pd-Y-In (Sn, Pb) membranes, by Y. Sakamoto, Nagasaki University; effects of carbon monoxide on permeation in Pd-Ag foils, by J. Meldon, Tufts University, Medford; permeation in ceramic supported palladium films, by S. Uemiya, Seiko University, Tokyo; stability of Pd/alumina component membranes, by D. Way, School of Mines, Golden, Colorado; and hydrogen diffusion in Pd and Pt alloy membranes, by F. A. Lewis, Queen's University, Belfast.



The Fifth International Symposium on Hydrogen in Metals

Over 350 participants attended this symposium, held at the Conference Centre in Les Diablerets, Switzerland from 23rd to 30th August. Some 40 of the 390 abstracts presented dealt with aspects of platinum group metal-hydrogen systems, and of these over 30 involved studies of the palladium-hydrogen system.

Palladium in Optical Switching Phenomena

Interest in palladium has been generated by 'optical switching' effects produced during metallic to transparent transitions, dependent upon hydrogen content in hydrided yttrium (1). The latest work of groups in Vrije University, Amsterdam, and in the Philips Research Laboratories, Eindhoven, by J. N. Huiberts, R. Griessen and collaborators was reported. The palladium layers separate gaseous hydrogen from the hydrogen-content and physical property dependent yttrium specimens, see Figure. The palladium layer impedes oxidation of the hydrided yttrium while providing a catalytic surface for hydrogen molecule dissociation, followed by hydrogen diffusion to and from the interface with the yttrium layer during as rapid-as-possible thermodynamic equilibration. The protective palladium layer thus allows possibilities for the examination of physical and thermodynamic parameters of the underlying hydrided yttrium and other rare earth compositions.

Presentations will be published in a forthcoming issue of the *Journal of Alloys and Compounds*. The next symposium will be held in 1998 in Zhejang, P.R. China, with Professor Q. D. Wang as chairman; Fax: 0086-571-7991930. F. A. LEWIS

Reference

1 *Platinum Metals Rev.*, 1996, **40**, (3), 109