large reconstructions can occur when palladium interacts with hydrogen at 150 K. However, in the bulk of a metal in which a hydride is being formed, there are few places for the atoms to go when the lattice expands. As a consequence it would appear that more thought needs to be given to stabilising the surface in order to prevent material degradation, when metal-hydrogen reservoirs are being designed.

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Carbon Monoxide Sensing Technology

Growing awareness of the hazard of carbon monoxide (CO) in the home environment has aroused great interest in detector alarms in the U.K. and North America. Various sensing technologies have been used to detect the gas.

The first commercial sensor, the Taguchi sensor, correlated the change in conductivity of a heated tin oxide pellet to the concentration of CO present. However, due to its high power requirements, this sensor required mains wiring. The first battery powered CO detectors used an optical detection technique based on colour chemistry, the colour change being the same as in the formation of carboxyhaemoglobin in the blood.

Recently, electrochemical units, suitable for use in battery powered alarms, have become commercially available. These have significant advantages over prior technologies in their accuracy and reliability over a wide range of gas concentrations. Some instruments have visual displays to differentiate between acute high CO concentrations and hazardous chronic low concentrations. Carbon monoxide and oxygen diffuse into the sensor from the ambient air to react:

Anode: $CO + H_2O \rightarrow CO_2 + 2H^+ + 2e^-$
Cathode: $\frac{1}{2}O_2 + 2H^+ + 2e^- \rightarrow H_2O$
Overall: $CO + \frac{1}{2}O_2 \rightarrow CO_2$

The current flowing between the anode and cathode through an external circuit is proportional to the CO present over a wide concentration range. The carbon dioxide (CO_2) that is produced diffuses out from the sensor.

The electrode reactions take place under acidic conditions to avoid a build up of CO_2 in the sensor. Under these conditions platinum is required to catalyse the electrode reactions. Platinum has the ability to form a range of chemisorbed surface species, thereby lowering the activation energy of intermolecular reactions. Platinum forms carbonyl species and surface bound hydroxyl species required for the overall anode reaction.

In practice porous electrodes made from a high surface area platinum material are used. This provides a three-phase boundary between the gas, the electrolyte and the electrode where the electrode reactions can occur rapidly in the presence of CO. GAVIN TROUGHTON

Platinum Labware Catalog

Alfa Aesar in North America has just published a "Platinum Labware Catalog" which describes a range of laboratory products incorporating platinum, platinum group metals and Zirconia Grain Stabilised (ZGS) platinum, utilising the inertness and malleability of platinum.

The catalogue describes typical uses of the equipment and contains reference data and information on a recycling programme.

To obtain a copy of the catalog contact Alfa Aesar; in North America, tel: 800-343-0660 ext. 6404, fax: 800-322-4757; Rest of the World, tel: 978-521-6404, fax: 978-521-6350.