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Palladium as an Aid in Trace Analysis of Food

Palladium has become established as one of the most widely applicable chemical modifiers in electrothermal atomic absorption spectrophotometry (ETAAS). Its applications have recently been extended to the determination of lead, cadmium and tin in food slurries.

In ETAAS a volume of sample is introduced into a small furnace—usually a graphite tube—and heated in stages to remove the solvent, decompose the sample matrix and finally produce a cloud of atoms in the central zone of the furnace. These atoms absorb light selectively, permitting the ultra-trace determination of metals. Chemical modifiers are added to the sample solution to avoid the loss of the elements of interest during the decomposition stage. Palladium appears to act by forming compounds, for example Pb_3Pd, which are more thermally stable than the base metal alone.

A recent report from the University of Strathclyde, Glasgow, describes the extension of this work to the determination of lead in slurries of freeze-dried foodstuffs (S. Lynch and D. Littlejohn, "Palladium as a Chemical Modifier for the Determination of Lead in Food Slurries by Electrothermal Atomisation Atomic Adsorption Spectrometry", *J. Anal. At. Spectrom.*, 1989, **4**, (2), 157–161). Detection limits of 200 ng/g have been reported. Promising results have also been obtained for cadmium and tin. Palladium appears to have considerable potential in this area. P.W.

Plasma-Enhanced Vapour Deposition of Thin Rhodium Films

Thin films of platinum and of palladium have been prepared successfully by plasma-enhanced chemical vapour deposition, and now the use of this method for the formation of thin rhodium films has been reported (A. Etspüler and H. Suhr, "Deposition of Thin Rhodium Films by Plasma-Enhanced Chemical Vapor Deposition", *Appl. Phys. A.*, 1989, **48**, (4), 373–375).

Dicarbonyl-2,4-pentadionato-rhodium(I) was vapourised from a vessel whose temperature could be changed to achieve the required vapour pressure of the organometallic compound and was then carried into the reaction vessel, through the upper electrode, by a flow of argon or a mixture of argon and hydrogen. The rate of deposition and the properties of the rhodium film depend upon a number of parameters including the temperature of the source, the temperature of the substrate, the partial pressure of the organometallic, and the hydrogen content of the carrier gas.

It was found that a source temperature of 50°C gave the best results; increasing the substrate temperature from 30°C to 150°C increased the rhodium content of the deposit from 86 to 96 per cent and lowered its resistivity by a factor of four. Hydrogen in the carrier gas also resulted in a further increase in the rhodium content of the film. The lowest resistivity value determined for these thin rhodium films was 23μΩcm, compared to 4.51μΩcm for pure bulk rhodium at a temperature of 20°C.

Plasma-enhanced chemical vapour deposition using organometallic is thus a suitable technique for preparing rhodium thin films, especially on three-dimensional and temperature sensitive substrates.