acidity, and this has a significant effect on the catalytic system.

Rhodium catalysed low pressure hydroformylation was developed over 20 years ago by Union Carbide, Davy McKee and Johnson Matthey to produce butyraldehyde from propene, CO and $H_2$. Although the standard industrial process uses triphenylphosphine as a ligand for the catalyst, there is much interest in alternative phosphines. Professor A. M. Trzeciak and colleagues of the University of Wroclaw, Poland, have used $\pi$ acceptor ligands based on pyrrole, $PPh_x(NC_4H_4)_{3-x}$ (x = 0–2) to form rhodium based complexes such as Rh(2,4-pentanedionato)(CO)($P(NC_4H_4)_3$). These precursors readily form $HRh(CO)L_3$ with $H_2$ and CO and can perform hydroformylation reactions with excellent selectivity.

Iridium catalysed methanol carbonylation has recently been commercialised by BP in conjunction with catalyst supplier Johnson Matthey. Unlike the existing rhodium system, the mechanistic detail behind the new *Cativa* process is an unexplored area. However, the situation is being remedied by Professor P. M. Maitlis and A. Haynes and their group at the University of Sheffield, U.K. Both rhodium and iridium form analogous active catalytic species, $[M(CO)_2I_2]^-$ (M = Rh, Ir), but their reactivity is very different. Although both readily react with the MeI cocatalyst, only the rhodium complex undergoes a very rapid migratory CO insertion to the acyl $[Rh(CO)(COMe)I_3]^-$. The iridium forms a relatively stable methyl complex $[MeIr(CO)_2I_3]^-$, which can undergo the essential CO insertion reaction when promoted by protic solvents or tin(II) iodide.

Nitric oxide (NO) has been implicated in a variety of disease states such as septic shock, epilepsy and arthritis. E. Slade, B. A. Murrer and colleagues of Johnson Matthey Technology Centre, U.K., have shown that the ability of ruthenium (III) complexes to bind NO can be used to clear NO from biological systems. Ligand systems involving polyaminocarboxylates give ruthenium compounds with good water solubility, low toxicity and allow rapid *in vivo* removal of NO. Infrared spectroscopy is a useful tool for determining the mode of bonding of NO to ruthenium.

Although first line anti-tumour therapy uses cisplatin, $Pt(NH_3)_2Cl_2$, and carboplatin, $Pt(NH_3)_2(C_3H_6C(COO)_2)$, cisplatin resistance can develop after initially successful treatment. C. F. J. Barnard and B. A. Murrer from the Johnson Matthey Technology Centre, U.K., introduced JM-473, *cis*-Pt($NH_3$)(2-methylpyridine)$Cl_2$ which shows activity against resistant tumour xenograft models. The alkyl substituted pyridine ligands slow ligand substitution and can reduce thiol deactivation, which is an important mechanism in resistance.

## Addendum

The next conference in this comprehensive series of platinum group chemistry is presently scheduled to take place in the U.K. at Nottingham University, in 1999.

# Controlling the Shape of Colloidal Platinum

Colloidal metal particles find use in optical, electronic and magnetic devices, as catalysts and photocatalysts. Their catalytic activity depends on the size and shape of the nanoparticles, so the ability to control these parameters is very desirable. Some success has been achieved in controlling the size distribution, stability and catalytic activity of the nanoparticles, but controlling shape has been more difficult.

Now, however, researchers from the Georgia Institute of Technology, Atlanta, U.S.A., and Hahn-Meitner Institut, Berlin, Germany, have synthesised colloidal platinum nanoparticles with controlled shapes (T. S. Ahmadi, Z. L. Wang, T. C. Green, A. Henglein and M. A. El-Sayed, *Science*, 1996, **272**, (5270), 1924–1926).

Platinum nanoparticles were prepared from a solution of $K_2PtCl_4$ and sodium polyacrylate (capping agent) in various concentrations of capping polymer to platinum cation. The platinum ions were then reduced by hydrogen gas. On changing the ratios of the concentrations at room temperature under the same conditions, the distribution of platinum nanoparticle shapes could be changed. Tetrahedral, cubic, irregular-prismatic, icosahedral and cubo-octahedral particle shapes were observed, with cubic and tetrahedral being predominant in some cases.