Acknowledgements

This study formed part of an EPSRC funded project, 'Improved Platinum Aluminide Coatings for Enhanced Corrosion Performance' (contract number GR/K02-367). Help and advice from Rolls-Royce plc, Chromalloy UK Ltd and Johnson Matthey PLC are acknowledged.

References

1 J. R. Nicholls and D. J. Stephenson, *Met. Mater.*, 1991, March, 94

2 T. N. Rhys-Jones, *Corros. Sci.*, 1989, **29**, (6), 623

3 H. Hindman and D. P. Whittle, *Oxid. Met.*, 1985, **18**, (5/6), 245

4 G. Fisher, P. K. Datta, J. S. Burnell-Gray and W. Y. Chan and R. Wing, "An Investigation of the Oxidation Resistance of Pt-Aluminide Coatings Produced by Either High or Low Aluminium Activity Processes", Proc. 3rd Int. Conf. High Temp. Mater., Edinburgh, 23–25 Sept., 1997, Inst. Mater., London

5 C. Duret and R. Pichoir, "Coatings for High Temperature Applications", Applied Science Publishers, London, 1984, p. 33

6 R. Strieff, *J. Phys. IV - Proc.*, 1993, **3**, 17

7 R. Prescott and M. J. Graham, *Oxid. Met.*, 1992, **38**, (3/4), 233

8 J. Jedlinski, and S. Mrowec, *Mater. Sci. Eng.*, 1987, **87**, 281

9 G. Fisher, P. K. Datta, J. S. Burnell-Gray, W. Y. Chan and J. C. Soares, *Surf. Coatings Technol.*, 1998, **110**, 24

10 T. E. Strangman and P. A. Solfest, *U.S. Patent* 4,880,614; 1989

11 H. Hosada, T. Takahashi, M. Takehara, T. Kingetsu and H. Masumoto, *Mater. Trans.*, 1997, **38**, (10), 871

12 K. N. Lee and W. L. Worrell, *Oxid. Met.*, 1989, **32**, (5/6), 357

13 G. Fisher, P. K. Datta and J. S. Burnell-Gray, *Surf. Coatings Technol.*, 1999, **113**, 259

Anticancer Properties of Platinum(IV) Complexes

Since Barnett Rosenberg published the first work on the antitumour activity of platinum compounds 30 years ago, platinum-based drugs have made a major contribution to cancer therapy (1). Cisplatin, the first platinum anticancer drug, and the later platinum drugs developed, are widely used to treat lung, ovarian, testicular, head and neck, and bladder cancers and many other tumours (2). It is generally established that DNA is the primary target for platinum anticancer drugs and much work has gone into examining the mechanisms of activity taking place.

Now, scientists in the Netherlands, have investigated the activity of Pt(IV) compounds as antitumour agents to discover whether such compounds are real drugs or, as is widely believed, act as prodrugs, that is they are reduced to Pt(II) before reaching their DNA target (3). A prodrug is a compound converted within the body to its active form. It is used when the active drug is too toxic for direct administration, or is poorly absorbed, or would be broken down before finding its target.

Pt(IV) is kinetically more inert than Pt(II), which means Pt(IV) drugs are more stable to acidic media, so may survive the conditions present in the stomach, and thus can be administered orally. Pt(IV) drugs are of particular interest since they may be toxic to tumours which are normally resistant to cisplatin. Pt(IV) amine complexes, with the chelating ligand *trans*-R,R-diaminocyclohexane and other co-ordinating anions, were reacted with DNA model bases, such as 9-methylxanthine and 9-methylhypoxanthine. The nature of the anions, and of the DNA model base, was found to determine the *in vitro* reactivity of the Pt(IV) compounds. Identical Pt-DNA adducts were detected from reaction with both Pt(IV) and Pt(II), suggesting that the mechanism of inhibition of DNA replication is the same for Pt(IV) and Pt(II). Reaction occurred in all cases, and Pt(IV)-DNA intermediates were found, so reduction to Pt(II) is not a requirement prior to reaction with DNA. They speculate that Pt(IV) may enter the cell by a different mechanism to Pt(II) and so the possibility remains that some Pt(IV) compounds do not act as prodrugs.

References

1 B. Rosenberg, L. VanCamp, J. E. Trosko and V. H. Mansour, *Nature*, 1969, **222**, 385

2 K. R. Harrap, *Platinum Metals Rev.*, 1984, **28**, (1), 14; C. F. J. Barnard, *ibid.*, 1989, **33**, (4), 162

3 E. G. Talman, Y. Kidani, L. Mohrmann and J. Reedijk, *Inorg. Chim. Acta*, 1998, **283**, (1), 251

Porous Platinum Nanofibres

A new way to produce nanostructures replicating the structure and shape of a base has been developed by researchers from Toyota Central R&D Labs in Japan. They synthesised platinum (Pt) fibres, reproducing the porous structure and fibrous shape of an activated carbon-fibre (C) base (H. Wakayama and Y. Fukushima, *Chem. Commun.*, 1999, (4), 391–392).

The Pt precursor, $Pt(acac)_2$, and acetone were placed in a vessel with activated C fibres and pressurised under supercritical carbon dioxide. The Pt precursor dissolves, and is adsorbed onto the C. Oxidation then removes the C and reduces $Pt(acac)_2$ to Pt metal, which sinters. Thus control of nanostuctural shape has been achieved and porous Pt fibres of high-surface area with potential catalytic use have been made.