conventionally-styled HydroGen 3 and the quite outrageous AUTOnomy concept vehicle.

In another hall, politicians scrambled for photo opportunities with a new fuel-cell-powered motor scooter. Jointly developed by Aprilia (Italy) and MES-DEA (Switzerland), the scooter carries a 3 kW PEMFC – effectively supplying its environmental credentials to a young 'fashion' vehicle.

However, perhaps the most creative concept of all came from the British company, Intelligent Energy. Again, using platinum-based PEMFC technology, their compact units could be used for many different power applications. One of them, a 50 kW system composed of two 25 kW stacks, is to be used to power a lightweight single engine Boeing aeroplane (3). Although fuel cells will not be powering the world's airplanes in the foreseeable future, the first flight of this fuel cell plane is planned for December 2003, the one hundredth anniversary of the first powered flight. As a symbol, it allows us to consider where the fuel cell might be in another hundred years, although signs are that we will be using fuel cells in our daily lives much sooner than that. D. M. JOLLIE

References

1 http://www.hannovermesse.de/

2 http://www.fair-pr.com/

3 W. Knight, 'Fuel cell-propelled aircraft preparing to fly', http://www.newscientist.com/, 12th May, 2003

David Jollie is the Editor of the online resource Fuel Cell Today (fuelcelltoday.com), sponsored by Johnson Matthey, Hatton Garden, London. His main interests are the industrial development and utilisation of fuel cells.

Polymeric Platinum-Containing Anticancer Drugs

There have been many reviews over the past 30 years on platinum anticancer drugs. Usually, these have described the structure/activity relationships which have been established for platinum complexes. Few, if any, have dealt with polymeric species containing platinum, which is now the subject of the following review of a chapter written by Deborah W. Siegmann-Louda and Charles E. Carraher (Florida Atlantic University) entitled 'Polymeric platinum-containing drugs in the treatment of cancer'. This well informed chapter comes from the future Volume 3 in the book series on polymer science entitled "Macromolecules Containing Metal and Metal-Like Elements", which will be published by John Wiley & Son (http://www.wiley.com/), in late 2003 or at the beginning of 2004, tentatively priced at U.S. $125.

The polymer-platinum conjugate can act as a drug itself or as a prodrug. For the polymer to act as a prodrug requires a non-toxic polymer backbone containing solubilising entities to make it water-soluble and functional groups capable of reversible binding to the drug species with, ideally, some targeting specificity to enhance accumulation in the tumour. The binding of platinum drugs through oxygen-donor leaving groups, either carboxylate or hydroxyl species, provides a ready means of realising this model. Where the polymer-conjugate acts as a drug itself, the binding of the platinum to the polymer may reduce the elimination of the drug by the kidneys and reduce toxicity by reduction in the amount of hydrolysis products formed. Additionally, the polymer conjugate may circumvent resistance due to reduced cellular influx/enhanced cellular efflux mechanisms that affect small molecules. Finally, the activity may be modified by multiple bonding at a given site. Binding the platinum through nitrogen donors, such as amines, gives materials which exemplify this approach. The active species may be released by chain degradation, where monomeric units are released from the ends of the polymer, or chain scission, where macromolecular units are produced by breaks at random points in the polymer chain.

Examples of each of the above approaches are given in the review. Structural information on the polymer-platinum conjugate is given where this is available along with cytotoxicity data for many samples. Although some materials were found to be more cytotoxic than cisplatin there has been no attempt to date at the commercial introduction of any polymeric platinum drug. C. F. J. BARNARD

Chris Barnard is a Scientific Consultant at the Johnson Matthey Technology Centre in Sonning Common, U.K. His main interests are in platinum chemistry, particularly in the areas relevant to anticancer therapy, and homogeneous catalysis.