
Editorial

New Applications for Gold

The gold industry has recognized the importance of identifying new applications for gold and is increasingly active in developing basic science into exploitable technology. That is a good sign. But we must ensure that development of the basic science of gold is encouraged too.

Gold has been surprisingly under-investigated as far as its chemistry is concerned and catalysis by gold is only now beginning to come into its own. Two international conferences have recently highlighted the growing interest in the use of gold as a catalyst. We reviewed the first of these, held in Cape Town in April, in our previous issue (*Gold Bull.*, 2001, 34, 56 - 66). Since then, there has been a gold/silver catalysis symposium held as part of EuropaCatV in Limerick, Ireland in September*. We are left with the overall impression that gold catalysis research relevant to practical applications has started very late compared with investigations of other catalytic materials but it has exciting potential for new uses in chemical processing, pollution control and fuel cells.

Other new applications for gold are also being developed. These include the use of gold as a dopant in high performance alloys and in advanced materials. Additions of small quantities of other metals to high carat golds gives them added strength with consequent new commercial possibilities (see *Gold Bull.*, 1999, 32, 39 - 47). An article describing the effects of additions of rare earths is included in this issue. New applications in the pharmaceutical and dental areas are being pursued by investigating the properties of new candidate gold drugs and new gold alloys respectively.

Nanotechnology and Catalysis

Gold catalysis depends on activation of small nanoparticles of gold on transition metal oxides, and as such it is part of the wider field of nanotechnology. This was highlighted at the LBMA Precious Metals Conference in Istanbul in May. As readers of the Nanotechnology abstracts in our 'Highlights from the Literature' section will know, gold is very amenable to preparation in nanosized particles and these have many potential uses in electronics and biomedical applications.

*To be reviewed in our next issue.



Amongst the metals only silver and platinum compete: but silver can be too reactive with the environment and platinum is twice as expensive as gold. Studies in academia include both methods for controlling the growth of gold nanoparticles and studying their properties and interactions with molecules of all shapes and sizes. Appropriate characterization methods have also been devised.

Nanotechnology sits somewhere between chemistry, which is based on interactions between single atoms and molecules, and large scale traditional engineering which lies behind so many of the manufactured products used in today's society, but it is much closer to the atomic and molecular dimension. For example, it is foreseen that nanometre-sized gold particles could form the basis for a new type of faster computer and for new approaches to methods for biomedical diagnosis. An electrochemical nanoswitch operating on fewer than thirty electrons was described recently (see *Gold Bull.*, 2001, 34, 33) and molecular switches which could form a basis for a memory chip involving ultrathin wires and tiny particles of gold have recently been announced. Sensors based on nanotechnology, including catalysis, are already being developed. One indication of the potential seen for nanotechnology is that the US Federal Government is planning to spend \$400 million this year on research in this field. This is exciting news. Let us hope that some of it is directed to gold!

It is therefore encouraging to learn that World Gold Council has a new strategy to promote the industrial applications of gold. You will see in an accompanying note in this issue a statement about an opportunity to apply for WGC funding of new R & D projects relevant to this aim. To assist in this strategy, Dr Richard Holliday has joined World Gold Council as Manager, Industrial Applications. We welcome him also as a member of the editorial team on *Gold Bulletin*.

A handwritten signature in black ink that reads "David Thompson".

David Thompson
Technical Editor