

## References

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# Platinum Group Metals in Catalysis

The 14th North American Meeting of the Catalysis Society was held in Snowbird, Utah, from June 11th to 16th, 1995. This prestigious meeting attracted some 1000 participants from industry and universities predominantly from North America. The four parallel sessions for each of the 5 days meant that it was impossible to do more than sample the wide range of catalytic topics covered. The meeting had a special emphasis on environmental catalysis, with 31 oral papers being presented, and as usual in this area the noble metals, such as platinum, featured prominently. The low temperature carbon monoxide oxidation activity of platinum/ceria combinations was discussed by J. C. Frost from Johnson Matthey and L. Murrell from ABB Lummus Crest/Engelhard, while M. Prairie from Sandia National Laboratories emphasised the dominant role of platinum/gold/titanium as a photocatalyst for treating air and water pollutants.

A slightly disappointing aspect of the meeting was the lack of presentations on genuinely new catalytic materials. Many of the most interesting presentations reviewed new techniques such as NMR studies of molecules in zeolites to probe acidity (J. Haw from Texas A & M University) or electron holography in electron microscopes which allows the 3-dimensional interior structure of nanoscale particles to be examined; this was discussed by A. Datye and L. Allard from the University of New Mexico. Other developments of note included the detailed work on membrane reactors and particularly the use of membranes to control the rate and position of mixing of reactants in hydrocarbon selective oxidation, reviewed by M. Harold from Du Pont.

There were sessions on surface science, catalyst characterisation, sulphide catalysts, hydrocarbon conversion, acid catalysts, zeolites, the evergreen topic of syngas formation and reactions, selective oxidation (with only a few pre-

sentations on methane coupling), residual oil upgrading, catalyst deactivation and reaction engineering. An unusual but refreshing feature of the meeting was the number of high quality presentations by industrial organisations. Conspicuously absent were discussions on homogeneous catalysis, polymerisation catalysis, biomimetics and other topics which normally attract considerable interest worldwide.

While new applications of the platinum group metals were not much in evidence, almost a third of the papers dealt with some aspect of platinum group metal catalyst performance and the continuing importance of these materials in heterogeneous catalysis came across very clearly throughout the meeting.

J.C.F.

## Palladium Shape Memory Alloys

High-temperature shape memory alloys, especially titanium-nickel-based alloys, are used in industrial and medical applications because of their unique combination of perfect shape memory and ductility. However, their use is restricted to temperatures around 373 K, the temperature of the thermoelastic martensitic transformation. There is now a need for shape memory engineering alloys with higher temperatures for use as actuators in motor vehicles, aircraft engine and pipe couplings, and titanium-palladium alloys with a martensite start temperature of 823 K may be suitable.

Now, researchers from Japan have studied the means to improve the characteristics of these alloys (D. Golberg, Y. Xu, Y. Murakami, K. Otsuka, T. Ueki and H. Horikawa, *Mater. Lett.*, 1995, 22, (5, 6), 241-248). Using  $Ti_{50}Pd_{50-x}Ni_x$  ( $x = 10, 15, 20$ ) alloy high temperature tensile tests at 293-858 K were carried out. They found that reversibly transforming the as-rolled martensitic phase and annealing it below the recrystallisation temperature improved the shape memory characteristics of this system.