

U.S.A.) provided great insight into C–H bond activation processes, and Zhenyang Lin (Hong Kong University of Science and Technology) showed how theoretical studies can add to the insight in an incisive way. Sylviane Sabo-Etienne (Laboratoire de Chimie de Coordination, Toulouse, France) described the activation of boranes and silanes, demonstrating the main group elements to hydro-

gen bonds as  $\eta^2$ -ligands. Richard Eisenberg (University of Rochester, U.S.A.) reported the power of parahydrogen-induced polarisation to track through the mechanistic pathways of  $H_2$  through a catalytic cycle, while Jon Iggo (University of Liverpool, U.K.) reported on impressive technical developments with a flow cell to allow *in situ* NMR under high pressures, without

## An Equilibrium in Catalyst Optimisation and Development?

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A number of the presentations at the Eighth International Conference on the Chemistry of the Platinum Group Metals focused on catalysis. One of the major issues addressed was the cost involved in the design, synthesis and optimisation of new catalysts. Why spend so much money and time on the preparation of expensive ligands and complicated techniques when triphenylphosphine with  $PdCl_2$ , under standard conditions, works well?

As the conference progressed through imaginative and stimulating presentations it became clear that the search for more efficient catalytic processes requires the involvement of both academia and industry. While the optimisation of the processes can be left to the industrialist, academics should dedicate their time to design and enhancement of novel systems that might involve unprecedented chemistry.

There were a number of fascinating and inspiring presentations. Professor B. R. James (University of British Columbia, Canada) provided an amusing advertisement for the paper industry, describing the requirements for new strategies in the hydrogenation of lignin found in wood pulp, particularly one using a  $RuCl_3 \cdot 3H_2O$  and trioctylamine catalyst. This was a call to academia for some fresh ideas.

There were also some examples of novel routes for the overall development of catalytic systems. Two interesting presentations on the use of dendrimer catalysts by the van Koten group (G. P. M. van Klink and R. J. M. Klein Gebbink, Utrecht University, The Netherlands) were given. Organic products could be separated from the reaction

mixture by recently developed nanofiltration techniques. Careful choice of catalyst, the strong chelation of the pincer ligands in these cases, prevented catalyst leaching.

An important puzzle was also highlighted by Professor P. S. Pregosin (ETHZ, Switzerland) in his talk on the '*meta-dialkyl effect*'. This interesting contribution showed that greatly improved enantiomeric excesses are obtained when *meta-dialkyl* substituted ligands are used. The reasons for this dramatic effect were discussed and studies have shown that in Pd-phosphino-oxazoline allyl complexes, the observed *trans*-influence of both the N and P donors were the same. This remarkable '*leveling effect*' clearly needs further investigation and may have many implications for reactivity.

The conference has shown that there is a great deal of chemistry which is available for study, and in particular platinum group metals can be used to study a wide range of reactions. Pure curiosity and application-driven research will continue to be essential for the development of exciting and novel chemistry. In both cases, real investment will be required to achieve the challenging aims ahead.

### The Author

Gareth Owen is working towards a Ph.D. in organometallic chemistry at Imperial College, under the supervision of Dr Ramón Vilar. His thesis will concentrate on the palladium-mediated reactivity and insertion chemistry of carbon-heteroatom multiple bonds, such as isocyanides, imines and heterocumulenes. His research interests include the design of novel supramolecular ligands and their uses in the control of selectivity in catalysis.

Gareth Owen is the joint winner of the *Platinum Metals Review* PGM8 conference student article competition.