carbonaceous residue. With subsequent pulses of butane the build up of the carbonaceous deposit increased and the selectivity to butene also increased.

Jenny Jones (University of Leeds, U.K.) presented work on sulfur poisoning of CH_4 combustion catalysed by Pt, Pd and Rh. Sulfur compounds, such as mercaptans, are used as odorants in domestic supplies of natural gas, so the effects of a range of sulfur compounds on catalyst deactivation were studied. Catalysts used were 2 wt.% Pd, Pt and Rh on alumina with a gas feed of 4% CH_4 in air. Activity was found to increase in the order: Pt < Rh < Pd. TEM helped to distinguish between sulfur-induced agglomeration and simple site blocking effects in catalyst deactivation.

Automotive Catalysis

The final session contained three presentations on automotive catalysis. The first two were concerned with NOx storage/reduction (NSR) catalysts for NOx control in lean-burn engines. These catalysts consist of a Pt/Ba component which stores NOx as nitrate during lean engine operation. The engine periodically runs rich and under this condition the nitrate is decomposed and the released NOx is reduced with the help of a Rh component in the catalyst. David James (University of Reading, U.K.) presented pulsed flow microreactor work on the effect of Pt loading on the decomposition of $Ba(NO_3)_2$ and the difference between using H_2 or CO as the reductant. Pt was shown to promote nitrate decomposition with the extent of the promotion increasing with Pt loading. H_2 was shown to be superior to CO in NOx reduction.

The second presentation on NSR catalysts was by Stephen Poulston (Johnson Matthey) who described the effects of gas composition on the regeneration of nitrated or sulfated model NOx storage catalysts consisting of Pt/Ba. Again the advantage of H_2 over CO as a reductant was highlighted. The influence of CO_2 in the simulated gas feed was also described. CO_2 is often omitted from synthetic exhaust feed compositions but has an effect on catalyst regeneration by lowering the temperature of Ba nitrate and sulfate decomposition.

The final talk by James Anderson (University of Dundee, U.K.) was on the use of an oxychlorination treatment to regenerate engine-aged three-way catalysts. Oxychlorination partially recovered catalyst activity and, in the case of Pd-based catalysts, also the oxygen storage capacity; there was some evidence for redispersion of Pt but not of Rh.

Conclusions

This short highly-directed conference provided an insight into many of the current themes of interest to catalyst scientists. Selected papers will be published in a special issue of *Catalysis Today*.

The next conference is expected to be a meeting to mark the retirement of Professor Geoff Webb on 16–18th July, 2003, at the University of Glasgow (http://www.chem.gla.ac.uk/colloquia/catalyst/Catalysis_Symposium.html). For further information visit the websites at www.rsc.org and www.icheme.org.

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Rhodium Dendrimer Catalysts

Rhodium (Rh) complexes have high reactivity and selectivity and could be used in the hydroformylation of long chain alkenes to form aldehydes – an important industrial process. However, due to their difficult and costly recovery this particular use of Rh has been restricted.

Now, researchers at the University of St. Andrews, Scotland, have successfully used diphenylphosphine functionalised polyhedral oligomeric silsesquioxane (POSS) dendrimers (with 16 or 48 diphenylphosphine end groups) as ligands for the Rh catalysed hydroformylation of oct-1-ene (L. Ropartz, K. J. Haxton, D. F. Foster, R. E. Morris, A. M. Z. Slawin and D. J. Cole-Hamilton, *J. Chem. Soc., Dalton Trans.*, 2002, (23), 4323–4334).

Unexpectedly high regioselectivity to the linear aldehyde (86%) was obtained with a POSS dendritic ligand (with a spacer of five atoms between the P atoms, and C-Si linkage). Small molecule analogues and other dendritic ligands had lower selectivity.