paper presented by Wang Hongli, Xie Maosong, Wei Zhaobin, Hong Zubei, Wang Xiangzhen, Fu Zugen, Chen Yixuan and Guo Xiexian, Dalian Institute of Chemical Physics, on similar platinum/titania catalysts described the effect of SMSI on the water gas shift reaction which is enhanced by prior high temperature reduction with hydrogen.

Several papers were presented which illustrated the usefulness of infrared spectroscopy for the characterisation of metal-carbon monoxide bonding and the manner in which this changes with metals and metal dispersions. J. B. Peri, Amoco Oil, U.S.A., described the use of computerised dispersive infrared which he finds to be more useful than Fourier Transform infrared when one is interested in limited spectral regions. Such information can add a new dimension to catalyst development and the quality control of commercial catalysts. A detailed infrared investigation of carbon monoxide chemisorption on palladium/alumina catalysts with varying metal concentration and dispersion was discussed by Xu Huizhen, Yin Yuangen and Guo Zhougru, of the Chinese Academia Sinica. An attempt was made to relate infrared results to reactivity of chemisorbed carbon monoxide in the presence of hydrogen. Changes in carbon monoxide bonding on alumina supported platinum and ruthenium catalysts measured during temperature programmed desorption was discussed by Guo Xiexian and Xin Qin, of the Dalian Institute of Chemical Physics.

## Fibrous Alumina Supports

The use of fibrous alumina as a novel catalyst support was illustrated by papers presented by Huang Zhier, Xin Chaifen, Tan Changyn and Peng Shaoyi, and Ge Shipei, Xiao Dongran, Kang Bingxin and Peng Shaoyi, all of the Academia Sinica. The first of these reported the use of fibrous alumina supported platinum for catalytic combustion. The second paper described the use of palladium supported on a similar material for the selective removal of diolefin by hydrogenation of pyrolysis gasoline. In both cases the activity can be attributed to a reduced mass transfer limitation because of the fine fibre diameter (3 to 5 $\mu$m).

The application of heterogenised polynuclear metallic clusters for olefin hydroformylation was covered by two papers from the Academia Sinica. Luo Yuzhong and Fu Hongxiang studied a carbon monoxide carbonyl system supported in a functionalised polystyrene and Su Guiqin, Chen Yuqing, Yang Sukun, Luo Shandao, Xie Wenjuan and Yang Zhenyu investigated cobalt-rhodium mixed metal clusters supported on a phosphinated functionalised silica.

F.K.
J.W.J.

# Platinum in Advanced Coatings for Gas Turbines

The use of platinum in corrosion-resistant coatings for the protection of gas turbine blades has been reported in this journal previously (R. G. Wing and I. R. McGill, *Platinum Metals Rev.*, 1981, **25**, (3), 94); such coatings are now finding wide application, particularly for aero and marine turbines. More recently, the advantageous use of platinum in ceramic thermal barrier coating systems for advanced gas turbines has been reported at the Third Japan Institute of Metals Symposium on the High Temperature Corrosion of Metals and Alloys, held in November 1982 at Lake Yamanaka, Japan.

Spallation of the ceramic coatings, which are based on stabilised zirconia, arises from the thermal stresses and the corrosive degradation of the bonding layer between the zirconia barrier and the substrate. At the symposium, H. Takeda, H. Baba, T. Suzuki and K. Shimotori of the Toshiba Corporation reported research where the use of a 1.5$\mu$m layer of platinum between the ceramic layer and the bond layer gave rise to a three-fold increase in life of the coating in hot corrosion tests, and a 20 per cent increase in life in thermal fatigue tests. As yet, no explanation for this major improvement in coating durability has been advanced, but these findings could prove to be a significant breakthrough in the development of commercial thermal barrier coating systems for gas turbines.

C.W.C.