

Introduction

This Special Issue of *Catalysis Today* includes a selection of research presented at the first International Workshop on the ‘*Application of Microporous and Mesoporous Materials as Catalytic Hosts for Fe, Cu and Co*’, held in Scheveningen, The Netherlands, 1–4 March 2005. This 3-day event welcomed some 90 delegates from over 20 countries. Over 60 contributions were presented, 26 oral and 38 poster contributions. The workshop was divided in three session days, each one focussing on the use of one of the three transition metal elements Fe, Cu and Co. Each day, two recognized specialists presented plenary lectures and a round table discussion completed each session. Together, the sessions provided a very good idea of the state of the art of the thriving field of combining transition metal catalytic centers in porous materials.

The last decade research in this field has become an important area from the viewpoint of environmental catalysis and also green chemistry. In his opening lecture, Weckhuysen set the framework for the workshop with some recent appealing examples of his own and other researchers’ work. The contributions to the workshop covered many aspects related to catalytic applications of these materials including the abatement of nitrous oxide, NO_x control and selective oxidation of organics.

During the 1st day, lectures by Bell, Pirngruber and Renken focussed on the intriguing kinetics of nitrous oxide decomposition over Fe/ZSM-5 which appear to be complex. The complexity of this catalytic system is also evident from the large effort put into precise catalyst synthesis and especially detailed characterization of the nature of the transition metal ions occluded in the porous environment. Engaged and vivid discussions after the lectures (which made the original time schedule at most indicative) and during the round table led to the realization that fundamental understanding of the ‘active site’ in Fe/ZSM-5 is still lacking. Evidently, this calls for the use of sophisticated characterization techniques as was apparent from the attention for this aspect during lectures of De Groot, Taboada, Lázár and Volodin.

The plenary lecture by Zecchina on the 2nd day offered a fine overview of the use of probe molecules in infrared

spectroscopy over Cu-containing porous materials. Kazansky showed by combined IR experiments and DFT calculations that hydrogen and ethane form unusual surface complexes with Cu⁺ species. The trend to combine experiment and theory was also evident from the plenary lecture presented by Berthomieu. Groothaert showed the impact that *operando* spectroscopy studies can have in our understanding of the dynamic processes occurring during catalysis. In this session, Jobson (Volvo Technology) announced that a Cu-containing catalyst is now close to commercialization for NO_x control in diesel engines.

The final day provided a mix of lectures focussing on cobalt with a review by Busca and several contributions focussing on the use of combinations of metals. Dong showed that the use of CoAlPOs in supercritical carbon dioxide holds promise for selective cyclohexane oxidation. The workshop ended with a summary by Kapteijn, who but also formulated the most important burning questions that remain to be answered.

The contributions in this special issue include work carried out in the field of synthesis and characterization of transition metal cations in porous materials as well as the application of these materials in industrial and environmental settings. We believe that the 19 papers in this issue represent a good overview of the state of the art of the catalytic applications of the elements iron, copper and cobalt in micro- and mesoporous materials.

The organizers and editors are grateful to the scientific committee and to many colleagues for their time and efforts in reviewing the contributions. The organizers wish to thank the Dutch Zeolite Association and the Netherlands Organization for Catalysis Research (NIOK) for supporting the organization of this successful scientific event.

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