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Foreword

This issue contains the Proceedings of NATO Advanced Research Workshop, the Third Workshop on C_1 – C_3 Hydrocarbon Conversion, held in Krasnoyarsk, Russia, 14–17 July 1997. The Workshop was devoted to memory of outstanding Russian scientist, Prof. G.K. Boreskov, one of the founders of Russian school of catalysis. The meeting was organised by the Krasnoyarsk Research Centre, Krasnoyarsk State Technical University under the auspices of Russian Engineering Academy and followed two previous Workshops held in Krasnoyarsk in 1991 and 1994.

The purpose of the Workshop was to bring together the leading scientists to discuss new developments in both direct and indirect processes of the natural gas conversion, to make a prognosis for future. Besides, one of the aims of the Workshop was to acquaint with a great region which has large stocks of natural gas – Krasnoyarsk Region. The Siberian Workshop attracted the attention of scientists from 12 countries: Europe, USA, Canada, Japan, Saudi Arabia. The total attendance was about 50 and 37 key-note lectures, oral contributions and posters were presented at the meeting.

A special emphasis was made on the following problems: (1) activation of low alkanes; (2) instability of the products; (3) industrial application of C_1 – C_3 hydrocarbon transformation in a near future.

The problem of activation of low alkanes consists of the low reactivity of C_1 – C_3 hydrocarbons with the high energy of C–H bond. Now there are a number of efficient catalysts with a good catalytic performance, but a problem is that at the moment no suitable catalysts exist which are able to break the strong C–C or/and C–H bond and not oxidise the valuable products formed (chemical instability). Moreover there is a possibility of decomposition of the product under reaction condition (thermal instability). To over-

come these obstacles the following methods were considered: separation of the products and reagents immediately after reactors; significant decrease of the oxidant concentration (using the membrane reactor or distributed feed of oxidant); significant decrease of the contact time.

Concerning the industrial application of the processes of low alkanes conversion it is necessary to solve the following engineering problems: (1) to distribute oxygen feed (e.g. using electrochemical oxidation, or membrane reactor, or new reactor operation, e.g. thermal diffusion column reactor); (2) to utilise the heat of the reaction, e.g. by combination of endothermic and exothermic reactions; (3) to use liquefied natural gas for transportation and separation of products.

A special attention was paid to the non-traditional methods of the conversion of low alkanes, such as methane processing under microwave radiation to give acetylene, hydrogen or syngas; electrochemical oxidation of low alkanes to produce syngas; CO_2 reforming of methane in a thermal diffusion column reactor and pyrolysis reactor, etc.

The main direction of research on catalytic conversion of low alkanes was proposed for the future: (1) paraffin activation; (2) oxidant activation; (3) surface chemistry of catalysts; (4) adsorption and desorption of initial gases and products; (5) in situ catalyst characterisation; (6) high temperature reaction at very short contact time; (7) enzyme-like catalytic systems.

Twenty nine papers have been accepted for publication after having been fully refereed as is usual in Catalysis Today. The authors and referees are to be thanked for having respected the deadlines of the editing procedure.

Generous financial contributions from the NATO Science Programme made it possible for many scientists to participate in the Workshop. We are also

grateful to the Administration of Krasnoyarsk Region and Krasnoyarsk Science Foundation for the financial supports of the Workshop.

We would like to acknowledge the members of the International Advisory Board: Prof. M. Baerns, Dr. F. Cavani, Prof. H.D. Gesser, Prof. A. Holmen, Prof. O.V. Krylov, Prof. V.D. Sokolovskii for their assistance in establishing the scientific programme and the members of the Local Organising Committee for their

hard work on all aspects involving the organisation of this meeting.

We hope you enjoyed the meeting and will find these Proceedings a valuable addition to your catalysis library.

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