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Preface

The papers comprising this special issue of Catalysis Today were presented at the Air Pollution Abatement Catalysis (APAC) Symposium in Kraków, Poland, from 21 to 24 September 2005.

The 61 papers included in this special issue are divided into six chapters:

I. Hydrodesulfurisation and hydrodenitrogenation (8).
II. DeNO$_x$—mobile sources of emission (14).
III. SCR of NO, NO and N_2O decomposition (22).
IV. Diesel particulates' abatement (7).
V. Oxidation of chlorinated and non-chlorinated hydrocarbons (8).
VI. CO oxidation and ozone decomposition (2).

Thanks to the efforts of the authors and especially the paper reviewers this special issue provides an up-to-date perspective on the air pollution abatement problems.

Special thanks are due to Dr. Anna Białas (Faculty of Chemistry, Jagiellonian University) for the excellent technical editorial work in preparation of this issue.

The International Symposium on "Air Pollution Abatement Catalysis" (APAC 2005) has been organised within the framework of the French-Polish Scientific Cooperation (Jumelage) "Carbonaceous and Catalytic Materials for Environment". This network of Laboratories is supported from the French side by Centre National de la Recherche Scientifique (CNRS) and from the Polish side by Polish Academy of Science (PAN). The Ministry of Scientific Research and Information Technology in Poland, as well as the Ministry of Foreign Affaires in France and Embassy of France in Warsaw are also supporting this European group.

In 2002, the activity of this group has been positively evaluated by the European Union, and a European Seminar supported by a grant (No project ICA1-2002-60035) has been organized in Zakopane (Poland). The present Symposium was organized as the follow-up of this 2002 European project. Financial support is gratefully acknowledged for Wojciech Swietoslawski Foundation for Development of Science in Poland.

Among the presented contributions 41% were from Poland, 31% from France and the remaining from 19 other countries.

The following scientific topics, related to problems of environmental pollution, were considered:

- Low-sulphur content gas oils (simultaneous HDN-HDS of refractory S- or N-containing compounds).
- deNO$_x$ catalysis for flue gases from *mobile* sources of emission (by HC or urea, and plasma assisted deNO$_x$).
- deNO$_x$ catalysis for flue gases from *stationary* sources of emission (by HC and oxygenated compounds) and N_2O decomposition and reduction.
- Diesel particulate matter removal and NO$_x$ reduction: particulate matter oxidation assisted by NO_2 or "O radical"—plasma.

Special attention was paid to the following fundamental topics which were more specifically discussed.

Catalytic NO oxidation to NO_2 (at low NO concentration), mild oxidation of hydrocarbons by NO_2, N–N bond formation during deNO$_x$ processes, oxidation state of metal active sites, role of non-thermal plasma-assisted deNO$_x$ reaction, particulates-NO_2 interaction and beneficial effect of CO_2 and water on diesel soot oxidation.

Plenary lectures and contributions from R. Burch (Ag), M. Che (catalyst synthesis), T. Grzybek (Clays), F. Ribeiro (Zeolites) and B.E. Nieuwenhuys (Au^0, Au^{x+}), have emphasized the formation of both reduced (M^0) and cationic (M^{x+}) metal species as active sites.

R. Burch has concluded, discussing the case of supported Ag catalyst, that "...the most probable role of hydrogen is to facilitate the formation of NO_2 which, in turn, can lead to activation of the hydrocarbon and subsequent reduction of NO$_x$ at low temperature". This conclusion appears to be strongly considered for other catalytic systems, and leads to two fundamental reactions in deNO$_x$ processes: (i) oxidation of NO to NO_2, and (ii) NO_2–HC interaction. This last interaction has also to be taken into account for the NO_2-assisted continuous diesel soot oxidation.

Two models have been considered in the context of the deNO$_x$ reactions: the Martens et al. (Angew. Chem. 37 (1998) 1901), and the Berger and Djéga-Mariadassou three-function system (Catal. Today 90 (2004) 27). The N–N bond comes from a diazonium species in the first model, whereas in the second case it forms from dinitrosyl intermediate species. The conclusion is that this fundamental problem is still open for the discussion.

All sessions of the Symposium were held in the historical place of Collegium Novum of the famous Jagiellonian University. The Welcome Reception took place in the Collegium

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Maius, the oldest building of the Jagiellonian University. Lunches were served in the historical Aula bl. Jakuba (blessed Jacob's Aula), a part of Franciscan Monastery, and the Conference Dinner was held in the Niepolomice Royal Castle.

Members of the Organising Committee are greatly acknowledged: Dr. A. Borowski, Dr. J. Muszynski, Dr. L. Socha, as well as Mrs. B. Romanowska (Treasurer) and Mrs. J. Thil (Secretary), all from Institute of Coal Chemistry PAS, Gliwice.

The Organizers

Prof. Gérald Djéga-Mariadassou
Laboratoire Réactivité de Surface
Université Pierre et marie Curie
CNRS-UMR 7609, Paris, France

Dr. Andrzej Krztoń
Institut of Coal Chemistry
Polish Academy of Sciences
Gliwice, Poland

Prof. Mieczysława Najbar
Faculty of Chemistry
Jagiellonian University
Cracow, Poland

Prof. Jerzy Pielaszek
Institute of Physical Chemistry
Polish Academy of Sciences
Warsaw, Poland

Guest Editor
Mieczysława Najbar*
Faculty of Chemistry, Jagiellonian University,
Ingardena 3, PL-30060 Cracow, Poland

*Fax: +48 12 6340515
E-mail address: mnajbar@chemia.uj.edu.pl

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