

## Catalytic conversion of polycyclic aromatic hydrocarbons: an introduction

Conversion of multi-ring aromatic hydrocarbons has begun to receive increased attention. Both from fundamental and practical viewpoints, more understanding of the chemistry, reaction process, and the catalysis for conversion of polycyclic aromatic hydrocarbons (PAH) is needed for the following reasons. First, some new and emerging industrial chemical processes depend on shape-selective or regio-selective conversion of polycyclic hydrocarbons, such as naphthalene, biphenyl, and phenanthrene and their derivatives. Second, PAH conversion is involved during the upgrading and subsequent refining of heavy oils and residues, which represent an increasingly more important group of industrial chemical processes. Third, reactions of PAHs are an inevitable part of many processes under development for producing alternative transportation fuels from coals through liquefaction and upgrading. Fourth, destruction of PAHs and heteroatom-containing PAHs present in fuels (and in flue gases, air and water) is necessary because of their environmentally harmful nature. Due to more and more stringent environmental regulations (such as the Clean Air Act Amendments of 1990), oil industries are required to further reduce the contents of sulfur and aromatics in transportation fuels. Finally, conversion of some non-aromatic polycyclic hydrocarbons such as decalin and adamantane may also be used for making special chemicals or special fuels, but such applications would not be feasible without an efficient

catalytic process.

In order to foster this increased understanding of the catalytic chemistry and processes related to PAH conversion, and to address the above issues, we organized a symposium on Catalytic Conversion of Polycyclic Aromatic Hydrocarbons as a part of the 210th American Chemical Society (ACS) National Meeting in Chicago, 20–24 August 1995. This symposium was co-sponsored by the ACS Divisions of Fuel Chemistry and Petroleum Chemistry. It brought together scientists and engineers from several countries who are engaged in research to better understand the chemistry, catalysis, and reaction process by which PAHs are converted in various existing and new chemical processes related to the manufacturing of fuels and chemicals and for the protection of the environment.

This symposium covered various aspects of catalysis, reaction chemistry, catalytic processes, and new catalytic materials for hydrogenation, hydrocracking, alkylation, isomerization, and polymerization of PAHs as well as hydrodesulfurization, hydrodenitrogenation, and hydrodeoxygenation of heteroatom-containing PAHs.

This special issue of *Catalysis Today* consists of selected papers presented in the four sessions of the symposium. We have broadly classified the papers in terms of content into the following three categories:

1. Shape-selective alkylation, hydrogenation, and polymerization.

2. Hydrogenation, hydrocracking, and heteroatom removal.

3. Catalyst synthesis, new reactions, and polycyclic chemicals.

We are grateful to all the people who contributed to the ACS symposium and to this special issue, especially the authors and peer reviewers of the papers. Acknowledgment is made to the Donors of The Petroleum Research Fund (administered by the American Chemical Society) and to the ACS Divisions of Fuel Chemistry and Petroleum Chemistry for provid-

ing partial travel support that made it possible for our overseas participants to present their papers at the symposium.

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