

## CHRONICLES

### HETEROGENEOUS CATALYSIS IN THE SYNTHESIS AND TRANSFORMATIONS OF HETEROCYCLIC COMPOUNDS

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A symposium – Heterogeneous Catalysis in the Synthesis and Transformations of Heterocyclic Compounds – which was organized by the Organic Catalysis Section of the Scientific Council on the problem "Catalysis and Its Industrial Application" and the Institute of Organic Synthesis of the Academy of Sciences of the Latvian SSR, was held from October 30 to November 1, 1972 in Riga.

Representatives of more than 40 scientific-research institutes of the Academy of Sciences of the USSR, allied republics, colleges, and branch institutes participated in the symposium.

The advances and future paths for development in the field of heterogeneous catalytic methods for the synthesis and transformations of heterocyclic compounds were demonstrated in plenary papers by Academician of the Latvian SSR S. A. Giller, Professor V. B. Kazanskii, Professor V. M. Gryaznov, Master of Chemical Sciences V. S. Smirnov, and Master of Chemical Sciences A. V. Mashkina; in addition, the detailed characteristics of the newest physicochemical methods used for the study of catalytic reactions of heterocyclic compounds and the catalysts themselves were given, and the theoretical foundations of a fundamentally new approach to the realization of interlinked catalytic reactions by means of the so-called membrane catalysts, which were discovered in the Soviet Union, were set forth.

The results of an investigation of the preparation and transformations of oxygen-, nitrogen-, and sulfur-containing compounds in catalytic reactions of partial oxidation, oxidative ammonolysis, hydrogenation, dehydration, decarbonylation, hydrogenolysis, dehydro- and deaminocyclization, condensation, etc. were reported in 64 scientific communications (13 of them were presented by the Institute of Organic Synthesis of the Academy of Sciences of the Latvian SSR).

Significant advances have been made in the development of catalytic methods for the synthesis of intermediates for medicinal preparations and of means for the introduction of chemical processes in agriculture. Processes for the production of furan,  $\alpha$ -methylfuran, formylpyridines, pyridinecarboxylic acids and their derivatives, piperazine, and methyl propyl ketone have been created. Some of them have been tested at the pilot-plant and industrial levels.

Considering the limited nature of natural resources, one should note the great timeliness of investigations associated with the synthesis of pyridine bases and thiophene from accessible raw material.

Interesting results have been obtained with respect to the catalytic synthesis of indole and its derivatives and of polynuclear nitrogen-containing condensed compounds.

A number of papers were devoted to a new route to the synthesis of nitrogen heterocycles – the vapor-phase catalytic redox reaction of nitro compounds with alcohols.

Research on the catalytic hydrogenation of furans, pyridine and its derivatives, succinimides, isoindoles, nitrobenzimidazoles, and dihydropyrrrolizine was given extensive treatment in the symposium.

The promising research on the synthesis and transformations of dioxane structures, imidazoles, and unsaturated cyclic hydrocarbons in the presence of ion-exchange resins should especially be pointed out.

The role of quantum-chemical methods of calculation in the interpretation of the reactivities of heterocyclic compounds and the mechanism of catalytic reactions has grown appreciably.

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A resolution adopted by the participants in the symposium provides for further expansion of complex investigations of a catalytic method for the synthesis of hard-to-obtain heterocyclic compounds with the goal of development of theoretical concepts regarding the mechanism of heterogeneous catalysis in addition to acceleration of the incorporation of catalysis in the production of medicinals and monomers, as well as insecticides, fungicides, herbicides, etc.