

CONFERENCE ON THE USE OF POLAROGRAPHY IN THE CHEMISTRY AND TECHNOLOGY OF POLYMERS AND MONOMERS

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A conference on the use of polarography in the chemistry and technology of polymers and monomers took place in Kharkov on 29th-31st October 1964. The conference was convened by the State Committee of the Chemical Industry and the All-Union Scientific Research Institute of Single Crystals.

About 100 people participated in the conference.

The conference showed that polarography is an important method of studying polymers and the various intermediate products used in their synthesis.

Of the 28 reports read at the conference, a great part were devoted to the determination of monomers. For example, V. D. Bezuglyi and Yu. P. Ponomarev reported on a method of analyzing alkylstyrenes and other difficult-to-reduce vinyl compounds in a base electrolyte of tetraethylammonium iodide in a medium of dimethylformamide. The method makes it possible to determine substances with half-wave potentials of up to -2.75 V (relative to saturated calomel electrode). Together with V. N. Dmitrieva, they proposed a method of determining vinyl polymers in the form of mercury-acetate complexes. A work by A. M. Shur, Yu. S. Lyalikov, and M. M. Filimonova was devoted to determining complex vinyl ethers. A number of reports were devoted to the use of a polarographic method for controlling the production of, for example, maleic anhydride (Ya. P. Stradyn', V. V. Teraud, and M. V. Shiman-skaya), caprolactam (G. N. Matveeva and N. K. Petrova), acrylonitrile (N. A. Kudryavtseva), control of the synthesis of styrene, vinylidiphenyl, and vinyltetralin (L. A. Mel'nik, V. D. Bezuglyi, R. S. Mil'ner, et al.). The polarographic method has also been used for determining the content of polymers not entering the polymerization reaction (D. B. Gurvich and A. A. Kogodovskaya), and for determining ammonia and certain primary and secondary amines in joint presence (B. P. Zhantalai and N. I. Kobylina). A monoethanolamine-formaldehyde system has been studied by Z. V. Zaitseva and P. M. Zaitsev. Polarographic analysis of industrial waste water of the phenol and acetone industry for acetophenone, mesityl oxide, α -methylstyrene, cumene hydroperoxide, hydrogen peroxide, and aluminum was reported on by M. M. Buzlanova, T. T. Shleina, and N. A. Kurochkina.

Works on the study of the physical properties of polymers caused special interest: molecular weight, solubility (E. K. Salifchuk and V. D. Bezuglyi), electrochemical initiation of polymerization (A. I. Fedorova, S. Ya. Vasina, and É. A. Maznichenko), and also works in which the polarographic method was used to study the reactivity of monomers and to establish the relationship between the polarographic indices of monomers and their structure and the kinetic characteristics of their polymerization (for example, the reports of E. V. Kuznetsov and A. A. Bogoyavlenskaya; A. S. Gorokhovskaya; T. A. Alekseeva and V. D. Bezuglyi).

V. I. Shapoval and D. N. Zaitseva have used polarography for quantitative determination of the content of low-molecular components of polyester resins. L. A. Koshikov reported on a study of adsorption of high-molecular compounds by mercury.

A number of reports were devoted to polarography of polymerization initiators (V. L. Antonovskii, Z. S. Frolova, et al.) and polymerization inhibitors (Ya. I. Tur'yan and T. V. Mikhailova).

A. G. Stromberg reported on methods of increasing the sensitivity of amalgam polarography with accumulation, the use of which can place this method among the most highly sensitive ones for determining ultramicroimpurities in materials of high purity.

V. D. Bezuglyi made a survey report on the use of polarography for analysis and study of polymer materials. The work of this scientist and his colleagues in the polarographic study of the reactivity of monomers and the relationship between their structure and polarographic behavior is of great interest.

The exchange of opinion of the participants in the conference showed that the polarographic method can find even wider use in the chemistry and technology of polymers than in the chemistry of low-molecular compounds, in view of certain specific properties of polymer molecules.

The conference was well organized and passed fairly clearly. The reports caused a lively discussion. Together with discussion of the reports, attention at the conference was directed toward the necessity of further expansion of research in the use of polarography in polymer chemistry and technology — especially in determining traces of various elements in polymer compositions, studying the physical properties of polymers, electrochemical initiation of polymerization, and also in composite automation of processes with the use of polarographic sensing elements etc. Attention was also given to the need for coordination of scientific research work in this area, improvement of technical information, and exchange of experience.

The resolution of the conference noted the importance of organizing mass production of modern apparatus, for example, ÉP-312 electronic polarographs and highly pure substances for electrochemical analysis.

The materials of the conference of the All-Union Scientific Research Institute of Single Crystals will be published in a collection. The Second All-Union Conference on the use of Polarography in Polymer Chemistry is to be held in 1967.