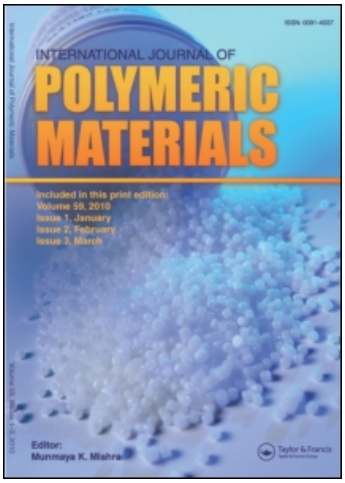

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International Conference on Regulation of Polymeric Materials Stability

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International Conference on Regulation of Polymeric Materials Stability

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The International Conference on Regulation of Polymeric Materials Stability was held on October 12–15, 1992 in Moscow at the Institute of Chemical Physics of the Russian Academy of Sciences, mostly through the efforts of the Division of Chemical and Biological Kinetics of the Institute.

The current Conference is the historical development of cooperation among the Academies of Sciences of Socialist States in the area of Aging and Stabilization of Polymers. The first such Conference was held in Moscow in 1988 (the Institute of Chemical Physics was at the head of this cooperation), the second was organized by the Polymer Institute of the Slovak Academy of Sciences (Bratislava) and was held in High Tatras in 1990. There the decision was made to hold the third Conference in Moscow on October, 1992.

On the 1st of January, 1991, the official cooperation between the Academies of Sciences of Socialist States was ended. Last December the Soviet Union was politically dissolved. However, the Conference founded by the former cooperation has been completed, although the list of participants was changed substantially.

On the proposal of Professor V. A. Kabanov, the Chairman of the Scientific Council of the Department of Pure and Applied Chemistry of the Presidium of Russian Academy of Sciences on Macromolecules the name of the Conference was also changed. Two former conferences were known as Conferences on Aging and Stabilization of Polymers.

The current Conference also followed National Symposiums on Aging and Stabilization of Polymers, which were held after the Second World War in the Soviet Union. The founder and the first Chairman of these Meetings was Professor A. C. Kuz'minskii. The second Chairman was Professor M. B. Neiman, and from 1966 to 1984 the Chairman was Professor N. M. Emanuel, who was also at the Head of the research in this field in the USSR and in the frame of cooperation between the Academies of Sciences of Socialist States. The eighth and last of these Symposia was held in 1989 in Dushanbe (Republic of Tajikistan), where the decision to hold the ninth Conference in Moscow in 1992 was made.

The Conference was organized by the Institute of Chemical Physics and the

Scientific Council of the Department of Pure and Applied Chemistry of the Presidium of Russian Academy of Sciences on Macromolecules. The Organizing Committee consisted of scientists from Russia (including Bashkortostan and Tatarstan), Lithuania and Uzbekistan.

Scientists from Belgium, Belorussia, Czech and Slovak Federative Republic, Germany, Great Britain (England and Scotland), Italy, Poland, Portugal, Switzerland, United States of America, and Russia (including Bashkortostan and Tatarstan) attended to contribute to the Conference. Unfortunately, for financial reasons the expected participation of many scientists from Kasakhstan, Uzbekistan, Tajikistan, Lithuania, Ukraine, and Latvia was canceled. Financial constraints also caused the absence of part of the scientific contingents from Germany, Italy, Rumania and Greece.† That is why the number of lectures was reduced from 66 to 42 and the program altered accordingly.

The Conference was sponsored by the financial support of Western Companies such as AKZO (Netherlands), CIBA-GEIGY (Switzerland), Montedison and AMC SPREA (Italy), and Uniroyal Chemical and Kiser Research (USA). The Organizing Committee takes this opportunity to express many thanks to these Companies. A financial contribution was also made by the Institute of Chemical Physics and Institute of Elemento-Organic Compounds of the Russian Academy of Sciences. This sum covered all registration fees and publication costs for the abstracts and program of the Conference.‡

The topics of the Conference included the problems of thermal, thermo-oxidative, photo-oxidative and irradiative degradation, hydrolysis of polymers, biodegradation, mechanodegradation, degradation during the process of treatment, combustion of polymers and synthesis of antipirenes and stabilizers. Discussions involved the problems of the prediction of polymer stability, their secondary treatment, development of self-degradable polymers, environmental study, and applications of polymers in different fields of industry and agriculture.

The Conference was opened by remarks of Professor E. Burlakova, the head of the Division of Chemical and Biological Kinetics, Institute of Chemical Physics, Russian Academy of Sciences. The Chairman of Conference, Professor G. Zaikov, reviewed the latest achievements of scientists of the former USSR in the area of Aging and Stabilization of Polymers in his lecture entitled, "The current state and some frontiers for development of polymer aging and stabilization."

One set of lectures was concerned with the problem of photodegradation and light stabilization of polymers. It should be mentioned that the lecture of Professor G. Geuskens (University of Brussels, Belgium) dealt with the mechanism of action of hindered anine light stabilizers as well as contributions of members of the staff of the Institute of Chemical Physics: Doctor V. Ivanov ("Photochemical modification of saturated rubbers"); Doctor L. Postnikov ("The general regularities of the photooxidative degradation of aliphatic polyamides"); and Doctor A. Margolin ("Photooxidation of isotactic polypropylene as nonhomogeneous process").

An interesting discussion was prompted by the lecture of Doctor L. Rychla

†The lecture of the scientists from Greece has been presented by Russian co-authors.

‡The proceedings of the Conference will be published in the International Journal of Polymeric Materials.

(Polymer Institute, Slovak Academy of Sciences, Czech and Slovak Federative Republic), which concerned the chemiluminescence from oxidative degradation of polymers and application of this effect for study of the kinetic regularities and the mechanism of processes of polymer oxidation.

Following these proceedings were a number of lectures regarding the aging and stabilization of polyvinylchloride. The most important was the lecture of Professor W. Starnes, Jr. (College of William and Mary, Maryland, USA), which considered problems of improvement of thermostability of PVC and the implications of 1,2-Dichloroethyl branches in poly(vinyl chloride) for thermal stability and the mechanism of polymerization. Among other reports contributed in this session, we should mention the lectures of Professor K. Minsker ("Characteristics effects in processes of halogen-containing polymers degradation and stabilization"), Doctor S. Kolesov ("PVC thermal stability in blends with poly(olefins)") and Doctor R. Biglova ("Synthesis of new stabilizers through polymer-analogous conversions"), all from the Bashkirian State University; as well as the lecture of Professor B. Troitskii (Institute of Organometallic Chemistry, Russian Academy of Sciences, Nizhnii Novgorod), in which the mathematical models of the initial stage of the thermal degradation of poly(vinyl chloride) in the presence of HCl was considered.

Considerable discussion was caused by the lecture of Doctor P. Stott (Uniroyal Chemical Company, Connecticut, USA) regarding theory and application of synergistic interactions between different classes of radical scavenging antioxidants. The disorder in polymers and its role in oxidation processes were considered in the lecture of Professor Yu. Shlyapnikov (Institute of Chemical Physics). The influence of the mesomorphic state on the durability of polymer coatings was reported by Professor E. Rosantsev from the Moscow Institute for Applied Biotechnology.

The problems of thermal degradation, particularly of thermostable polymers, were considered in a series of lectures. Some aspects of the thermal degradation of polymer systems based on methyl methacrylate were reported by Professor I. McNeill, from the University of Glasgow, Great Britain. Transfer stabilization of thermostable polymers was discussed in the lecture of Professor Yu. Sazanov from the Institute of Macromolecules of the Russian Academy of Sciences. Professor A. Rusanov (Institute of Element-Organic Compounds, Russian Academy of Sciences) considered m-Carborane-containing polyamides as a stabilizer for polyheteroarylenes. Another representative of the same institute, Professor Ya. Vygodskii, described the effect of branching and curing in the high temperature synthesis of polymers containing α-diketone groups. Doctor N. Prokopchuk (Institute of Physical and Organic Chemistry, Belorussian Academy of Sciences) proposed a new method of estimation and prediction of the thermo- and radiation stability of elastomers.

Wide discussion also followed the lecture of Professor A. Askadskii (Institute of Element-Organic Compounds, Russian Academy of Sciences) on the influence of the chemical structure on thermal characteristics of polymers. Specifically, new methods of computer simulation of synthesis of thermostable polymers caused great interest in this lecture. A review of the research made on thermal and thermo-oxidative stability of polyether-based polymer electrolytes was proposed by Pro-

fessor G. Cameron (University of Aberdeen, Great Britain). Some aspects of polymer stabilization were discussed in the lecture of Doctor S. Al-Malaika (Aston University, Great Britain). For the most part, self-degradable polymers have been considered, and the role of complexes of metals in polymer stabilization as well as in initiation of the thermal decomposition of polymers has been shown. New metal chelates as stabilizers for polymers and low molecular substances were proposed in the lecture of Doctor V. Vinogradova (Institute of Chemical Physics). The lecture of Professor N. Mukmeneva (Institute of Chemical Technology, Kazan, Tatarstan) was concerned with heteroatom stabilizers for polymers: synthesis and properties. The synthesis and application of novel degradable polymers were reported in the lecture of Professor Z. Jedlinski and M. Kowalczuk from the Institute of Polymer Chemistry of the Polish Academy of Sciences (Zabrze, Poland).

A special session considered the problems of transport phenomena in polymers. The new reliable method of measurement of the thermodynamical diffusion coefficients of electrolyte solutions in polymers was proposed by Professor V. Lobo (University of Coimbra, Portugal). The general model of multicomponent transport of low-molecular compounds in glassy polymers and its application for the modelling of simultaneous transport of water and drugs in hydrophilic polymers were discussed in lectures of Doctor J. Petropoulos ("Demokritos" National Research Centre for Physical Sciences, Greece) and Doctor A. Polishchuk (Institute of Chemical Physics). Some aspects of the diffusion of water in polymers were reported by Doctor A. Iordanskii (Institute of Chemical Physics).

The lectures of members of the Staff of Moscow Lomonosov Institute of Fine Chemical Technology (Professor V. Shershnev, Doctor I. Khodzhaeva) concerned some problems of stabilization of natural and synthetic rubbers, such as stabilization of phase structure of elastomer blends and stability of cis-1,4-polyisoprene and its vulcanizers in aqueous biologically active medium.

There was special interest in the lectures in the area of combustion of polymers. Fire retardant mechanisms of additives for polymeric materials based on metal halides was discussed in the lecture of Professor L. Costa (University of Turin, Italy). The lecture of Doctor Donskoi (Institute of Aviation Materials, Russia) and Doctor R. Aseeva (Institute of Chemical Physics) described the thermal stability and flammability of sulphochlorinated polyethylene compositions. Some peculiarities of the combustion of organic compounds under conditions of their use were demonstrated by Doctors A. Margolin and N. Bachman (Institute of Chemical Physics).

Among other contributions, the lectures of Professor J. Behnisch from the "Erich Correns" Institute for Polymer Chemistry, Germany ("Selective functionalization of polymer surfaces by low pressure plasma treatment") and of Professor V. Milinchuk from the Obninsk Branch of Karpov Physico-Chemical Institute, Russia ("The radiation resistance of polymers") should be mentioned as being discussed with great interest.

As a whole, the current conference has shown successful development of fundamental research in the area of Aging and Stabilization of Polymers as well as its practical application. In spite of tremendous financial problems, this research area continues to develop in the States of the former USSR, although the rate of such development has been slowed.