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International Symposium on Physicochemical Aspects of Polymer Surfaces (New York City, August 24-28, 1981)

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SUMMARY REPORT

**International Symposium on Physicochemical
Aspects of Polymer Surfaces
(New York City, August 24-28, 1981)**

This Symposium was held as a part of the American Chemical Society National Meeting. The Division of Colloid and Surface Chemistry was the prime sponsor and it was cosponsored by the Divisions of Organic Coatings and Plastics Chemistry, and Industrial and Engineering Chemistry. K. L. Mittal of IBM Corporation was the organizer and Chairman of this Symposium.

The study of polymer surfaces is important from both fundamental and applied points of view, as polymers play an important role in many areas of human endeavor and all signals indicate that their usage is going to grow more and more in times to come. Wheresoever polymers are used, and the applications range from microelectronics to prosthetics, their surface characteristics are of paramount importance. So the need to understand and tailor polymer surface properties is quite patent, and the availability of sophisticated surface analytical tools has been a boon in enhancing our knowledge of polymer surfaces.

In the past the topic of polymer surfaces has been discussed in various meetings, but this Symposium was hailed as the most comprehensive ever held on this important topic, as the technical program contained a total of 84 papers by more than 150 authors from 21 countries representing many corners of the world. However, for a variety of reasons, a few papers were not presented and this is not unexpected considering the magnitude of the symposium. In any case it was a veritable international event irrespective of how one looks at it, and it elicited an excellent response in terms of attendees (there were 260 at the time of the Opening Remarks at 8:30 in the morning). The attendees represented a broad spectrum of backgrounds, interests, and professional affiliations but all had one common denominator—interest in learning the latest about polymer surfaces. There were many brisk and enlightening (but not exothermic) discussions, and these were augmented by more informal corridor conversations.

If the comments I have heard from the attendees are barometers of the usefulness and success of the Symposium, then it was a grand success.

The Symposium was organized with the following objectives in mind: to bring together scientists and technologists interested in all ramifications of polymer surfaces, to review and assess the current state-of-the-knowledge, and to provide a forum for the exchange and cross-fertilization of ideas. The best way to present the state-of-the-art on a topic is via a blend of overviews and original research papers, and this is exactly what was done in this case. The program contained both invited and contributed papers, and these were both overviews and unpublished original research in character. The invited speakers were selected so as to represent widely differing disciplines and interests, and these hailed from academic, governmental, and industrial research laboratories.

The program was divided into nine sessions: 1) Spectroscopic Analysis; 2) Contact Angle, Wettability, and Surface Energetics; 3) Reactions and Interactions; 4) Tribology and Triboelectrifications; 5) Adsorption and Adhesion; 6) Crazeing, Fracture, and Morphology; 7) Modification of Polymer Surfaces; 8) Biomedical Aspects and Bioadhesion; and 9) Polymer-Metal Interfaces. Even a cursory glance at the titles of the sessions should suffice to underscore that practically every aspect of polymer surfaces was covered. Even a brief description of each paper will render this Report prohibitively long, so here are some salient comments about each session.

In the first session a number of techniques for characterizing polymer surfaces were discussed and these included ESCA, transmission and reflection spectroscopy, FT-IR, photoacoustic FT-IR, and Auger spectroscopy. The second session dealt with the determination of contact angles and surface free energies of polymers. The surface energy of polymers plays an important role in many areas (e.g., wetting, adhesion, printing), and these were discussed. The surface thermodynamics of liquid polymers was also discussed. The third session was devoted to reactions and interactions (thermal oxidation, photooxidation, radiation) at polymer surfaces. The papers ranged from interactions at polymer surfaces (in the form of film) to chemical reactions at the interface in polystyrene colloids.

The next session covered the tribological and triboelectrification aspects of polymers and their implications. Adsorption and adhesion of polymers constituted the theme of the next session. A number of papers discussed the adsorption at polymer surfaces, and one dealt with the acid-base character of specific interactions of polymers. The importance of polymer surface acidity and basicity was emphasized, and examples were given where the acid-base concept plays an important role.

Session 6 contained papers which concentrated on the crazeing, fracture surface energies, and morphology of polymers. One paper specifically discussed the variation of polymer (very thin) morphology and structure through surface interactions with the substrate.

The next session highlighted the various techniques for modifying polymer surfaces. The techniques discussed included plasma (both RF and microwave), chemical (reaction with a gas, graft copolymerization), and deposition of oriented monolayers. The papers dealt with a number of different polymeric substrates and the creation of differing surface chemistry.

Biomedical aspects and bioadhesion was the subject of the next session. The topics discussed included surface energetics of polymers and bioadhesion, biomedical aspects of polymer surfaces, polymer-blood interactions, and protein adsorption at polymer surfaces. The last session was devoted to polymer-metal systems, and the papers dealt with the understanding, characterizing, and tailoring of polymer-metal interfaces. The utility of ESCA in monitoring such interfaces was amply demonstrated, and one paper discussed the use of Stoneley and leaky interface waves in characterizing metal-polymer boundaries. The last paper discussed the important issue of interfacial interactions between polymers and other materials and their effects on bond durability.

The papers discussed in this Symposium should be of interest to a broad spectrum of people with wide-ranging interests. The proceedings containing full papers will be published in two volumes by Plenum Publishing Corp. and should be available in November 1982. It is hoped that these volumes will serve as the repository of our latest knowledge anent polymer surfaces.

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