Physicochemical Aspects of Polymer Surfaces
Volume 1
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PREFACE

This and its companion Volume 2 document the proceedings of the International Symposium on Physicochemical Aspects of Polymer Surfaces held under the auspices of the American Chemical Society in New York City, August 23-28, 1981. This event was sponsored by the Division of Colloid and Surface Chemistry and the Divisions of Organic Coatings and Plastics Chemistry, and Industrial and Engineering Chemistry were the cosponsors.

The study of polymer surfaces is important from both fundamental and applied points of view. The applications of polymers are legion and wheresoever polymers are used, their surface characteristics, \textit{inter alia}, are of great concern and importance; and the areas where polymers find applications range from microelectronics to prosthetics. In the last decade or so, the availability of various sophisticated surface analytical techniques, particularly ESCA, has been a boon in enhancing our knowledge of polymer surfaces.

This Symposium was designed to bring together scientists and technologists interested in all aspects of polymer surfaces, to provide a forum for discussion of various ramifications of polymer surfaces, to discover the latest developments, to provide an opportunity for cross-pollination of ideas, and to highlight areas which are in a state of rapid development and those which need intensified efforts. If the comments from attendees is any barometer of the success of an event, then this Symposium was a grand success and the above objectives were amply fulfilled.

Although the topic of polymer surfaces had been a subject of discussion in various meetings, this Symposium was hailed as the most comprehensive event ever held on this topic; and it was a veritable international event. The program contained 84 papers from 21 countries and the authors represented many and varied backgrounds and interests. The program comprised both invited overviews and contributed original research papers. The invited speakers were selected so as to represent widely differing disciplines and interests and they hailed from academic, governmen-
tal and industrial research laboratories. Also the inter-, multi- and transdisciplinary nature of the topic was quite patent as the papers ranged from surface and interface analysis to tribology to bioadhesion to metallized plastics.

With regard to these proceedings volumes, it should be pointed out that, for a variety of reasons, 17 papers (out of 84) are not included. However, it should be noted that three papers are included which were not in the program, and two of these papers (by Dr. Vroman, and by Drs. Nyilas and Chiu) were specially commissioned by the Editor. So these volumes contain a net total of 70 papers by 142 authors from 20 countries. It should be emphasized that all papers were reviewed by qualified reviewers and concomitantly many papers were sent back to the authors for suitable revision, and some were not accepted at all.

In these volumes, the papers have been somewhat rearranged (from the order in the program) to fit them better and have been grouped in nine Parts: Spectroscopic Analysis; Contact Angle, Wettability and Surface Energetics; Reactions and Interactions at Polymer Surfaces; Tribology and Triboelectrification; Crazing, Fracture and Morphology; Adsorption and Adhesion; Modification of Polymer Surfaces; Biomedical Aspects and Bioadhesion; and Polymer-Metal Interfaces. Volume I contains Parts I-V and Parts VI-IX constitute Volume 2. The topics covered include: surface analysis of polymers using a variety of techniques, e.g., Auger, ESCA, surface enhanced Raman; wettability characteristics of polymers, surface free energy determination of polymers, surface thermodynamics of liquid polymers, and adhesion of ice to polymer surfaces; reactions and interactions at polymer surfaces; surface phenomena in latex autohesion and vulcanization of latex films; tribological and trielectrification aspects of polymers, electrical conduction mechanism in polymers; adsorption on polymers, role of acid-base and electrostatics in polymer adhesion, and welding of polymers; fracture and morphological aspects of polymers, variation of polymer morphology and structure through surface interactions; various ways (RF plasma, microwave, chemical, graft copolymerization and use of monolayers) to modify polymer surfaces; biomedical aspects of polymer surfaces and bioadhesion, role of surface energetics in biological adhesion, protein adsorption on polymers, and blood-polymer surface interaction; investigation of interfacial interactions between polymers and other materials (particularly metals), study of metal-polymer boundaries using ultrasonic interface waves, adhesive joining of metals to engineering plastics, and metallization of plastics.

It is clear from the above list of topics that there is a brisk activity taking place in the analysis, understanding and tailoring of polymer surfaces to suit a variety of needs and applications. This two-volume set (~1200 pages) should be a useful
source of information to both the seasoned researcher as well as to the neophyte in this arena. It should be pointed out that the Editor had hoped to include discussion in these volumes, but, unfortunately, in spite of constant exhortation, the number of written questions received did not warrant undertaking such endeavor. However, it should be recorded that there were many brisk and enlightening (but not exothermic) discussions both formally (in the auditorium) and informally in the corridors and other suitable places.

Acknowledgments. First of all, I am thankful to the appropriate officials of the various Divisions for sponsoring or co-sponsoring this event, and to the appropriate management of IBM Corp. for permitting me to organize this Symposium and to edit these volumes. The generous support of the Petroleum Research Fund of the American Chemical Society in providing travel monies for certain invited overseas speakers is gratefully acknowledged. Also I must take this opportunity to express my sincere thanks to the unsung heroes (reviewers) for their time and valuable comments, as comments from the peers are important in maintaining the quality of scientific publications.

On a personal side, I would like to acknowledge the assistance (in many ways) and patience of my wife (Usha) and my kids (Anita, Rajesh, Nisha and Seema) for maintaining a low entropy state in the house so as to render it conducive to work. Special thanks are due to Mr. Jim Busis, Plenum Publishing Corp., for his continued interest in this project and for lending a helping hand whenever the need arose. Also I would like to express my appreciation to Barbara Mutino for her heroism at the typewriter and for meeting various typing deadlines. It would be a remiss if I do not acknowledge the cooperation, enthusiasm and patience of the contributors without which this set would not have seen the light of day.

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PART I. SPECTROSCOPIC ANALYSIS

The Modification, Degradation and Synthesis of Polymer Surfaces Studied by Means of ESCA
D. T. Clark

Spectroscopy of Polymer Surfaces using the Surface Enhanced Raman Effect
D. L. Allara, C. A. Murray and S. Bodoff

X-Ray Photoelectron Spectroscopic Study of the Electronic Structure of Poly-p-Phenylene Sulfide
J. Riga, J. P. Boutique, J. J. Pireaux and J. J. Verbist

XPS Analysis of Fluorocarbon Films Produced by Sputtering of a PTFE Bulk Cathode
J. J. Pireaux, J. P. Delrue, A. Hecq and J. P. Dauchot

Localized Auger States in Polyethylene
J. A. Kelber, R. R. Rye, D. R. Jennison and J. C. Houston

The Influence of a Substrate on the Surface Characteristics of Silane Layers
H. Ishida, S. Naviroj and J. L. Koenig

PART II. CONTACT ANGLE, WETTABILITIES AND SURFACE ENERGETICS

Wettability of Polymer Surfaces
M. A. Fortes
# Novel Methods of Studying Polymer Surfaces by Employing Contact Angle Goniometry

F. J. Holly................................................................. 141

# The Solidification Front Technique: Its Scope and Use to Determine Interfacial Tensions

R. P. Smith, S. N. Omenyi and A. W. Neumann.............. 155

# Surface Thermodynamics of Liquid Polymers: Theory

I. C. Sanchez and C. I. Poser........................................ 173

# Characterization of High Surface Area Polyester Filaments by Means of Wetting Force Measurements

B. Miller, H.-D. Weigmann and D. Simonetti................. 183

# Surface Free Energy of Plasma-Deposited Thin Polymer Films

A. M. Wrobel.............................................................. 197

# Properties of n-Alkane Films in the System: Teflon/n-Alkane-Water

E. Chibowski, B. Janczuk and W. Wojcik...................... 217

# Interfacial Free Energies of Cells and Polymers in Aqueous Media

D. F. Gerson.............................................................. 229

# Adhesion of Ice to Polymers and Other Surfaces

K. Itagaki................................................................. 241

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## PART III. REACTIONS AND INTERACTIONS AT POLYMER SURFACES

# Surfaces (Interfaces) and Polymer Stability

H. H. G. Jellinek.......................................................... 255

# Surface Oxidation Reactions of Unsaturated Polymers

B. Rånby, J. F. Rabek and J. Lucki............................... 283

# Photooxidative Degradation of Clear Ultraviolet Absorbing Acrylic Copolymer Surfaces

A. Gupta, R. H. Liang, O. Vogl, W. Pradellok, A. L. Huston and G. W. Scott................................. 293
CONTENTS

Interactions Between Several Radiation Sources and Certain Polymer Surfaces; Reflectance - Transmittance Characteristics
J. R. Hallman, C. M. Sliepecevich and J. R. Welker........................................ 305

Characterization of Dense Sulfonated Polysulfone Membranes
M. A. Dinno, Y. Kang, D. R. Lloyd, J. E. McGrath and J. P. Wightman.......................... 347

Surface Phenomena in Latex Films Vulcanization
O. Shepelev and M. Shepelev.......................... 367

Factors Influencing Latex Autohesion
M. Gur-Aryeh and M. Shepelev........................ 377

PART IV. TRIBOLOGY AND TRIBOELECTRIFICATION

Tribology of Polymers: State of an Art
B. J. Briscoe........................................ 387

Tribological Properties of Rubberlike Materials
D. F. Moore......................................... 413

A Survey of the Adhesion, Friction and Lubrication of Polyethylene Terephthalate Monofilaments
M. J. Adams, B. J. Briscoe and S. L. Kremnitzer..... 425

Surface Energetics and Tribological Properties of Miniature Polymer Elements
Z. Rymuza........................................... 451

Charge States in Polymers: Application to Triboelectricity
C. B. Duke.......................................... 463

Triboelectrification of Polymers - A Chemist's Viewpoint
D. A. Seanor........................................ 477

Electrical Contact Performances and Electrical Conduction Mechanisms of an Elastomeric Conductive Polymer
T. Tamai............................................ 507
PART V. CRAZING, FRACTURE AND MORPHOLOGY

Surface Free Energies and Fracture Surface Energies of Glassy Polymers
   L. H. Lee................................................................. 523

The Work of Adhesion and the Fracture Surface Energy of Epoxy-Polycarbonate Adhesive Joints
   B. W. Cherry............................................................ 545

The Variation of Polymer Morphology and Structure Through Surface Interactions
   J. B. Lando................................................................. 559

About the Contributors.................................................. 569

Subject Index.................................................................... xvii
CONTENTS OF VOLUME 2

PART VI. ADSORPTION AND ADHESION

Acid-Base Interactions in Polymer Adhesion
F. M. Fowkes........................................ 583

Role of the Molecular and the Electrostatic Forces in the
Adhesion of Polymers
B. V. Derjaguin and Yu.P. Toporov..................... 605

Adsorption and Contact Angle Studies. IV. Alcohols and
Water on Polypropylene and Polycarbonate
B. C. Nayar and A. W. Adamson........................ 613

Adsorption on Modified Silicone Surfaces
F. J. Holly and M. J. Owen.......................... 625

The Physicochemical Surface Properties of Fiber-Forming
Polymers
H.-J. Jacobasch..................................... 637

Surface Characterization of Polymers by Inverse Gas
Chromatography. Poly(ethylene terephthalate) Film
J. Anhang and D. G. Gray................................ 659

Elastic and Viscoelastic Adhesion
G. A. D. Briggs...................................... 669

Autoadhesion of Etched Polyethylene Films
M. Salkauskas and M.-G. Klimantavičiūtė.................. 689

Development Trends with Regards to Welding Techniques for
Plastics
H. Potente............................................. 699
Welding Technology and Durability of Plastic Film Welded Joints
M. G. Dodin........................................ 717

PART VII. MODIFICATION OF POLYMER SURFACES

Acid-Base Considerations of Surface Interactions in Polymer Systems; Control by Microwave Plasma Treatment
H. P. Schreiber, C. Richard and M. R. Wertheimer.... 739

An ESCA Investigation of the Plasma Oxidation of Poly (p-Xylylene) and its Chlorinated Derivatives
A. Dilks and A. VanLaeken........................... 749

Mild Direct Fluorination of Polymers Studied by X-Ray Photoelectron Spectroscopy
M. Millard, J. Burns and H. Sachdev................ 773

Chemical Characterization of Surface-Activated Polymer Films Using the ESCA Technique
T. Ohmichi, H. Tamaki, H. Kawasaki and S. Tatsuta............ 793

Introduction of Reactive Groups onto Polymer Surfaces
R. K. Samal, H. Iwata and Y. Ikada................... 801

Oriented Monolayer Assemblies to Modify Fouling Propensities of Membranes
L. M. Speaker and K. R. Bynum......................... 817

Flexural Fatigue and Abrasion Resistance Effects of Sunlight-Induced Modification of the Surface of Nylon 6 Fibers
M. S. Ellison, Y. Fujiwara and S. H. Zeronian........... 843

Chemical Modification of Kevlar® Surfaces for Improved Adhesion to Epoxy Resin Matrices: I. Surface Characterization

Graft Copolymerization of Vinyl Monomers onto Wool by Use of (TBHP-FAS) System as Redox Initiator
B. N. Misra and D. S. Sood............................ 881
CONTENTS

PART VIII. BIOMEDICAL ASPECTS AND BIOADHESION

Surface Energetics and Biological Adhesion 895
   R. E. Baier and A. E. Meyer

Polymer-Water Interface Dynamics 911
   J. D. Andrade, D. E. Gregonis and L. M. Smith

Polymer Surface Modification to Attain Blood Compatibility of Hydrophobic Polymer 923
   M. Suzuki, Y. Tamada, H. Iwata and Y. Ikada

Polymer Surface Interactions in the Biological Environment 943
   P. Y. Wang and M. J. Bazos

XPS Analysis of Segmented Polyether Polyurethane-Ureas: Assessment of Surface Activity Toward Blood Platelets 953
   N. A. Mahmud, S. Wan, V. Sa da Costa, V. Vitale,
   D. Brier-Russell, L. Kuchner, E. W. Salzman and
   E. W. Merrill

ESCA Studies of Extracted Polyurethanes and Polyurethane Extracts: Biomedical Implications 969
   B. D. Ratner

Interactions of Blood with Multiphase Polymers; Effect of Sulfonate-Ester-Containing Domains on Platelet Reactivity 985
   S. J. Whicher and J. L. Brash

Specific Protein Interactions as a Possible Explanation for Unexpected Behavior of Blood at Interfaces 1003
   L. Vroman

Fundamentals of Native Plasma Protein Adsorption on Polymer Surfaces 1011
   E. Nyilas and T-H. Chiu

PART IX. POLYMER-METAL INTERFACES

Interfacial Interactions Between Polymers and Other Materials and Their Effects on Bond Durability 1035
   W. J. van Ooij

Chemical Interactions at Polymer-Metal Interfaces: Studies with X-Ray Photoemission 1093
   J. M. Burkstrand
Analysis of Metal-Polymer Boundaries using Ultrasonic Interface Waves
    R. O. Claus and R. T. Rogers......................... 1101

Effect of Filler Size and Plasticizer on the Adhesion of Electroless Copper to PVC
    C.-C. Wan........................................... 1115

Adhesion of Metal Deposits on Plastics Based on Acrylic Polymers
    M. Kadreva......................................... 1125

Adhesive Joining Aluminum to Engineering Plastics: I. Polyester Fiberglass Composite
    J. D. Minford........................................ 1139

Adhesive Joining Aluminum to Engineering Plastics: II. Engineering Grade Styrene and Cross-Linked Styrene
    J. D. Minford........................................ 1161

ESCA Studies of Interfacial Degradation Between Ethylene-Acryllic Acid Copolymers and Lead/Tin Alloys
    F. Yamamoto, S. Yamakawa and M. Wagatsuma............ 1181

Analysis of Vinyl Copolymer Surfaces by XPS and Surface Reactions
    J. F. M. Pennings................................... 1199

Electroless Metallization on Sensitized Polymer Powders Fused onto a Polymer Surface
    L. G. Svendsen and G. Sørensen....................... 1213

About the Contributors.................................. 1225

Subject Index........................................... 1237