

## PREFACE

The collection of papers assembled in this issue is based on key presentations that were made during the IUPAC sponsored symposium held in Athens, Greece, August 29 through September 2, 1982. The symposium theme was on the Interrelations between Processing Structure and Properties of Polymeric Materials which, in our view, represented a timely topic in the forefront of developments that could be addressed on an international scale. It should be pointed out that this was the first time an IUPAC sponsored symposium was held in Greece in keeping with the high standards of this body and cutting across national barriers. Naturally, the issue as to why polymers and, specifically, the subject matter was chosen for a theme must be addressed here. In our view and those of the Scientific Committee polymers represent an interdisciplinary area of science and engineering that also requires close coupling of the academic and industrial sectors for its successful developments. Furthermore, the wide use of polymeric products has prompted development of related industry, in one form or another, in almost every country. Thus, the subject matter which focused on understanding of existing polymers for better processing and usage such as in the manufacturing of light-weight load-bearing parts had international appeal both in practical everyday usage and in long-term research developments. Also with emphasis being placed on the interrelations between the different sectors of the field, a proper setting was created in the symposium for collaborations to be established across many boundaries. We have now been reassured after the symposium in many ways that the sponsoring country as well as the many international participants benefited tremendously from this event. The planning of the symposium started with a workshop which was held in Athens on August 1980 to decide the specific topics to be addressed. The majority of the workshop participants formed the scientific committee which organized and chaired the different sessions and selected the work of its participants for presentation and publication. Publication of the work that was presented at the symposium is provided in two forms. This issue, as per IUPAC requirements, provides the contributions that were submitted by the invited participants and organizers. Following this issue, the complete proceedings of the symposium (both invited and contributed papers) are to be published by Elsevier Press.

Concerning specific topics covered in this issue, the reader should refer to the work of White and Janeschitz-Kriegl for description of structure development during processing operations. The paper by Wedgewood and Seferis focuses on structure characterization for solid state properties while the paper by Capaccio describes structural changes that may occur when processing ultra-high modulus fibers. A unique process that takes advantage of molecular arrangements in processing high modulus and strength polyethylene fibers is described in the work by Pennings, et al. In general, though, the influence of molecular defects on the large deformations and rupture of polymers is described by Kausch. Fracture as a material property for polymers is covered in the papers by Theocaris. The papers by Takayanagi, May, and Halpin, et al., provide excellent coverage of polymer composite aspects that were presented in the symposium. Finally, the papers by Astarita and Nicolais, Duda, and Mashelkar are representative of work presented in the area of diffusion and sorptive properties of polymers in relation to their structure. Appropriately, a description of collaborative research through IUPAC by Clegg concludes this issue. We are indeed grateful to these authors for both their excellent presentations at the symposium and for these papers. However, it is only appropriate that we acknowledge the valuable contributions of the remainder of our invited speakers. Thus special thanks are extended to P. J. Flory, R. F. Landel, J. T. Quinlivan, V. T. Stannett, and R. S. Stein, in addition to the contributing authors of this issue.

Finally, having worked for almost three years on a successful event, it is only natural that we wish to also acknowledge here some key individuals and organizations who helped above and beyond the "call of duty." We greatly appreciated the personal involvement of: Minister of Culture and Science of Greece, Ms. Melina Mercouri, in opening the symposium, as well as the general assistance provided by that ministry; Dr. George Lianis for his continued support, both as a member of the scientific committee and Minister of Science and Technology of Greece; the assistance and help provided by colleagues of our respective universities, as well as those of the Scientific and Organizing Committees; Dr. Evandelidou-Tsolis and especially Professor E. Dilaris as individuals who committed to the symposium from its inception and represented, in organizing matters, the Greek Chemists Association effectively in this international event; our associates Dr. George Papanikolaou and Mrs. S. Yuh for carrying the burdens of everyday operation during the planning and running of the symposium. In closing, we can truly hope that the work presented here captures for the reader a small but significant sample of the scientific accomplishments of the symposium that we know have benefited in many ways the participants, our students, and us.

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General Co-Chairmen