

Preface

A rather large amount of material has been accumulated in the field during the past nearly two decades since the publication of the first edition by the present senior author in 1997. The new material may be divided into three groups. The first contains mainly experimental results successively obtained for static, transport, and dynamical properties, the second deals with ring polymers (including circular DNA) studied both experimentally and theoretically with the use of Monte Carlo simulation, and the third concerns such simulations on excluded-volume effects, including those in polyelectrolytes. These results and some additional descriptions were included in the chapters (except Chaps. 4 and 10) of the present edition, whose Chap. 9 was newly added. This work was done under joint authorship with Professor T. Yoshizaki. On that occasion, the authors also attempted their efforts to correct errors in the first edition as much as possible.

Finally, it is a pleasure to acknowledge the assistance of Dr. D. Ida who prepared newly some of the tables and figures and of the author and subject indexes and corrected some of the errors.

Kyoto, Japan
September 2015

Hiromi Yamakawa

Preface to the First Edition

This book is intended to give a comprehensive and systematic description of the statistical-mechanical, transport, and dynamic theories of dilute-solution properties of both flexible and semiflexible polymers, including oligomers. This description was developed on the basis of the “helical wormlike chain” model along with an analysis of extensive experimental data. Chapter 2 and the fundamental parts of Chaps. 3, 4, 6, and 9 are based on the author’s lecture notes for courses in polymer statistical mechanics given at the Graduate School of Kyoto University in 1978 through 1994. Much of the material in the book arises from his research reported since the time of publication (1971) of his earlier book, *Modern Theory of Polymer Solutions*.

The accomplishment of this research was made possible by the collaboration of his students, postdoctoral students, and other collaborators, especially F. Abe, Y. Einaga, M. Fujii, W. Gobush, T. Konishi, K. Nagasaka, M. Osa, N. Sawatari, J. Shimada, W. H. Stockmayer, Y. Takaeda, and T. Yoshizaki. Professor W. H. Stockmayer gave the author an opportunity to stay in Hanover in 1971/1972, and indeed the research in this book was started at that time. Professor T. Norisuye, who is not a collaborator of the author but his colleague, kindly provided him with the unpublished material on the third virial coefficient dealt with in Chap. 8.

The author is indebted to Dr. J. Shimada for his careful checking of the mathematical equations in the manuscript. Finally, it is a pleasure to acknowledge the assistance of Prof. T. Yoshizaki and Mr. M. Osa who prepared some of the tables and figures and also translated the manuscript into the compuscript with Miss M. Fukui.

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