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Preface

Chan I. Chung

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Theory & Practice

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Preface

Conceptual understanding and basic analytical skill are sufficient in most cases to deal with practical engineering problems. This philosophy and the contents of this book reflect my industrial, academic, and consulting experience of 38 years. I have been fortunate to have the opportunity to study the fundamentals of extrusion mechanisms, melt rheology, and polymer physics as well as the opportunity to apply them successfully in commercial practice. My fundamental and practical knowledge of extrusion led to several commercially successful high performance screw designs.

A process engineer must have a good knowledge of the material being processed as well as the engineering aspects of the process in order to fully understand the process and the product. This is especially true for polymers because the properties of a polymer product strongly depend on its processing history. Fundamentals of polymer physics and melt rheology are presented for those who lack previous training. This book starts at a basic level emphasizing conceptual understanding and progresses to an advanced level for ambitious readers. Theoretical models are presented with discussions on their capabilities, assumptions, and limitations. Examples show how the theoretical models can be used in practice. Discussions on disputed or ill-understood topics should be considered as my opinion.

Practical engineering problems are usually too complex to obtain exact mathematical solutions. Approximate solutions with ambiguity are obtained using simplifying assumptions and approximate material properties. The knowledge learned from practical experience is essential to properly interpret the solutions.

I wrote this book to share what I learned through my career with other engineers and scientists. I have tried to present the topics accurately, clearly, and carefully. However, mistakes and ambiguities are inevitable. Your comments will be welcome and appreciated.

Chan I. Chung