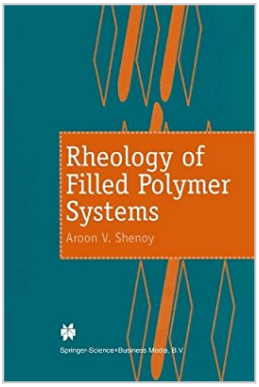

Rheology of Filled Polymer Systems

By A.V. Shenoy

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Polymeric materials have been replacing other conventional materials like metals, glass and wood in a number of applications. The use of various types of fillers incorporated into the polymer has become quite common as a means of reducing cost and to impart certain desirable mechanical, thermal, electrical and magnetic properties to the polymers. Due to the energy crisis and high prices of petrochemicals, there has been a greater demand to use more and more fillers to cheapen the polymeric materials while maintaining and/or improving their properties. The advantages that filled polymer systems have to offer are normally offset to some extent by the increased complexity in the rheological behavior that is introduced by the inclusion of the fillers. Usually when the use of fillers is considered, a compromise has to be made between the improved mechanical properties in the solid state, the increased difficulty in melt processing, the problem of achieving uniform dispersion of the filler in the polymer matrix and the economics of the process due to the added step of compounding. It has been recognized that addition of filler to the polymer brings a change in processing behavior. The presence of the filler increases the melt viscosity leading to increases in the pressure drop across the die but gives rise to less die swell due to decreased melt elasticity.The decrease in melt elasticity can raise the critical shear rate at which melt fracture during extrusion starts to occur and hence one could often consider increasing the throughput rate in the case of filled polymer melt systems.

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- 476 pages

Editorial Review

Review
`Rheology of Filled Polymer Systems will be of most interest to those involved in injection molding and similar processes. [...]if you are interested in molding processes, and especially in the theoretical background, then this book is for you. [...]The main feature which distinguishes this book from others on polymer rheology is its focus on filled systems. The addition of fillers (particles, fibers, flakes, etc.) makes such systems behave much differently than unfilled polymers. [...]the writing is quite good [...] Shenoy does a good job of presenting data for a variety of systems, explaining the trends intuitively, and then showing how it all fits in with the theories developed earlier in the book.'
Barry Berenberg in **Composite.About.com**

From the Author
It is hoped that this book will provide all the necessary background needed to understand the various aspects relating to therheology of filled polymer systems so that even new entrants to this exciting field may benefit from the information. For those who have already whetted their appetite with a taste of this research area, it is hoped that this book will provide complete details under one cover and entice them to probe into the vacant areas of research that may become obvious to them on reading this book.

From the Back Cover
The rheology of filled polymer systems is an ever expanding field in the polymer industry today. Using a concise, practical and simple format this comprehensive work explains the concepts behind filled polymer systems and the rheological techniques involved in studying their behavior. Aware that the readers of the book may come from differing backgrounds, the first three chapters familiarize the reader with the basics about polymers, fillers and physicochemical interactions between them, rheology and rheometry. Covering such topics as preparation of filled polymer systems, steady shear viscous properties and extensional flow properties, this book covers the areas of importance from the introductory level through to more complex issues.

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