

terials. Each chapter contains a well-referenced introduction, followed by an overview of the area and then concentrating on selected representative examples. The historical background and the minitutorial in each chapter are designed to bring the uninitiated up-to-speed describing some of the breakthroughs as well as the challenges in the field. The practitioners will also find the volume useful for the up-to-date (some chapters cite work up to 1992) information in the area.

Although inorganic materials probably means different things to different people, the book might go unnoticed by readers who usually associate inorganic materials with ceramics.

Bruce and O'Hare have made a valuable contribution in this growing area of materials chemistry. For those interested in the subject, this book will provide a useful reference text while it can serve as a stimulus for the uninitiated.

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Mixing in Polymer Processing

Edited by Chris Rauwendaal, Marcel Dekker, New York, 1991, 496 pp., \$160.00

This book is the outgrowth of a 1983 AIChE Diamond Jubilee Meeting on Mixing in Polymer Processing, whose organizer was the editor and where many of the chapter contributors were speakers. The eight years it took to write, edit and publish this book render the material dated; except for the editor's references, it is hard to find a reference which is more recent than 1985.

The book contains 11 chapters dealing with the fundamentals of distributive and dispersive mixing and with the performance of the main polymer mixing devices.

All chapters are well referenced by and large.

In the area of the fundamentals of laminar distributive mixing of rheologically homogeneous mixtures, with passive interfaces, the chapter by Erwin is excellent, but brief and dated; the section of Valsamis and Tadmor on laminar distributive mixing in Corotating disk processors is brief but thorough for this device; the relevant major section by Rauwendaal dealing with single-screw helical channel flow mixing is also thorough, but with material that can be found in earlier texts on polymer processing. There is mention of chaotic laminar distributive mixing, an area of research which is quite active today.

There are two chapters on the fundamentals of laminar dispersive (intensive) mixing: one by Elmendorp dealing with immiscible fluids and the other by Manas-Zloczower on the dispersion of agglomerated solids in high-intensity batch mixers. Elmendorp's chapter, based on his thesis, treats the subjects of dispersion and coalescence thoroughly and with balance. Manas-Zloczower has also written a thorough chapter on this area of her speciality. Both chapters provide also some practical insights to dispersive mixing.

The difficult subject of measuring the degree and uniformity of mixing is addressed briefly, but lucidly, by Tucker. The important concepts involved in evaluating mixedness, as well as the associated pitfalls, are well presented.

The rest of the book is devoted to specific polymer processing/compounding equipment.

The chapter on single screw, though too long for a not-so-effective mixing device, contains a very good presentation of all the technologically important single-screw mixing elements, as well as static mixers.

Three chapters deal with twin-screw extruders. Janssen presents the equations governing the positive displacement conveying and drag leakage flows in fully

intermeshing counterrotating devices. In a more practical and technological fashion, Drieblatt and Eise and Nichols treat the intermeshing, self-wiping, corotating and the tangential counterrotating extruders, respectively. Important subjects such as the effect of process and design variables on dispersive and distributive mixing, devolatilization, filler incorporation, and reactive processing are presented in an easy-to-follow fashion. The Nichols chapter is the better of the two.

Banbury-type intensive mixers are presented by Manas-Zloczower in connection with deagglomeration processes and the continuous version of these devices, the Farrel continuous mixer (FCM) by Kearney. Kearney's chapter is long in equipment considerations and short in the discussion of the phenomena occurring in the FCM.

The important phenomenon of "dissipative mix-melting," which contributes greatly to mixing in compounding equipment, is discussed briefly by Nichols and by Valsamis and Tadmor.

This book can help enhance the basic understanding of distributive and dispersive mixing in polymer systems and of the most important compounding devices. In the latter area, the treatment could be more even and uniform by more extensive editing. We also believe that instead of a chapter on summation, an introductory chapter to mixing/compounding equipment, right after the fundamentals, would serve the reader well in guiding him through the relative advantages of each device.

Finally, this book does not address the ultimate question in polymer mixing: how is mixing performance affected by the combined effects of the mixer design, processing and material variables.

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