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By Xiangwu Zhang



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Connects fiber chemistry and structure to properties that can be designed and engineered Micro- and nanoscale, synthetic and natural polymer and non-polymer fibers explained with applications to industrial, electronic, biomedical and energy Information pertinent for fiber, textile, composite, polymer and materials specialists

This volume provides the basic chemical and mathematical theory needed to understand and modify the connections among the structure, formation and properties of many different types of manmade and natural fibers. At a fundamental level it explains how polymeric and non-polymeric fibers are organized, how such fibers are formed, both synthetically and biologically, and how primary and secondary properties, from basic flow to thermal and electrical qualities, are derived from molecular and submolecular organization, thus establishing the quantitative and predictive relationships needed for fiber engineering. The book goes on to show how fiber chemistry and modes of processing for dozens of materials such as silks, ceramics, glass and carbon can be used to control functional optical, conductive, thermal and other properties. Its discussion ranges over microscale and nanoscale fibers (nanofibers), covering methods such as spinning and electrospinning, as well as biological fiber generation through self-assembly. Technologies in this text apply to the analysis and design of fibers for industrial, electronic, optical, medical and energy storage applications.



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Editorial Review

Review

This is the newest textbook in the textiles areas, focusing on structures, properties and preparation processes of manufactured and natural fibers, as well as nanofibers. The features of the book are the discussions on chemical and physical structures of the fibers, introduction on flow behavior (rheology) of polymer fluids and formation processes of manufactured fibers and nanofibers; and more detailed discussions on properties of the fibers, including mechanical, thermo, viscoelastic, electrical, frictional, and optical properties. I personally more like the descriptions of fiber properties, and several of the properties, such as electrical and optical ones, have not been discussed in textile books. Generally speaking, the book is an excellent reference material for graduate and undergraduate students in textile sciences, materials sciences and engineering majors, and also is very useful in providing the most updated information on structure, properties and formations of fibers for all textile materials related professionals. It can also sure as a textbook for textile engineering majors. I am sure the book can find more readers from industry now due to the fact that many professionals are trying to catch up the information on new materials. --Professor Gang Sun, Department of Chemical Engineering and Materials Science, University of California, Davis,

About the Author

Fiber and Polymer Science, College of Textiles, North Carolina State University

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