Viscoelastic Materials

By Professor Roderic Lakes



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Understanding viscoelasticity is pertinent to design applications as diverse as earplugs, gaskets, computer disks, satellite stability, medical diagnosis, injury prevention, vibration abatement, tire performance, sports, spacecraft explosions, and music. This book fits a one-semester graduate course on the properties, analysis, and uses of viscoelastic materials. Those familiar with the author's precursor book, Viscoelastic Solids, will see that this book contains many updates and expanded coverage of the materials science, causes of viscoelastic behavior, properties of materials of biological origin, and applications of viscoelastic materials. The theoretical presentation includes both transient and dynamic aspects, with emphasis on linear viscoelasticity to develop physical insight. Methods for the solution of stress analysis problems are developed and illustrated. Experimental methods for characterization of viscoelastic materials are explored in detail. Viscoelastic phenomena are described for a wide variety of materials, including viscoelastic composite materials. Applications of viscoelasticity and viscoelastic materials are illustrated with case studies.

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Viscoelastic Materials By Professor Roderic Lakes Bibliography

- Sales Rank: #2492812 in Books
- Brand: Brand: Cambridge University Press
- Published on: 2009-04-27
- Original language: English
- Number of items: 1
- Dimensions: 9.96" h x 1.06" w x 8.46" l, 2.45 pounds
- Binding: Hardcover
- 480 pages

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Editorial Review

About the Author

Roderic Lakes is a Distinguished Professor in the Department of Engineering Physics at the University of Wisconsin-Madison. He is a Fellow in the American Association for the Advancement of Science (AAAS) and a Fellow in the American Society of Mechanical Engineers (ASME). He has won numerous teaching awards and is the author and co-author of more than 194 archival publications, three books, including Viscoelastic Solids and Biomaterials (2nd and 3rd editions, with J. B. Park), and fourteen book chapters. The author's articles in Science and Nature are of particular note as they have led to numerous synergistic publications in a variety of disciplines.

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