



High Temperature Materials and Mechanisms

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High Temperature Materials and Mechanisms From CRC Press

The use of high-temperature materials in current and future applications, including silicone materials for handling hot foods and metal alloys for developing high-speed aircraft and spacecraft systems, has generated a growing interest in high-temperature technologies. **High Temperature Materials and Mechanisms** explores a broad range of issues related to high-temperature materials and mechanisms that operate in harsh conditions. While some applications involve the use of materials at high temperatures, others require materials processed at high temperatures for use at room temperature. High-temperature materials must also be resistant to related causes of damage, such as oxidation and corrosion, which are accelerated with increased temperatures.

This book examines high-temperature materials and mechanisms from many angles. It covers the topics of processes, materials characterization methods, and the nondestructive evaluation and health monitoring of high-temperature materials and structures. It describes the application of high temperature materials to actuators and sensors, sensor design challenges, as well as various high temperature materials and mechanisms applications and challenges. Utilizing the knowledge of experts in the field, the book considers the multidisciplinary nature of high temperature materials and mechanisms, and covers technology related to several areas including energy, space, aerospace, electronics, and metallurgy.

- Supplies extensive references at the end of each chapter to enhance further study
- Addresses related science and engineering disciplines
- Includes information on drills, actuators, sensors and more

A comprehensive resource of information consolidated in one book, this text greatly benefits students in materials science, aerospace and mechanical engineering, and physics. It is also an ideal resource for professionals in the industry.

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Editorial Review

Review

"This book collates the work of fifty able researchers and should appeal to all studying high temperature materials and applications at the highest level."

—Peter C. Gasson, CEng, MIMechE, FRAeS, from *The Aeronautical Journal*, September 2014

"The book addresses a wide variety of topics, spanning from synthesis of materials for high temperature applications, to characterization, application and challenges. In that aspect, it offers in one volume reference material for now and the future. ... a valuable book to have."

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"The main strengths of the book are those chapters written by clear experts in the field, for example, Navrotsky (*High Temperature Chemistry and Thermodynamics*) and Smialek and Jacobson (*Oxidation of High-Temperature Aerospace Materials*). ... This book covers an interesting mix of high temperature materials and high temperature devices that would be useful to engineer designing and fabricating equipment or facilities for high temperature applications. I am not aware of any other books with this particular mix of materials/devices for high temperature application."

—Elizabeth Opila, University of Virginia, Charlottesville

About the Author

Dr. Yoseph Bar-Cohen is a senior research scientist and supervisor of the Advanced Technologies Group at Jet Propulsion Lab. In 1979, he received his Ph.D. in physics from the Hebrew University, Jerusalem, Israel. His research is focused on electro-mechanics including planetary sample handling mechanisms, and novel actuators that are driven by such materials as piezoelectric, EAP, and biomimetics. In April 2003, *Business Week* named him one of five technology gurus who are "Pushing Tech's Boundaries." His accomplishments have earned him numerous honors and awards. He has (co)edited and (co)authored several books and publications, co-chaired 44 conferences, and has 22 registered patents.

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