



Bulk Metallic Glasses

By C. Suryanarayana, A. Inoue

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In spite of the large amount of research activity in this subfield of materials science and engineering, there is no single book available that provides background information, methods of synthesis, characterization procedures, properties, and potential and existing applications of bulk metallic glasses. Written in an easy-to-understand style by pioneering researchers in this field, **Bulk Metallic Glasses** is one of the first books to coherently discuss the synthesis, processing, properties, and applications of these unique materials.

The book explores the differences between nanocrystalline, glassy, and amorphous solids as well as the thermodynamics and kinetics and various processing methods of glass formation. It critically compares the different criteria for glass formation, describes the advantages and limitations of experimental methods for synthesizing bulk metallic glasses in assorted sizes and shapes, and examines the kinetics of crystallization/devitrification and the mechanisms of transformations. It also covers the density, diffusivity, thermal expansion, electrical resistivity, specific heat, viscosity, corrosion resistance, mechanical behavior, and magnetic properties of bulk metallic glasses. After presenting a wide array of applications, the book concludes with a discussion on the future of these materials.

The adoption of bulk metallic glasses into existing systems is besieged by many obstacles but due to their interesting combination of properties, future applications may be unlimited. A one-stop resource on all aspects of bulk metallic glasses, this book demonstrates the immense potential of these novel materials. It clearly elucidates the background, detailed methods of synthesis and characterization, structure, and properties of bulk metallic glasses.

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Editorial Review

Review

... interesting results, as well as all fundamental and applied topics, are systematically described in this book ... This book is suitable for young researchers in materials science and applied physics who are interested in learning about bulk metallic glasses and are looking for a guidebook to launch research into this exciting materials field. Also, this book can be perfectly used as a textbook for students in graduate schools.
?From the Foreword by C.T. Liu, Hong Kong Polytechnic University, and Auburn University, Alabama, USA

About the Author

C. Suryanarayana is a professor of materials science and engineering in the Department of Mechanical, Materials and Aerospace Engineering at the University of Central Florida in Orlando. A fellow of ASM International and one of the most cited researchers in materials science and engineering, Dr. Suryanarayana has published more than 330 technical papers in archival journals and authored/edited 19 books and conference proceedings. His research over the last 40 years has spanned rapid solidification processing, mechanical alloying, metallic glasses, superconductivity, quasicrystals, and nanostructured materials. He is the recipient of several awards, including the National Metallurgists' Day Award of the Government of India.

A. Inoue is the president of Tohoku University in Sendai, Japan. For the past 20 years, he has pioneered the field of bulk metallic glasses through systematic synthesis, characterization, and applications. Also one of the most cited researchers in materials science and engineering, Dr. Inoue has published over 2,000 papers in archival journals and edited several conference proceedings and books. He also holds over 200 patents and is the recipient of numerous awards, including the 2010 Acta Materialia, Inc. Gold Medal.

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