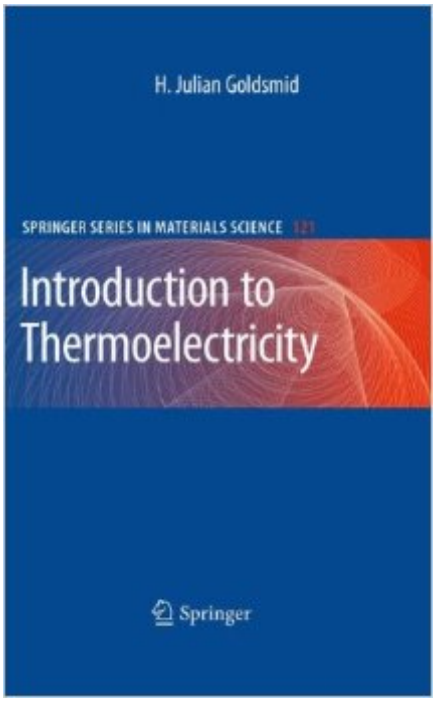
Introduction To Thermoelectricity (Springer Series In Materials Science)



Synopsis

Introduction to Thermoelectricity is the latest work by Professor Julian Goldsmid drawing on his 55 years experience in the field. The theory of the thermoelectric and related phenomena is presented in sufficient detail to enable researchers to understand their observations and develop improved thermoelectric materials. The methods for the selection of materials and their improvement are discussed. Thermoelectric materials for use in refrigeration and electrical generation are reviewed. Experimental techniques for the measurement of properties and for the production of thermoelements are described. Special emphasis is placed on nanotechnology which promises to yield great improvements in the efficiency of thermoelectric devices. Chapters are also devoted to transverse thermoelectric effects and thermionic energy conversion, both techniques offering the promise of important applications in the future.

Book Information

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Customer Reviews

This is the third in a series of books Professor Goldsmid has written on thermoelectrics over the last half-century. He is one of the pioneers of the field, and combines extensive knowledge with excellent pedagogy. The book is aimed at readers with batchelor-level technical training, engineers, physicists or chemists, who are interested in learning more about the design of thermoelectric materials and devices. Thermoelectricity is an all-solid-state energy conversion technology, which directly converts heat to electricity or electrical current to cooling power, without any moving part. It

is a totally robust technology, and very powerful per weight or volume. It has been used for a half-century to power satellites, but also in coolers used in camping gear, military and medical equipment, and wine coolers. The complicated machinery that drives mechanical heat engines (car engines, power plant turbines, jet engines) is here completely absent, but replaced by complicated electronic properties inside the thermoelectric materials themselves. This books is probably the best modern one that explains how it works. It is necessary reading for the beginning graduate student or serious professional studying thermoelectrics, or thinking about using them.

This book is probably the best for the student who want to learn why a thermoelectric material is better than an other one. It is really a good introduction epecially for the electronic properties. The reading of this book may be complemented by the reading of books dedicated to the thermal conductivity. Also it is usefull to read volume of the "Solid state physics" edited by Turnbull and Seitz, even if they are old books only available in public library, because they are still the best. I hope that this review will guide young scientists in their study, and that they will be able to developp products based on thermoelectric effects after.

I have read just the first two chapters and his description of the fundamental science behind the three thermoelectric effects is poor. He glances over this description and doesnt provide rigorous description. His math is passable. I havent seen any calculus based descriptions as yet, which some will count against him. Illustrations are poor so far. I really value the introductory parts of books as it sets the tone for the rest of the book to the reader

(Watson-Guptill Materials and Techniques) The Oil Painting Book: Materials and Techniques for Today's Artist (Watson-Guptill Materials and Techniques) New Edition by Creevy, Bill [1999] His Dark Materials Trilogy (His Dark Materials) An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics) Time Series: Theory and Methods (Springer Series in Statistics) Biomaterials Science, Third Edition: An Introduction to Materials in Medicine Biomaterials Science: An Introduction to Materials in Medicine, Second Edition Shear Localization in Granular Bodies with Micro-Polar Hypoplasticity (Springer Series in Geomechanics and Geoengineering) Electromagnetic and Optical Pulse Propagation 1: Spectral Representations in Temporally Dispersive Media (Springer Series in Optical Sciences) (v. 1) Important Developments in Soliton Theory (Springer Series in Nonlinear Dynamics) Electron Correlations in Molecules and Solids (Springer Series in Solid-State Sciences)