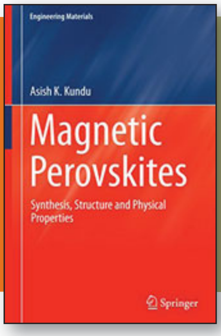
other elements. The elements chosen are zinc, cadmium, and mercury (under II); silicon, germanium, and tin (under IV); and sulfur, selenium, and tellurium (under VI), thus accounting for 27 semiconductors discussed comprehensively. These have a near-optimal direct-bandgap energy of ~1.5 eV, a value at which the conversion efficiency is maximum. Their absorption coefficient is high so that thin materials can be used.

The introductory chapter defines, with sample calculations, parameters such as abundance values, spectral efficiency, effective cubic lattice constant (used in later chapters to correlate properties of these 27 semiconductors), the effective medium approximation, and interpolation schemes. This is followed by six chapters on structural, thermal, elastic, band structure, optical, and carrier transport properties. Chapter 2 summarizes data on crystal structure and includes comparisons with III–V and II–VI semiconductors. The next chapter presents phase diagrams and properties of practical importance such as specific heat, Debye temperature, thermal expansion, and thermal conductivity, again comparing other semiconductors. The data on elastic constants, hardness, and lattice dynamic properties, covered in chapter 4, are useful to have in one place. The next chapter on band structure combines theory with empirical correlations of energy gap with molecular weight and effective cubic lattice constant. The chapter on optical properties is relevant to solar cells and optoelectronic applications. The final chapter on carrier transport properties includes discussions on electron and hole Hall mobilities and conduction mechanisms. A special feature is the attention devoted to material parameters—stoichiometry, alloying, doping, grain boundaries, graded structures—and heat treatment.

There are 26 categories of solar cells, including those made of earth-abundant materials, ranging in efficiency from 10.6% to 46%, each with its own technical and economic challenges. A brief summary would have been helpful comparing them and placing the Cu_2-II-IV-VI_4 semiconductors in context. This book is an authoritative source of information due to the in-depth discussions and adequate references, figures, tables, and appendices.

Reviewer: N. Balasubramanian *is an independent research scholar working on renewable energy and ultrafine-grain materials in Bangalore, India.*



Magnetic Perovskites: Synthesis, Structure and Physical Properties

Asish K. Kundu

Springer, 2016
167 pages, $129.00 (e-book $99.00)
ISBN 978-81-322-2759-5

This book presents some recent advancements in the area of magnetic perovskites and gives an introduction to the physics of complex magnetism (phase separation, spin glass, frustration). It is written from a materials science perspective and is essentially based upon scientific publications from the author. Thus, it only contains the results of a few recently studied compounds and may need to be updated in the future. Nevertheless, it can serve as an introduction to students starting in the field of magnetic perovskites. The book is organized into four chapters.

Chapter 1 briefly introduces the materials. After describing the importance of perovskites and a description of the structure, the author presents the synthesis. It is, however, restricted to single-crystal cobaltites; it is surprising that the author does not even mention thin-film growth techniques despite the huge amount of work in that area, as well as the potential applications in oxide electronics. The chapter ends with a list of key properties reported, corresponding only to those detailed in the book.

Chapter 2 presents results of electronic phase separation and glassy behavior. The first example is manganites, $A_{1-x}B_xMnO_3$ (A = La, Pr, Nd, Gd, and Y and B = Ca, Ba, Sr), which exhibit electronic phase separation. An example of glassy behavior in $A_{0.7}Ba_{0.3}MnO_3$ (A = La, Nd, and Gd) is also given. The second example is a cobalt-centered perovskite that displays electronic phase and spin-glass behavior.

Chapter 3 discusses the A-site cationic ordering and disordering effects on magnetotransport properties of cobaltites. This section starts with a clear description of ordered and disordered perovskites. The description of disordered ABO_3 perovskites was not necessary, and this content could have been merged with chapter 1 and the introduction of perovskites. The most interesting part is the disordered perovskites, the presentation of various parameters that influence the phase ordering, and the physical properties. Again, this listing is based on a series of particular compositions, and not the key parameters responsible for the disorder, which at the end are difficult to extract clearly.

Chapter 4 is devoted to bismuth-centered perovskites. After a very short introduction to multiferroicity, this chapter lists various complex compounds and their magnetic properties without including the most studied phase, $BiFeO_3$. A brief part is also dedicated to thin films.

This book is best suited to graduate students in solid-state physics or chemistry. Although it does not contain homework problems or exercises, some undergraduate students still might find it interesting, particularly those who have practical exercises in a laboratory. Despite the bias toward the author's work, it is a passable introduction to magnetic phenomena in perovskites.

Reviewer: Wilfrid Prellier *of the Laboratory of Crystallography and Materials Science, ENSICAEN/CNRS/Normandie Université, France.*

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Preregistration Opens	Late-March 2017
Preregistration Ends	Mid-June 2017

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