

Handbook of the Physics of Thin-Film Solar Cells

By Karl W. Böer

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This handbook is a compendium giving a comprehensive description of the basics of semiconductor physics relevant to the design and analysis of thin film solar cell materials. It starts from the basics of material science, describing the material and its growth, defect and electrical properties, the basics of its interaction with photons and the involved statistics, proceeding to space charge effects in semiconductors and pn-junctions. Most attention is given to analyze homo- and hetero-junction solar cells using various models and applying the field-of-direction analysis for discussing current voltage characteristics, and helping to discover the involvement of high-field effects in solar cells. The comprehensive coverage of the main topics of - and relating to - solar cells with extensive reference to literature helps scientists and engineers at all levels to reach a better understanding and improvement of solar cell properties and their production. The author is one of the founders of thin film solar cell research.

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Editorial Review

From the Back Cover

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About the Author

Dr. Karl W. Böer, is a Distinguished Professor of Physics and Solar Energy at the University of Delaware, emeritus, he is a fellow of the American Physical Society, the IEEE, the ASES, and the AAAS; he has won numerous top prizes in National and International Professional Societies and from his University; he is the Author of over 320 publications relating to solid state physics and solar energy and the author of six books in solid state physics, numerous book chapters and editor of 25 international proceedings. He created *physica status solidi* and is still an editor of series (a), he has created and acted as editor-in-chief of the *Advances in Solar Energy* for more than two decades. Listed in *World's Who's Who* and many other reference books and was recently inducted into the *World's Solar Energy Hall of Fame*. He is best known for his extensive research into the electrical properties of cadmium sulfide and for his development of CdS-based solar cells and for the creation of the first solar house that integrated solar electric and thermal conversion in a systems approach (the Solar One house of the University of Delaware). He is the author of numerous patents in the field of semiconducting and photo conducting devices. He is still a Research Professor with the Department of Physics and Astronomy, and the Department of Material Science and Engineering, as well as conducting joined research of CdS/CdTe solar cells with members of the Institute of Energy Conversion of the University of Delaware. The University created in his name the Solar Energy Medal for Distinguished Contribution to Global Solar Energy Utilization, with the first awardee, the former President of United States, Jimmy Carter in 1988 and since then biannually to worlds leaders in solar energy conversion.

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