Preface to the Fourth Edition

The present textbook, which introduces my readers to elements of solid state physics and then moves on to the presentation of electrical, optical, magnetic, and thermal properties of materials, has been in print for 25 years, i.e. since 1985 when the first edition appeared. It has received quite favorable acceptance by students, professors, and scientists who particularly appreciated that the text is easy to understand and that it emphasizes concepts rather than overburdening the reader with mathematical formalism. I am grateful for all the kind comments which reached me either by personal letters or in reviews found in scientific journals and on the internet.

The third edition was published in 2001, and was followed by a revised printing in 2005. My publisher therefore felt that a new edition would be in order at this time to give me the opportunity to update the material in a field which undergoes explosive development. I do this update with some reluctance because each new edition increases the size (and unfortunately also the price) of a book. It is not my goal to present an encyclopedia on the electronic properties of materials. I still feel that the book should contain just the right amount of material that can be conveniently covered in a 15-week/3-credit hour course. Thus, the added material was restricted to the newest developments in the field. This implies that the fundamentals, particularly in Part I and at the beginning of Parts II to V, remained essentially untouched. However, new topics have been added in the "applied sections", such as energy-saving light sources, particularly compact fluorescence light fixtures, organic light-emitting diodes (OLEDs), organic photovoltaics (OPV cells), optical fibers, pyroelectricity, phase-change memories, blue-ray disks, holographic versatile disks, galvanoelectric phenomena (emphasizing the entire spectrum of primary and rechargeable batteries), graphene, quantum Hall effect, iron-based semiconductors (pnictides), etc.,

to mention just a few subjects. The reader should find them interesting and educational.

As usual, a book of this wide variety of topics needs the advice of a number of colleagues. I am grateful for the help of Drs. Paul Holloway, Wolfgang Sigmund, Jiangeng Xue, Franky So, Jacob Jones, Thierry Dubroca, all of the University of Florida, Dr. Markus Rettenmayr (Friedrich-Schiller-Universität Jena, Germany), and to Grif Wise.

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September 2010

http://www.springer.com/978-1-4419-8163-9

Electronic Properties of Materials
Hummel, R.E.
2011, XIX, 488 p., Hardcover
ISBN: 978-1-4419-8163-9