

Encyclopedia of Condensed Matter Physics (6 Volume Set)

F. Bassani, G.L. Leidl, and P. Wyder, eds.
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Condensed-matter physics embraces much more than solid-state physics and includes, for example, the properties of classical and quantum fluids, aspects of atomic physics such as Bose-Einstein condensates, biomaterials, and nanostructures. The three editors, from the Scuola Normale Superiore in Pisa, School of Materials Engineering at Purdue University, and the Grenoble High Magnetic Field Laboratory, assisted by an 18-member advisory board from seven different countries, have compiled a six-volume work of 316 articles which provides a detailed review of most aspects of this very broad field. To this reviewer's knowledge there is no current encyclopedia which covers the same field. The nearest would be Trigg's 24-volume *Encyclopedia of Applied Physics*—see *MRS Bulletin* 22 (8) (August 1997), p. 66, or Poole's two-volume *Encyclopedic Dictionary of Condensed Matter Physics*, promoted by Elsevier as complementary to the work reviewed here.

The editors' objective was to provide in one treatise a source of definitive information for graduate students, researchers, engineers, and biologists covering not only the underlying science in the field as just defined, but also its methodology, relevant experimental techniques, and practical applications. Obviously not every conceivable topic is covered, but enough are to give a comprehensive view of the entire field. The editorial team recruited over 400 contributors from 30 countries, but more than half of these authors are from Italy, the United States, and France, the home countries of the three principal editors. Some of the contributors are not well known outside their fields, but all have

done an excellent job in reviewing their assigned topic. Most authors contributed but a single article, but a few contributed two, three, or four articles. It is especially to be noted that, despite the fact that only a minority of the contributor group consists of native-English speakers, the writing throughout is fluent, grammatical, and correctly punctuated.

The articles average about eight pages in length, are provided with numerous illustrations (some in color, but this is not always necessary or useful), cross-references to other relevant articles in the encyclopedia, often (but not always) a nomenclature list of symbols used in the article, and leads for further reading (textbooks, monographs, literature articles, and Internet sites, but no citations). Another feature of each article that is provided by the editors is a list of PACS codes. Alas, they nowhere define that this acronym stands for the Physics and Astronomy Classification Scheme (prepared by the American Institute of Physics and the International Council of Scientific and Technical Information), nor do they direct the reader to where definitions of esoteric PACS terms such as "74.20.-z" or "61.46.+w" may be found (on the Internet at <http://publish.aps.org/PACS/>). Without this information the notations are useless. The currency of the work (usually latest references are 2003/4) is about what might be expected given the inexorable time of gestation; however, in a few cases, this parameter dates back to 1981 or earlier and should have been rectified.


The front matter of each volume includes Guide to Use of the Encyclopedia, a list of all contributors to the entire work, a Table of Contents of each of the six volumes in which the articles are listed alphabetically by title (some are inverted so as to bring related articles close, e.g., Metals and alloys, electronic states of; Metals and alloys, optical properties of), and an array of all articles in a Subject Classification. The

last warrants further explication. Thirty-nine subject classifications were chosen by the editors, (e.g., Acoustics, Biophysics, Combinatorial Catalysis, . . .), and each chapter assigned to one of these categories. This was intended to make it easy for the reader to locate all chapters that are in his or her field of interest. Unfortunately, the assignment of chapters seems arbitrary, there are no cross-referencing aids, and many relevant chapters are not easily located. For example, the category "Semiconductors" lists 12 different chapters but omits an equal number of relevance, such as "History of Semiconductors," "Semiconductor Optics," and "Semiconductor Nanostructures" which have been placed in other categories. Similarly the category "Optical Properties" lists 11 relevant chapters, but those chapters entitled "Optical Properties of Defect Centers in Insulating Solids" and "Optical Properties of Materials" are placed in other categories.

The Index, which occupies 175 pages at the rear of Vol. 6, is very elaborate, with three levels of headings. Entries are distinguished as to "major discussion," "Table," or "Figure," and extensive cross-references are included. An estimated 40,000 entries are listed, which implies about 16 entries per page of text.


In sum, this encyclopedia does an excellent job of providing a resource for answers to specific questions as well as a tool for self-education in any of the sub-fields it covers. Some potentially useful (but omitted) features which would have added to its utility include a glossary of key terms, definitions of acronyms, and an index to contributors.

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