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## Molecular Crystals and Liquid Crystals

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## Molecular Electronics from Principles to Practice, by Michael C. Petty

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## Book Review

*Molecular Electronics from Principles to Practice*, by Michael C. Petty,  
John Wiley & Sons, Ltd., Chichester, West Sussex, England, UK, 2007,  
xxiii +517 pages; \$80; ISBN 978-0-470-01308-3 (paperback).

The term “molecular electronics” in the United Kingdom has typically meant the use of organic materials for electronic processes while in the United States it has meant the individual or small numbers of molecules to perform electronic functions. In this book, the author manages to give a good treatment to both topics. Petty has made important and timely contributions to the study of Langmuir-Blodgett films for electrical and optical applications.

The intended audience for the book includes final year science and engineering undergraduates with the intention of giving them the background in chemistry and physics to address the theme of the book. The physics and device discussions are adequate. I suspect that most chemistry students would find the chemical discussions superficial.

The book consists of twelve chapters titled as follows: Scope of Molecular Electronics; Materials’ Foundations; Electrical Conductivity; Optical Phenomena; Electroactive Organic Compounds; Tools for Molecular Electronics; Thin Film Processing and Device Fabrication; Liquid Crystals and Devices; Plastic Electronics; Chemical Sensors and Actuators; Molecular-Scale Electronics; and Bioelectronics. On the whole, the discussions are at an adequate level to introduce students to the topics under discussion.

There are a number of places throughout the book where the reader might have wanted more detailed discussion. On page 138, the spectrum shows two charge transfer transitions, but does not explain the origin of the two transitions. On page 144, in the third paragraph, the word “vibrationally” should probably be “electronically.” The Jablonski diagram on that page does not show internal conversion. On page 179, molecules that are not aromatic need not be aliphatic. On page 185, the synthesis of TCNQ was first reported in 1960. The discussion of charge transfer complexes as conductors would be improved by discussing the population of the conduction band. On page 273, another alternative to electrostatic LbL assembly involves the use of alternating electron rich and electron poor polymers. On page 305, Fig. 8.21 has a misplaced methyl group. On page 348, the last paragraph of Section 9.7.1 seems to be describing a bulk heterojunction cell but does not use that term. On page 416, it is not obvious that the molecular structures in Fig. 11.13 are nonplanar. On page 424, in the discussion of spintronics, a specific ferromagnetic material is not discussed.

Overall, the book is a useful contribution to the literature of the study of organic and polymeric materials for electrical and optical applications. Both students and experienced researchers will find it useful.

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