on his speciality is to look for his own name in the references, so I hope that, in view of my affiliation, I can be forgiven for looking especially closely at Verschuur's chapter on Faraday. It begins unpropitiously by ascribing to Humphry Davy the isolation of 47 new elements (probably a slip of the pen, though surprisingly escaping the editor's notice). Seven would be nearer the mark if, in addition to the Group 1 and 2 metals he isolated at the Royal Institution, we include his identification of iodine in Paris in 1813, assisted by Faraday. Also, so far as I am aware, there is no evidence to support Verschuur's claim that Faraday ever worked as an unpaid assistant to Davy before being formally hired.

These are small factual blemishes, but they lower confidence in the accuracy of other facts related. More surprisingly, the most complete biography of Faraday in recent times (*Michael Faraday* by L. Pearce Williams, DeCapo Press, 1987) does not appear in the bibliography. An irritating feature of Verschuur's exposition, which, after all, is gripping enough in its own right, is the interjection of sections of homespun philosophy, such as *obiter dicta* about inspiration in art, science and religion (for example, chapter 15). Furthermore, a trick much used in fiction, but out of place in a historical narrative, exacerbates the irritation: namely, the self-conscious introduction of the narrator's hindsight. This is used in several places to support the author's emphasis on the time dimension, not in a historical sense but as a vital component of the physical phenomena being expounded.

Moving to more modern times, and to the book's conclusion, yet more contentious generalizations crowd in, culminating in a personal philosophy of scientific progress. There is nothing wrong with trying to draw conclusions from history, of course, but history and philosophy remain separate disciplines, even in science. Verschuur's book is subtitled a history; it is a pity that he did not stick more closely to that appellation.

PETER DAY
The Royal Institution
London

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Optics and Photonics

Electro-Optics Handbook. *Optical and Electro-Optical Engineering Series.* R.

conductor surfaces and interfaces. As noted in the foreword of this monograph by Winfried Mönch, the subject uniquely combines aspects of physics and chemistry in addressing important questions on which new technologies may be based. This is particularly the case in microelectronics and optoelectronics where, with a view towards advanced applications, there has been a concerted effort to develop a fundamental, atomistic understanding. Progress in both theoretical sophistication and the development of experimental probes, notably scanning tunneling microscopy, have led to other advances that make possible the fabrication and eventually the use of epitaxial, atomic-scale structures in devices.

For example, several monographs and edited volumes by Simon Min Sze and others have already been devoted to discussion of microelectronics device theory, fabrication and application. Similarly, surface physics has been discussed in other texts, such as *Physics At Surfaces* by Andrew Zangwill (Cambridge, 1988). Mönch's monograph is unique, however, because his focus on the fundamental aspects of semiconductor surfaces and interfaces develops the subject from the point of view of a surface scientist who himself has made several important contributions in this area. In this regard, it builds a bridge from surface science to electronic-device applications.

The book starts with a brief but well-developed historical introduction, extending back to the discovery of rectification in 1874. The subsequent set of chapters presents the theoretical aspects of semiconductor surfaces, including space charge, surface states, band bending and surface photovoltage effects. This segment is properly completed with a chapter discussing interface states existing in metal–semiconductor and semiconductor–semiconductor structures.

The next group of chapters catalogs the properties unique to each class of semiconductor surface, thoroughly discussing the theoretical and experimental background and the general implications of those properties. The well-known structural reconstructions associated with semiconductor surfaces, including their unique electronic and vibrational properties, become the central focus, and the physical insights into the driving forces of the reconstructions are described quite clearly. Of particular interest is the description of recent work in the study of various structural phases of Si(111) and Ge(111) surfaces, especially thermally driven phase transitions probed by various structural and spectroscopic techniques.

This segment is followed by a discussion of deposition of metallic and nonmetallic species on semiconductor surfaces. Here, the author provides an excellent background on adsorbate-induced semiconductor surface reconstructions, as well as an atomistic view of adsorption. The latter serves as a basis for semiconductor surface processing, and the two chapters that follow are devoted to oxidation and passivation, respectively.

Theoretical and practical aspects of semiconductor interfaces are discussed in the book's final chapters. For metal–semiconductor interfaces, a general overview of the observed deviations from the Schottky–Mott theory is presented. To assess the Schottky-barrier heights of atomically abrupt expitaxial interfaces, the author discusses the relevance of both interfacial geometric and electronic structures. To complete the monograph, semiconductor heterojunctions are discussed briefly.

Semiconductor Surfaces and Interfaces provides a readable and comprehensive discussion of its subject. With its extensive set of references, the book could serve as an excellent text for a graduate-level course in surface science, where the emphasis would be on electronic materials, or as a reference book for scientists in the field. While the book is virtually up to date, a new edition might include related recent progress in, for example, the manipulation of atoms on semiconductor surfaces and probing of the resulting local electronic structure; the use of variable-temperature scanning tunneling microscopy to monitor phase transitions on the atomic scale; and the theoretical and experimental treatment of the Schottky-barrier problem at disordered interfaces.

N. JOHN DINARDO
Drexel University
Philadelphia, Pennsylvania

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