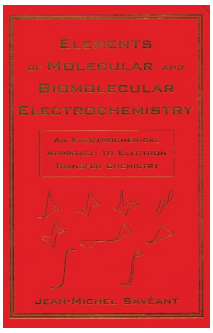
Elements of Molecular and Biomolecular Electrochemistry



An Electrochemical Approach to Electron Transfer Chemistry. By *Jean-Michel Savéant*. Wiley-VCH, Weinheim 2006. 508 pp., hardcover € 125.00.—ISBN 0-471-44573-9

Savéant is a giant of modern electrochemistry. Insightful, elegant, and groundbreaking experiments have poured from his Paris laboratory for more than three decades. Those of us working in the field have long wondered at the combination of rigorous and insightful theory with meticulous voltammetric experimentation that have resulted in kinetic and mechanistic conclusions that are often of an unrivalled precision and clarity. The more so, since electron transfer is at the heart of chemistry—synthetic as well as mechanistic—and the use of the conceptually relatively straightforward cyclic voltammetry experiment offers profound scope for the understanding, in thermodynamic and kinetics terms, of a plethora of chemical reactions and processes.

The scope of voltammetric insight can be appreciated from the following, much abbreviated, list of a few headings and subheadings from Savéant's book: "Redox catalysis", "Product distribution resulting from competition between follow-up reactions", "Coupling of electron transfer with acid-base reactions", "Reduction of carbon dioxide", "H-atom transfer versus electron + proton transfer", "The $S_{RN}1$ substitution", "Conformational changes, isomerisation and electron transfer", "Stepwise versus concerted mechanisms", "Reaction of radicals with nucleophiles", "Role of solvent …", "Enzymatic catalysis"—in short, the chemical conclusions and interpretations are at the cutting edge of the understanding of chemical reactivity, and are therefore of profound significance to all chemists, and especially those working in organic and biological chemistry.

In his book *A Brief History of Time* (1968), Stephen Hawking relates that "someone told me that each equation I included in the book would halve the sales". I fear that Savéant's book writing project may likely bankrupt him. In reality there are two books—probably with quite different readerships—intermingled in this tome, which results from the Baker Lectures given by Savéant at Cornell University in 2002. The first is a characteristically rigorous, insightful, and (to the non-electrochemist) mathematically demanding account of voltammetry. This is what we electrochemists expect of Savéant, and we delight in it. We love the stories, even though surely apocryphal, of draft papers submitted to him by his naïvely communicative students being cruelly edited, so as to eliminate the paragraphs of explanation and the algebraically essential links between the equations that were intended to illuminate the theory for lower-caste electrochemists! One can only speculate about the state of modern voltammetry had Savéant grown up with an English nanny advocating, like Mary Poppins in the musical of the same name, that "*Just a spoonful* of sugar helps the medicine go down … in a most delightful way" (my italics)!

However, the second "half-book" in the work consists of the descriptions of chemical results that emerge beautifully, clearly, and quantitatively from the voltammetry. These are extremely significant and insightful, especially and above all, for organic chemists. For example, it is shown how algebraically simple models of electron transfer can rationalize the chemically diverse kinds of behavior that follow when an electron is added to or removed from a substrate. Such models can explain, for example, whether electron transfer triggers a radical chemistry or an acid–base chemistry. They might also contribute to an understanding of enzymatic catalysis mechanisms, thereby leading to optimized biosensors. These and related issues are of central chemical importance, and I strongly urge the chemical community as a whole to pick up and read Savéant's messages—skim the voltammetry on a first read, but recognize the unique insights into molecular reactivity that it can provide. You may then be so impressed by what electrochemical methods can reveal that you will need to re-read and get know the entirety of this book of two halves.

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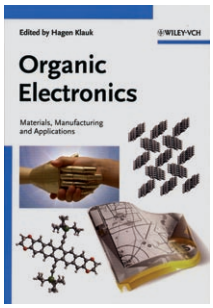
Organic Electronics



Materials, Manufacturing and Applications. Edited by *Hagen Klauk*. Wiley-VCH, Weinheim 2006. 428 pp., hardcover € 129.00.—ISBN 3-537-31264-1

Electronic circuits are fundamental to a myriad of photonic/electronic products, such as displays, computers, cell-phones, household appliances, and sensors. This technology is mainly based on silicon and Groups III–V semiconductors (and other inorganic materials) processed at high temperatures for the production of field-effect transistors. Despite concerns related to physical, technological, and economic limitations, transistor/circuit performance and integration will likely continue to increase according to Moore's law, leading to smaller, faster, and more powerful electronics. The aims of this book, *Organic Electronics*, are to focus attention and shed light on a new technology for producing electronic cir-