Vsevolodov, N.: **Biomolecular Electronics.** - Birkhäuser, Boston - Basel - Berlin 1998. ISBN 0-8176-3852-0, ISBN 3-7643-3852-0. 275 pp., SFR 118.00.

The evolution process in nature has selected optimized molecular detection systems working with high efficiency and stability. Light detection may serve as an example. The effort of physicists and engineers to minimize and improve the electronic systems is also directed to application of the organic and biological systems. The book is devoted to optical detection systems based on pigment-proteins and their possible utilization in construction of optoelectronic, holographic, and biosensory devices. The book concentrates mainly on the most promising systems: bacteriorhodopsin (BR) and its derivatives, and purple membranes. Systems related to chlorophyll are only shortly mentioned. The book can be regarded as a contribution to a new scientific field: bioelectronics. The text was originally written in Russian and translated into English. The book presents for the first time also the results of research done under military support in the formal Soviet Union. It contains both historical survey and open problems.

The book comprises 10 chapters. The text is concentrated in the initial six chapters. Chapter 7 presents a brief conclusion and perspectives, *e.g.*, with respect to biocomputers. Chapter 8 contains a rich list of references exceeding 600 papers and patents covering more than 30 years of research. The glossary and abbreviations are contained in chapter 9. Appendix (chapter 10) presents names and structural formulas of the most relevant molecules (including retinals and chlorophyll). The book is supplemented with the Subject Index.

In the introductory chapter the biophotonic and bioelectric phenomena are shortly surveyed and basic definitions are given, the concepts of molecular and biomolecular electronics are introduced. Chapter 2 brings basic information on rhodopsins in vertebrates, invertebrates, and microorganisms. Molecular structures, photochemical cycles, and concomitant effects (*e.g.* electrochromism, tissue electrical signals) are presented. Chapter 3 is devoted to more detailed information on optical and photochemical properties of BR and its analogs. The monolayers and films made using BR are characterized. Chapter 4 deals in general with photochemical and photochromic materials which may be used in the optical memory devices. Materials and systems based on purple membranes and BR-containing films and their preparations are presented. Related variants, *e.g.*, using chlorophyll or rhodopsin, are also mentioned. Here, a concept of biochrome is defined as a photochromic material based on photosensitive (pigment) proteins or protein complexes. Practical examples of application of BR in optoelectronic elements and biosensors are given in chapter 5. A more general survey of application of biochromes is given in chapter 6. Among others, such attractive concepts as optical memory, compact discs, polarization, and real-time holography are shortly mentioned.

The figures are simplified and illustrative, they help to explain the principles of the processes. There are many tables containing characteristics of the systems.

This book should be of value for those interested in application of biological principles and biomolecular systems in optoelectronics and computational systems. As not only the present state but also the goals of the future research are discussed, the book might be of great value for the researchers working or willing to work in this field—biologists, biophysicists, or engineers. The book might be used also as a textbook in courses of bioelectronics.

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