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**Review of the monograph by Dr. Eduard Monaico entitled
„Micro- and nano-engineering of III-V and II-VI semiconductor compounds and metal
nanostructures based on electrochemical technologies for multifunctional applications”
submitted for publication at „Bons Offices”, Chişinău, in 2022**

The reviewed monograph by Dr. Eduard Monaico is a **sound and significant contribution** to the field of elaboration and application of different electrochemical approaches based on electrochemical etching for nanostructuring of the most important semiconductor compounds for micro- and nanoelectronics, optoelectronics and photonics.

In the Introduction, the author very clearly formulates the purpose and tasks of the monograph, convincingly argues the theoretical and practical importance of the research field. The author represents applications of electrochemical processes in nanotechnologies to obtain various **nanoscale objects with on-demand morphology** according to design and controlled positioning. A special attention is paid to the comparison of pores introduced in III-V and II-VI semiconductor compounds and the self-organization of pores leading to highly ordered porous nanotemplates without any photolithographic processes. Moreover, the author convincingly demonstrates that porosification of semiconductor compounds combined with the application of special masks brings to light a variety of fascinating morphologies, including the formation of (i) networks of pores oriented parallel to the top surface of the semiconductor substrate and (ii) porous domains excluding pore percolation between them. These findings are of immanent importance for nanofabrication.

The author proposes and demonstrates, using **the pulsed electrochemical deposition**, the mechanism of "jumping electrodeposition", which allows for the deposition of a monolayer of Au nanodots used in an original method to estimate the electrical conductivity of 1D and 2D semiconductor nanostructures by pulsed electrochemical deposition of metal nanodots. At the same time, a combination of electrochemical nanostructuring of semiconductor substrates and the pulsed electrochemical deposition of metals is demonstrated to provide an effective tool for manufacturing new hybrid metal-semiconductor nanoarchitectures for various photonic, electronic and ferromagnetic device structures as discussed in Chapter 4.

The results of this study demonstrate the fact that during the last decade a jump occurred in the development of electrochemical technologies for obtaining nanomaterials. A rather important aspect of the present monograph consists in **the development of "green nanotechnologies"** by replacing electrolytes based on aggressive acids with neutral electrolytes based on NaCl. Thus, the electrochemical nanostructuring of semiconductor substrates has become more accessible and harmless to the environment.

The monograph is prepared on the basis of the author's own published papers reflecting the findings obtained within several scientific research projects, including bilateral projects with partners from abroad. **Dr. Eduard Monaico is highly appreciated by the international scientific community.**

The significant aspects of many technological processes, characterization and device design are collected in this monograph, making it a timely and valuable practical guide not only for specialists in materials science and engineering, nanoscience and nanotechnologies, electrochemistry of semiconductors, but also for students and PhD students.

In summary, **I strongly recommend publication of the monograph by Dr. Eduard Monaico** entitled „Micro- and nano-engineering of III-V and II-VI semiconductor compounds and metal nanostructures based on electrochemical technologies for multifunctional applications” at the Publishing House „Bons Offices” in Chişinău.



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