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Sommario/riassunto

This book provides a comprehensive review of established, cutting-edge, and future trends in the exponentially growing field of nanomaterials and their applications in biosensors and bioanalyses. Part I focuses on the key principles and transduction approaches, reviewing the timeline featuring the important historical milestones in the development and application of nanomaterials in biosensors and bioanalyses. Part II reviews various architectures used in nanobiosensing designs focusing on nanowires, one- and two-dimensional nanostructures, and plasmonic nanobiosensors with interferometric reflectance imaging. Commonly used nanomaterials, functionalization of the nanomaterials, and development of nanobioelectronics are discussed in detail in Part III with examples from screen-printed electrodes, nanocarbon films, and semiconductor quantum dots. Part IV reviews the current applications of carbon nanotubes, nanoneedles, plasmonic sensors, electrochemical scanning microscopes, and field-effect transistors with the future outlook for emerging technologies. Attention is also given to potential challenges, in particular, of taking these technologies at the point-of-need. The book concludes by providing a condensed summary of the contents, with emphasis on future directions. Nanomaterials have become an essential part of biosensors and bioanalyses in the detection and monitoring of medical, pharmaceutical, and environmental conditions, from cancer to chemical warfare agents. This book, with its distinguished editors and international team of expert contributors, will be an essential guide for all those involved in the research, design, development, and application of nanomaterials in biosensors and bioanalyses.