PRESENTER INFORMATION

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BIOGRAPHICAL SKETCH

Bruno Miranda is a fixed-term researcher at the Institute of Applied Sciences and Intelligent Systems of the National Research Council of Naples. He received his master's degree in industrial Bioengineering at the University of Naples Federico II with a thesis developed at the Okinawa Institute of Science and Technology in Japan. In 2023, he received his Ph.D. degree in Information and Communication Technology for Health at the University of Naples Federico II. His research interests are devoted to, but not limited to design, fabrication, characterization, and functionalization of hybrid metallic and dielectric nanostructured materials for optical biosensing. During his career, he gained experience in plasmonic nanoparticles, polymer nanocomposites, porous silicon, and photonic crystals for biomedical applications.

TITLE

Porous Silicon Biosensors: Fabrication, Characterization, and Functionalization Strategies for Diagnostic Purposes

ABSTRACT

Porous silicon biosensors have emerged as promising platforms for diagnostic applications due to their unique properties such as high surface area, biocompatibility, and tunable pore structure.
The fabrication process involves electrochemical etching of silicon wafers to create porous structures with controlled pore sizes and porosities. Various characterization techniques, including scanning electron microscopy, atomic force microscopy, and spectroscopic methods, are employed to analyze the morphology, surface properties, and optical characteristics of porous silicon.
Functionalization of porous silicon biosensors is crucial for specific and sensitive detection of target analytes. Surface modification techniques such as chemical functionalization, biomolecule immobilization, and nanoparticle conjugation are discussed to enhance the selectivity and sensitivity of biosensors towards target biomarkers.
Moreover, the presentation delves into the application of porous silicon biosensors in diverse diagnostic fields including medical diagnostics, environmental monitoring, and food safety. Case studies highlighting the performance of porous silicon biosensors in detecting biomolecules, pathogens, and toxins underscore their potential for point-of-care testing and rapid detection.