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Emergence of Silicon Photonics in the Field of Biomedical Sensing Applications: A Review

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Abstract

In the last few decades, the human body is prone to many different types of infectious diseases. This involves making use of technologies for detecting and monitoring the factors responsible for these diseases, and the devices should be free from any kind of harmful radiations. Photonics is considered to be one of the new advancements in the field of technology which can fulfill the need or requirement of biomedical sensing applications. The scope of this

review paper summarizes the concept of designing methods and material structures for biomedical applications. These designing methods include plane wave expansion, surface plasmon resonance (SPR), Helium ion lithography, band-gap variations, and refractive index variation of the material. The losses that are incurred or induced during the wave propagation includes adsorption, attenuation, reflection, and diffraction. There are several physical structures of the materials mainly 1D, 2D, 3D, three-layer silicon, five-layer, seven-layer, etc. The above mentioned material structures are used to detect cancer cell, DNA and protein concentration, identifying different mutation of SARS virus which includes COVID-19, as well as in the field of bio-sensing, bio-screening, and drug delivery system.

Keywords

Photonics Silicon

Plane wave expansion method Helium

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