**Analysis of one-dimensional photonic crystal biosensor for detection of SARS-CoV-2**

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**Abstract**

We theoretically investigate one-dimensional photonic crystal (1D PC) with a defect layer as a biosensor for the detection of COVID-19 (SARS-CoV-2) virus in the lungs [1]. The composed of 1D photonic crystal is chosen as Silicon dioxide and Titanium dioxide, with a central defective layer. The defect layer is taken as healthy lung tissue and infected lung tissue [2]. The different refractive indices of samples cause a shift in the transmission peak which can be used for the detection of COVID-19 (SARS-CoV-2) [3,4]. We optimized our structure and designed it in OptiFDTD software which uses the Finite-difference time-domain method (FDTD) to calculate the transmission spectrum of the biosensor [5, 6, 7]. We show that the sensitivity of the biosensor is 101.46 nm/RIU, the quality factor is 3.22 × 105 and the detection limit is 1.97 × 10-4RIU.

*Keywords: Photonic crystal, Transmittance, Defect modes, Biosensors, SARS-CoV-2*

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