Title: SARS-CoV-2 Spike Protein Sensing Using Photonic Crystal Fiber Technology

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Abastact: The COVID-19 pandemic, caused by SARS-CoV-2, is a significant worldwide health crisis that has sparked extensive scientific inquiry. We created a photonic crystal fiber sensor to find the SARS-CoV-2 spike protein and tested it with three different RBD concentrations. Zeonex was chosen as the fiber material, and the sensor was tested at different operating frequencies by changing the size of the strut. Testing in the terahertz range showed that the device was very sensitive, had a very low confinement loss (CL), and a moderate effective area (EA). The optimized model had a high relative sensitivity of 89.207%, an EA of 1.8356×10^5 μm^2, and a CL of 4.908×10^{-16} cm^{-1} at 2.2 THz. Additionally, the suggested sensor can be made using current manufacturing methods.

Keywords: SARS-CoV-2 · Spike Protein · Biosensor · PCF Technology · RBD concentrations

https://link.springer.com/article/10.1007/s11220-026-00742-6?utm_source=researchgate.net&utm_medium=article