Malgorzata

Gdansk University of Technology
Poland

Fiber Optic Sensors for Real-Time CRP Level Monitoring

Abstract:

C-reactive protein (CRP) is a key biomarker of inflammation, with elevated levels indicating various pathological conditions, including bacterial infections and sepsis. We present an optical fiberbased sensor for real-time CRP monitoring in urine, providing a rapid, cost-effective alternative to conventional methods such as ELISA.

Presented fiber optic based sensor monitors in real-time the dynamics of CRP changes. The sensor were made with infrared source, spectrum analyzer and a standard telecommunications optical fibre with modified sensor head into a microsphere covered with additional biofunctionalized layer. Used machine learning supports the detection of extraordinary increased amounts of CRP and allows early warming of epidemic. Measurements were validated on samples with different CRP concentrations in urine.

The developed sensor demonstrates high sensitivity, rapid response (<5 minutes), and potential for integration into portable diagnostic platforms for early infection detection. Its simplicity, mobility, and real-time monitoring capabilities make it suitable for field applications.

Biography

Małgorzata Szczerska professor at Gdansk University of Technology. Since 2017, she has been an associate professor in the Department of Metrology and Optoelectronics. Her research focuses on fiber optics and biophotonics, especially at the application of low-coherence interferometry for measuring physical quantities. She has authored or co-authored over 60 articles and four patent applications, notably a new class of fiber optic sensors for measuring temperature, refractive index and hematocrit levels.