PHOTONICS FOR POINT-OF-CARE SENSING

PolyChrome Berlin
Photonics for Sensing

GET A GLANCE

Compact optical multisensor for disposable bioanalytics are designed for fast, cost-effective and specific measurement of a wide range of chemical and biological substances.

Features

- Integrated photonic microring resonators
- Based on silicon nitride (SiN) wafer technology
- Functionalized by aptamers (Nucleic acid-based capture molecules)
- Rapid measurements (seconds)
- High resolution quantitative results

Applications

- Environmental analysis
- Food industry
- POCT
- Companion Diagnostics (CDx)

Technical Background

Compact optical analysis devices are engineered to provide **rapid, cost-effective, and specific** measurements of a broad spectrum of chemical and biological substances.

The fusion of **SiN-based ring resonators**, functionalized with nucleic acid-based capture molecules (**aptamers**), and integrated with **microfluidics**, can precisely fulfill these requirements. The concentrations of substances can be determined without markers in liquid analytes, based on a change in the refractive index.

This development project aims to demonstrate this capability for **Point-of-Care sensing**.

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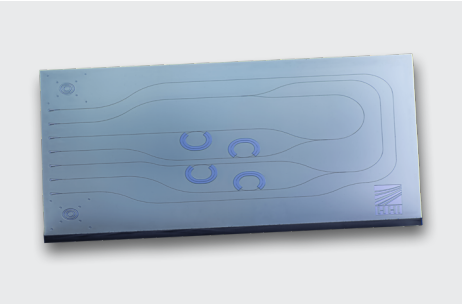
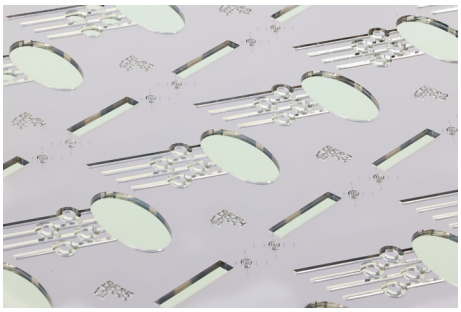
APPLICATIONS



Photonic Sensor Chip



Microfluidics

Water analytics

Problem:
Detecting bacteria and viruses in water is crucial for health safety. For instance, testing water in wastewater treatment plants can help trace infection sources. The quicker and more precise the results, the better the response.

Solution:
On-site substance measurement offers significant time and cost benefits, eliminating the need for laboratory visits. Compared to current color-change rapid tests, the use of aptamers enhances accuracy and sensitivity.

Further applications:
- Cyanobacteria
- SARS-CoV-2
- Legionella

Markets: Environmental analysis, Food industry

Individual healthcare

Problem:
The German lifestyle and life science market is expanding, with a growing demand for affordable, portable, and connected devices that can analyze numerous body parameters anytime, anywhere, especially in the digital age.

Solution:
The aptamer-functionalized ring resonators allow rapid and reliable target measurements. Paired with a WiFi-enabled device, it caters to the needs of this social media-driven market.

Further applications:
- Vitamin D
- Ferritin
- Vitamin B12

Markets: Life science market, food industry (supplement industry), POCT (Point-of-Care-Testing)

opTricon
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