



AT A GLANCE

Low-cost, single-use disposable sensor with multiple sensing channels, each sensitized to detect different chemical or biological substances.



Features

- Fast label-free multiplex analysis
- Point-of-Care
- Cost-effective
- Resource-efficient
- Low sample volume

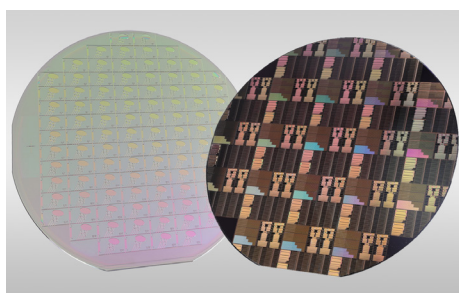
Applications

- Medical
- Companion diagnostics
- Environmental analysis
- Food industry
- Water analytics

Technical Background

At Fraunhofer HHI, a **photonic sensor technology** has been developed that allows **simultaneous, highly sensitive real-time** measurements of chemical or biological parameters.

Substance concentrations can be determined without markers in liquid or gaseous analytes, thanks to the functionalization of the sensor surface. Microring sensors can be combined on a sensor chip for use in multi-parameter analytics in Point-of-Care testing.



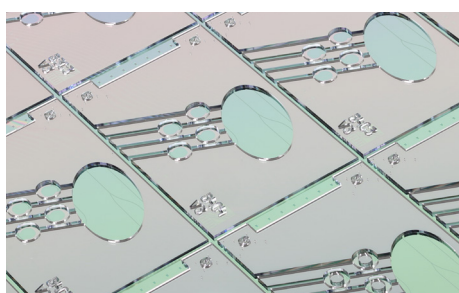
Silicon Nitride Wafer



Eight Channel Photonic Sensor Chip



Optical Multi-Sensor Device



Microfluidics

Features

- Multiple sensor elements per chip through multiplexing
- Hundreds of sensor chips on each wafer
- Operates as a label-free biosensor with a detection limit $> 100\text{nm/RIU}$ and in $< \text{pmol}/\mu\text{l}$ range (for proteins)
- Low sample volume of $< 30\mu\text{l}$
- Can target proteins, small molecules, vitamins, viruses, bacteria and nucleic acids
- Highly integrable system, also with microfluidics

Technical Background

- Measurement of refractive index via shift of optical resonances
- Cascading of sensor elements
- Multiplexing enables multi-parameter analysis
- Functionalization of individual sensor elements enables specific detection



Jakob Reck
Hybrid Integration and Sensing

Phone +49 30 31002-667
jakob.reck@hhi.fraunhofer.de

Fraunhofer Heinrich Hertz Institute
Einsteinufer 37, 10587 Berlin
Germany

www.hhi.fraunhofer.de/phs