

DIAGNOSTIC BIOSENSORS & SYSTEM INTEGRATION



SENSOR DEVELOPMENT

Next generation point-of-care testing (POCT) tools will rely heavily on highly miniaturized systems for probing nucleic acids and proteins. AIT's Molecular Diagnostics experts are committed to developing highly sensitive biosensors for analysing liquids such as serum or saliva using capacitive, magnetoresistive and photonic sensors as well as hybrid magnetic nanoparticles. AIT draws on its extensive expertise in the development and fabrication of sensors based on electrochemical electrodes, giant and tunnelling magnetoresistance, and integrated optical waveguides to design sophisticated lab-on-a-chip systems. With our profound know-how and long-standing expertise, AIT is your partner of choice when it comes to solving complex sensor challenges.

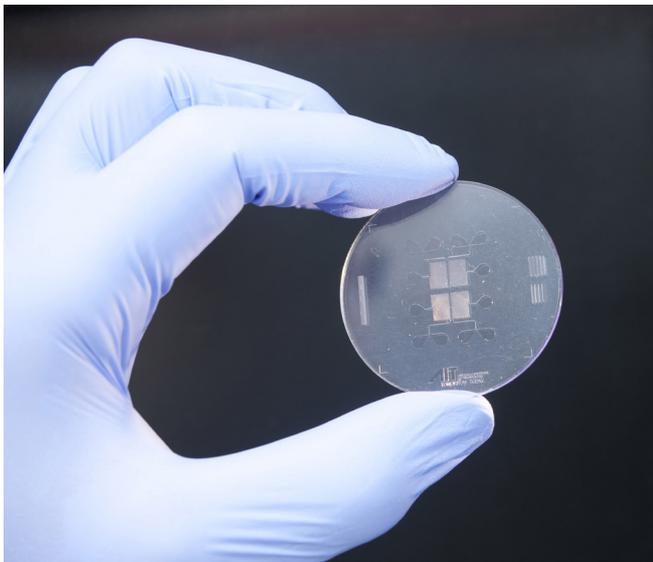
SYSTEM INTEGRATION

Portable molecular diagnostics depend on miniaturized and automated devices with superior analytical performance. AIT has profound expertise in the integration of biomarkers, sensors, microfluidics, reactors, thermal management and readout electronics for such systems. The overall diagnostic system concept needs to be considered at a very early stage of sensor development and assay design. Our approach to system integration includes optimizing component interaction, system packaging, reagent storage and handling, interfaces for modular devices and signal processing.

MICROFLUIDICS

Generally, POCT tools use microfluidic components to bridge the gap between macroscopic sampling and microscopic analysis. The integration of microfluidics and sensors into a single device reduces costs and increases analytical sensitivity and reproducibility due to automated and encapsulated liquid handling. We develop liquid-based systems, e.g. for serum or saliva analysis, integrating reagent storage and the automation of fluidic protocols. Once the requirements have been specified, our experts use comprehensive modelling and simulation techniques to design microfluidic components and implement the devices using the following fabrication technologies:

- High accuracy photolithographic resist patterning (e.g. SU-8) to form fluidic channels
- Injection moulding using silicon wafer mould inserts (in cooperation with a strategic technology partner)



AIT offers direct photolithographic patterning of microfluidic networks on flat substrates, including Si-wafers, glass slides or thermoplasts, with channel heights in the 10 -100 μm range and channel widths down to 2 μm . Nanopore tubing connections or custom-designed solutions are also part of our expertise.

A special focus lies on the integration of customized third party sensors. Fabrication takes place at the AIT Center for Thin Film Technology, which specializes in heterogeneous integration and precision assembly of different materials and components. AIT also develops functional thin films and coatings and uses the new possibilities offered by nanotechnology for systems and tools in biomedical diagnostics, lab-on-a-chip systems and sensors.

CONTACT

AIT Austrian Institute of Technology GmbH
Health & Environment Department
Molecular Diagnostics
Donau-City-Straße 1
A-1220 Vienna

DR. DI. RAINER HAINBERGER

Phone: +43(0) 50550 - 4304
Fax: +43(0) 50550 - 4399
E-mail: rainer.hainberger@ait.ac.at
Web: www.ait.ac.at