

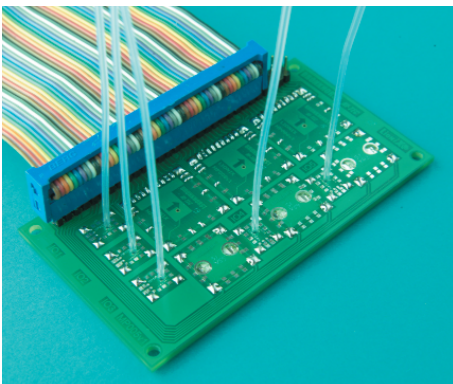
MICROFLUIDICS / LAB-ON-A-CHIP

Microfluidics

The revolutionizing potential of BioMEMS and Lab-on-a-Chip systems, based on microfluidics technology, is widely recognized in Life Sciences and in Industrial Process Control. Typical benefits of microfluidics are the reduced costs and consumption of reagents, faster mixing and heating, better control of processes, and the potentially high degree of automation.

Applications

As a result, innovative R&D equipment based on microfluidics is introduced rapidly. In pharmacy and genomics, for example, experiments can be performed by thousands in parallel, resulting in more efficient discovery of new drugs and the accelerated unraveling of the human genome. In fine chemistry, the optimization of process parameters and production of small quantities is performed in the very same micro reactor system, bypassing the expensive up scaling stages. Other emerging applications are in instrumentation for food quality and safety detection and in medicine.

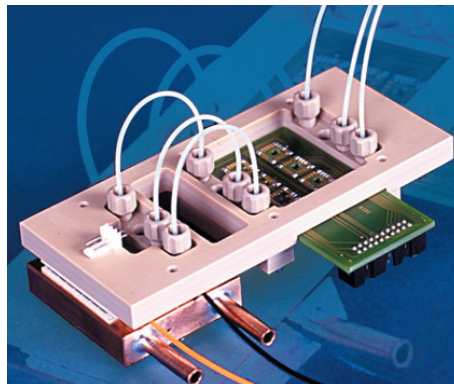


MATAS based microfluidic system

Modular integration

A key factor for the successful breakthrough of Lab-on-a-Chip technology in products will be the ability to combine

all the functions and components in a user friendly, compact system. In order not to waste all benefits of microfluidics, samples need to be transported from one component to the other without entering the macro-world. In this way, processes like cell lysis, sample amplification and dilution, sample cleaning, fluorescent labeling, process monitoring and optical detection can be incorporated in one and the same compact system.



Micro reactor system (partly MATAS based)

MATAS

MATAS, developed by LioniX, is a hybrid and modular integration platform, which enables the building of these complete systems. It uses standardized building blocks (modules), to be placed in a combined electronic and fluidic circuit board. The system is designed and fabricated using standard design rules, CAD-tools and fabrication technologies, resulting in the shortest possible product development time. All the modules can be tested and exchanged just as quickly as resistors and IC's on a printed circuit board.

Part of the design philosophy is that the platform is open to a great variety of components from (commercial) suppliers and that it has a freedom in material choice.

Our expertise

- glass and silicon biochips for analysis (capillary electrophoresis, sample processing, flow-through cells, dosing, etc.)
- biosensor systems based on integrated optics
- integration of optical detection techniques and microfluidic chips
- microfluidic components such as sensors for pH and conductivity, micromixers and microreactors
- system integration based on MATAS
- nanofluidics, through the link with MESA⁺

References

Projects in this area are being executed for big organizations such as ESA, Netherlands Aerospace Agency and Stork (capillary electrophoresis in space), Siemens and Unilever, and for smaller innovative companies and start-ups. Currently, MATAS is being applied in the Dutch public-private project 'Process-on-a-Chip', in which the Dutch fine chemistry industry is involved.