

A LAB-ON-A-CHIP PLATFORM FOR LIFE SCIENCES

INTRODUCTION

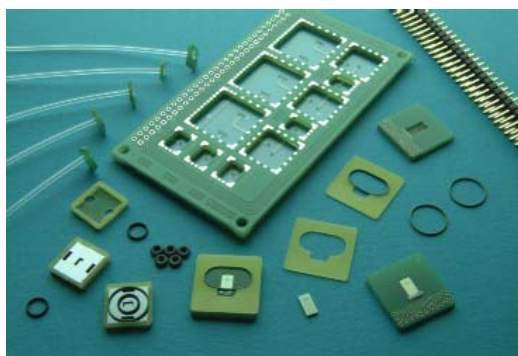
In recent years, Lab-on-a-Chip systems for chemical analysis and synthesis (micro reactor technology) have found their way from university research to industrial application. The revolutionising possibilities are widely recognised in Life Sciences and Industrial Process Control markets.

Benefits of Labs-on-a-Chip systems over their conventional macro equivalents are the reduced consumption of reagents, shorter temperature cycling times, faster mixing, and high degree of automation possible, resulting in higher throughputs and a reduction of costs.

Almost two decades of experience in microfluidics, resulted in a unique technology for flexible and cost effective development of Lab-on-a-Chip systems: MATAS (Modular Assembly Technology for micro total Analysis Systems).]

MODULAR MICROFLUIDICS

MATAS is a highly standardised, modular technology for design and fabrication of Lab-on-a-Chip systems. The technology enables the hybrid integration of microfluidic components, micro-optical devices and control electronics in a flow-through platform.



Microfluidic manifold in MATAS technology

Modules used so far are microreactors, chemical sensors for pH, conductivity and ion concentrations, CE-chips, electrodes, flow sensors, micropumps, optical detectors, filters, valves, pressure sensors, etc. All these modules can be tested and exchanged just as quickly as IC's and resistors on a printed circuit board (PCB). In the near future integrated optics based sensors and detectors will be available.

TECHNOLOGY

The module housings are manufactured with cost-effective, standard available technologies such as PCB technology, wire bonding and precision milling. Modules are attached mechanically, electrically and fluidically to a sandwich of a fluidic and a printed circuit board using conventional techniques such as soldering and O-rings or planar gaskets. Fluidic circuit boards can be fabricated either in silicon-glass technology or in plastics. Electronic control, interface and data-processing functions can be integrated on the printed circuit board.

FEATURES

- *Fast*

Fast design to realisation times (prototyping and small series) thanks to the use of proven technologies, CAD tools and design rules.

- *Modular*

Components are packaged in specifically designed modules with standardized interfaces.

- *Reliable and flexible*

Modules are testable and exchangeable

- *Open*

A variety of materials and of sensors, actuators and other components from various suppliers can be integrated.

TOOLKIT

A toolkit for on-line measurement of pH and conductivity was built.

