



Point-One

Pole of innovative technology on nanoelectronics and embedded systems

MEMSLand

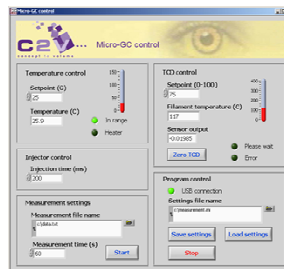
Cost Effective MEMS to Develop a Sustainable High Tech Business

BC4: micro GC gas analyzer

Vincent Spiering

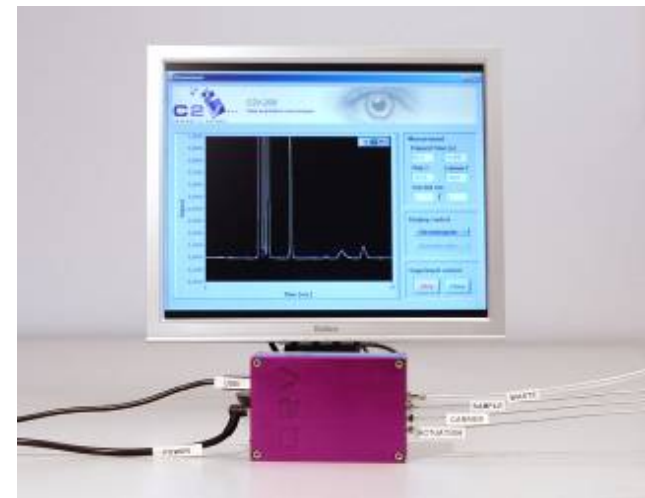
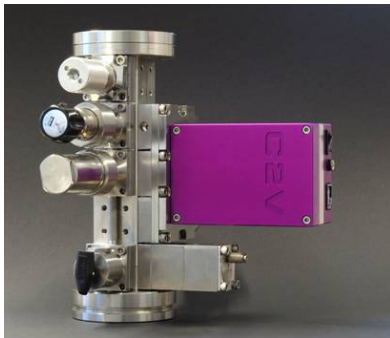
BC4: micro GC gas analyzer description

- Fast separation and detection of volatile components in a gas.
- Miniaturization and integration of a micro gas chromatograph, including injector, column, and detector results in:
 - reduction of analysis from 30 minutes to 30 seconds
 - reduction of costs by 1 order (from 10'000's to 1000's of euro's)
 - reduction of weight/size from lab table model to hand sized
 - reduction of gas consumption and power to allow (field) monitoring
 - ppm concentration sensitivity by using a microTCD



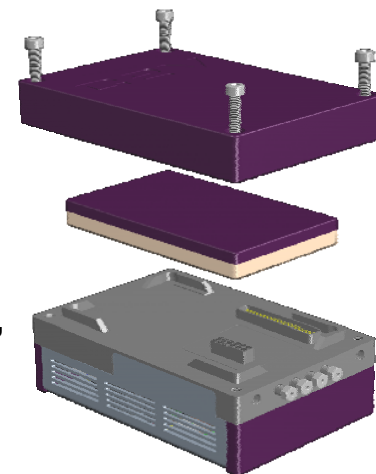
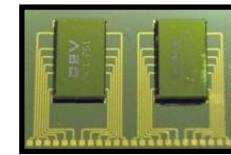
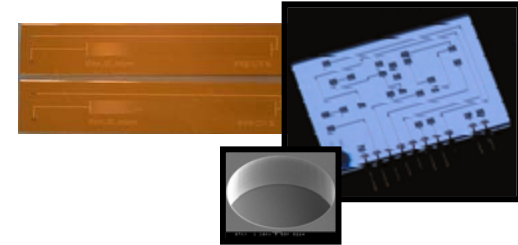
BC4: micro GC gas analyzer description

- Technology:
 - silicon and glass MEMS micromachined chip components (valves, detector)
 - integrated on a channel board (electrical & fluidic interface)
 - such that it can be heated up to 180 C, using a cartridge concept
- Applications:
 - on-line process control: monitoring of industrial processes, natural gas, gas purity
 - safety/security/military: monitoring of toxic gases/ chemical warfare agents
 - lab & environmental: analysis of all kinds of (industrial) gasses in lab/field



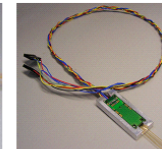
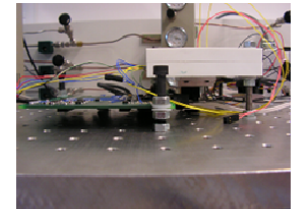
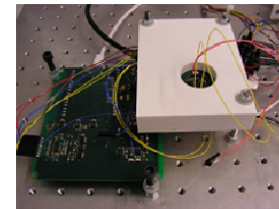
BC4: technology

- *chip level*:
 - for microfluidics chip components such as injector, detector, channel board
- *integrated chip module level*:
 - using Fluidic Multi Chip Module (FMCM) integration technology, creating a sort of “lab-on-a-chip” device
- *cartridge level*:
 - exchangeable cartridge board with GC separation functionality (Board with integrated chip module, heating, column, and electrical + gas connections)
- *Instrument module level*:
 - packaged cartridge channel board with electronics, software, USB and standard gas connections, softwareD



MEMSLAND activities per WP

- WP1: Business carrier
 - WP leadership
 - Technology platform, synergy
- WP3: Technology development (Lab-on-a-chip!):
 - Components: micro detector, micro valves
 - Chip integration: leakage, maximum temperature, yield
 - Assembly equipment (modified flip-chip)
 - Packaging: moulding, cartridge, module incl. electronics & software
- WP5: Testing
 - Mechanical
 - Temperature cycling
 - Functional
- WP6: Demonstrating
 - TCD detector (2007)
 - Integrated chip moulding (2008)
 - Micro GC cartridge and module (1st version 2008, 2nd version 2009)
- WP7: Dissemination
 - Micro GC / FMCM platform dissemination at conferences, exhibits, magazine, newspapers



Natural gas analysis

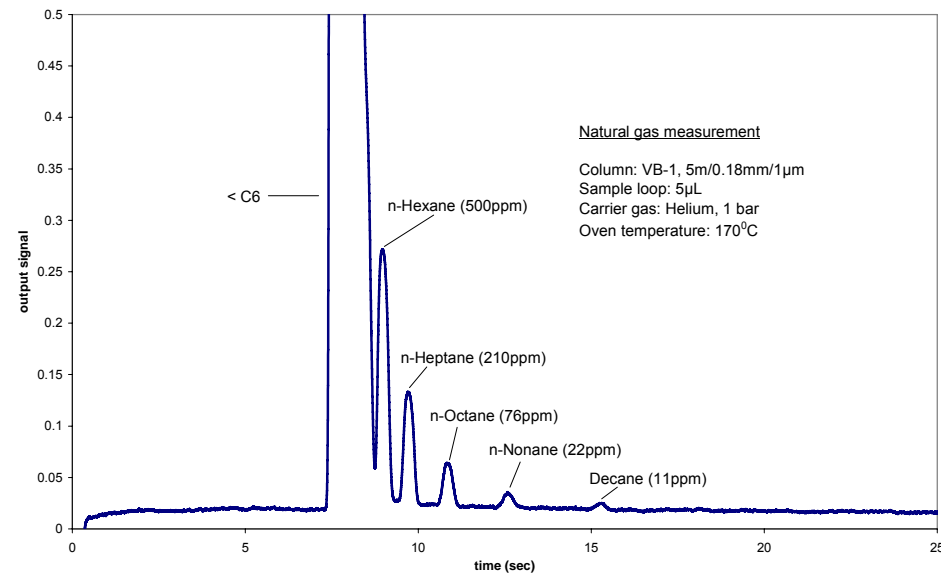
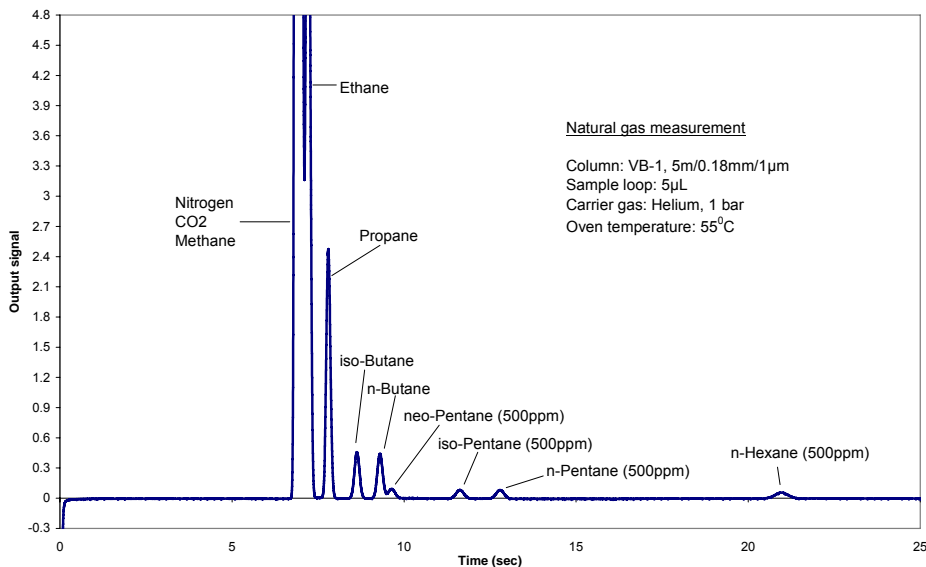
C3-C8:

- 22 seconds @ 55 C
- High separation quality
- Neo-Pentane visible



C7-C10:

- 16 sec @ 170 C
- High separation quality
- 11 ppm Decane detected



MEMSLAND collaboration

