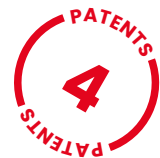




Primosamp & Primosens



Gas sampling & analysis on-the-go

What are Primosamp & Primosens?

Since 1950, gas chromatography remains the top choice among laboratory techniques for complex gas-mixture analysis. Until now, these systems could be as large as a table.

CEA-Leti, a specialist in microtechnologies, is introducing two highly miniaturized and low-cost gas sampling and analysis lab-on-chip systems that fit in the hand:

- **Primosamp:** samples gas into a removable cartridge. User can then inject the sample in any gas chromatograph.
- **Primosens:** samples gas into a removable cartridge and performs a gas chromatography analysis.

Applications

- Air-quality and environmental monitoring
- Defense and security
- Process monitoring
- Breath analysis
- Protecting workers from breathing dangerous gas
- Automotive

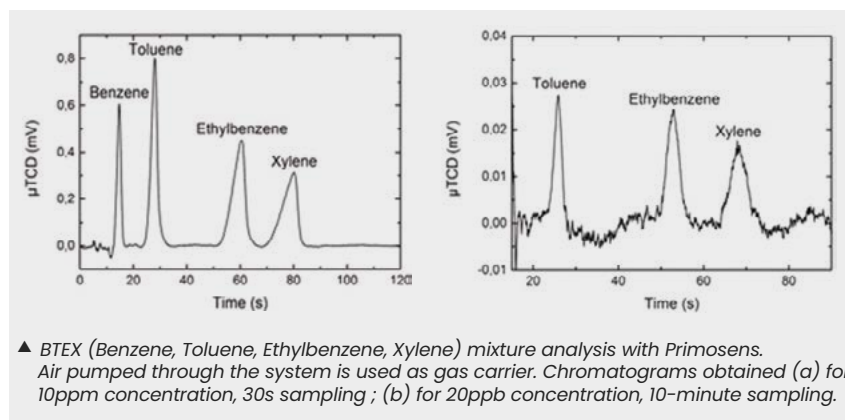
What's new?

Primosamp and Primosens are based on several innovations:

- **Low-cost solution:** cost divided by 10 due to collective fabrication
- **Low-power solution:** lower thermal capacity. Battery powered, both devices require 100x less energy than conventional gas chromatography systems
- **Easy to use:** no gas bottle needed, meaning no maintenance required
- **Handheld device:** highly miniaturized
- **Performance:** lower sampling volume and detection in the ppb range

CEA-Leti's PRIMO devices leverage miniaturized silicon technology bricks, such as micro-preconcentrators, micro-valves, micro-columns and micro-detectors.

- **Primosamp** includes a micro-preconcentrator chip, a 12 V battery and a commercial miniaturized gas pump
- **Primosens** includes a CEA-Leti micro-preconcentrator and micro-thermal conductivity detector (μ TCD), as well as a 12 V battery, a commercial miniaturized gas pump and a gas chromatography column.



What's next?

- Develop a new generation detectors for increased sensitivity
- Address new healthcare applications such as breath sampling and analysis
- Study the extension of PRIMOSAMP & PRIMOSENS into the high-end consumer market
- Scale down the system
- Develop an embedded recognition algorithm
- Pioneer new absorbent material for pre-concentration

CEA-Leti, technology research institute

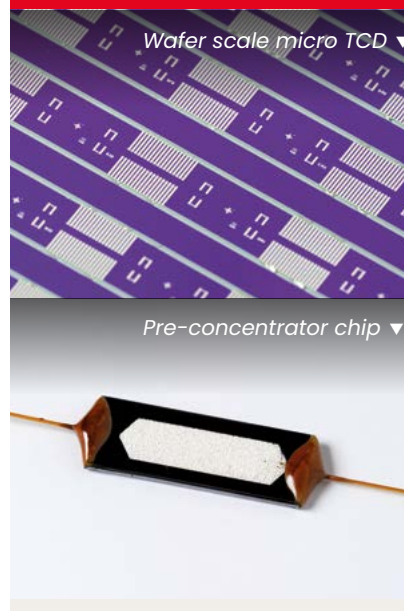
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Publications

- Silicon based micro-preconcentrators for portable gas analysis systems. in 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences, μ TAS, 2014
- Revisiting gas sampling and analysis with microtechnology: Feasibility of low cost handheld gas chromatographs, IEEE Sensors, 2017
- Miniaturization of breath sampling with silicon chip: application to volatile tobacco markers tracking. Journal of Breath Research, 2018
- A microfluidic device for digital manipulation of gaseous samples. Lab on a Chip, 2020



Interested in this technology?

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