

Micro and nanotechnologies for the development of an integrated chromatographic system

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ABSTRACT

The development of an integrated gas chromatographic system using micro and nanotechnologies is presented in this paper. For this purpose, the different components of the chromatographic system, namely the preconcentrator, the chromatographic column and the gas sensors are being investigated and developed, and the actual state of this investigation is presented. The proposed target application comes from the agrofood industry, in particular the determination of the fish freshness. The structure of the preconcentrator has been fabricated using deep reactive ion etching (DRIE). The same fabrication technique has been employed for the patterning of the silicon microcolumns, which have been sealed with Pyrex glass. Inlet and outlets have been connected and initial experiments of functionalization have been performed. Gas sensors have been obtained by microdeposition of doped WO₃ or SnO₂ nanomaterials on microhotplates and their responses to the gases of interest have been measured, proving that the target gas concentrations can be detected.

Keywords: microfabrication, gas chromatographic system, DRIE, microdropping, metal oxide, gas sensors