



## **Micro gas chromatography based on mems technology for the analysis of volatile species in planetary environments**

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Gas chromatography is used since the Mars Viking missions in the 70's to characterize the nature and amount of volatile chemical compounds present in planetary atmospheres, soils or rocks. This technique allows to separate the gaseous compound injected in the instrument for their subsequent detection either by a physical sensor, or a spectrometer giving information about the structure of the volatile. This pre-separation is precious to proceed to the identification of individual species present in a complex mixture. Moreover, it is a unique method to separate and quantify enantiomers of organic molecules which is a key information in astrobiology to assess the potential for such molecules to be related to a biotic or a pre-biotic process. Finally, the potential of this technique is proven by its current use in the Curiosity rover at the Mars surface, as it allowed to demonstrate the presence of organic material endogenous to Mars for the first time ever [1].

But despite its efficiency, this instrumentation is based on laboratory technologies and requires for resources which are limited (e.g. carrier gas), making it a resources consuming instrumentation. That prevents it to be considered for small and light scientific payloads. This is one among reasons why our team initiated a research and technology action with the aim to miniaturize this type of instrumentation. This work relies on the use of micro-electro mechanical systems and their integration into a complete chromatographic system with the aim to gain one order of magnitude in term of resources required to make it work.

In this communication we will present the different components that were developed for this project and their tested performances which show the potential for this system to be used in future in situ exploration space probes.

### References

[1] Freissinet et al., JGR planets 120, 495–514, (2015).