"Small is beautiful” planetary missions

Yasuhito Sekine1*, Akihide Hibara2, Kojiro Suzuki1, Seiji Sugita1, Takafumi Matsui3


Micro-Total Analysis System (micro-TAS) describes a miniaturized chip-sized device that automates all necessary steps for chemical analysis of a sample, such as sampling, transport, filtering, dilution, reactions, separation, and detection. Such micro-TAS technology has been originally developed in analytical chemistry and recently has started to be widely applied in many fields, e.g., medical care, marine technology, and police investigation. Because of its very small size, micro-TAS can be placed close to a sampling site, where human cannot reach easily. In this paper, we discuss possible applications of micro-TAS to space and planetary explorations. Together with our small and distributed FS landers, we propose a new type of planetary explorations with the aim of detection of biomarkers and volcanic gases on Mars, Titan and Enceladus.

Keywords: planetary explorations, chemical analysis, Mars, Titan, methane, volcano