

Compounds identified in-flight by ROSETTA-COSIMA before the comet encounter

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Abstract

Secondary ion mass spectrometry (SIMS) is a laboratory surface analyzing technique and, with the COSIMA instrument onboard ROSETTA, it will be applied for the first time to in-situ measurements of cometary grains, once ROSETTA encounters its target comet, 67P/Churyumov-Gerasimenko, in the September 2014. The COmetary Secondary Ion Mass analyzer (COSIMA) onboard ROSETTA will expose metal targets, collect cometary dust grains in the inner coma and analyze these with an optical microscope as well as secondary ion mass spectrometry [1].

The COSIMA instrument has been operated in-flight for commissioning in the first months after launch in March 2004 and on a regular basis during the passive and active spacecraft check-out time intervals up to ROSETTA hibernation from June 2011 onwards.

The secondary ion mass spectra background and /or contamination level of the COSIMA metal targets has been identified prior to launch and these had been selected accordingly to avoid masking of single elements or compounds by carrying different metal targets for cometary grain collection. The main compounds identified in-flight are silicon polymers and hydrocarbons.

We will discuss the surface analysis results with COSIMA, carried out far off any comet or asteroid in interplanetary space, their time evolution and their potential sources within ROSETTA.

References

[1] Kissel, J et al, Cosima High Resolution Time-of-Flight Secondary Ion Mass Spectrometer for the Analysis of Cometary Dust Particles onboard Rosetta, Space Science Reviews, Vol 128, pp. 823, 2007