

Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B)  
The Golden Age of Small Bodies, Science and Exploration (B1.1)

**DUST COMPOSITION OF COMET 67P AS MEASURED BY THE COSIMA  
MASS SPECTROMETER OVER TWO YEARS OF THE ROSETTA MISSION**

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COSIMA was a Time-Of-Flight Secondary Ion Mass Spectrometer (TOF-SIMS) on board the Rosetta spacecraft [1, 2]. During two years, the instrument allowed in situ analysis of the dust particles released from 67P/Churyumov-Gerasimenko before and after the comet's perihelion. Compared to the previous space missions targeting a comet, COSIMA collected the cometary dust at a lower impact velocity ( $<10 \text{ m.s}^{-1}$  [3]) that largely preserved the dust chemical properties and part of its physical structure such as the particle porosity [4, 5]. More than 35,000 particles were collected during the mission [6] and about 400, ranging from 50 to 1000  $\mu\text{m}$  in size, were analyzed by TOF-SIMS.

We will report the elemental composition of the cometary dust as deduced from COSIMA measurements [7, 8, 9]. The average elemental composition measured for 67P's dust will be compared to previous results obtained from the Giotto and Vega missions for comet 1P/Halley and the Stardust mission for comet 81P/Wild 2, to the composition of Chondritic Porous Interplanetary Dust Particles (CP-IDPs), and to the CI chondrite composition. The dust collected and analyzed by COSIMA is representative of 67P's non-volatile composition. The average minerals to organics ratio deduced from the TOF-SIMS measurements gives constraints on 67P's surface and nucleus characteristics. The astrochemical implications of COSIMA results will also be discussed with a focus on the high carbon content found in the cometary dust [7].

[1] Kissel J. et al. (2007) Space Science Reviews, 128, 823-867. [2] Hilchenbach M. et al. (2016) The Astrophysical Journal Letters 816, L32. [3] Rotundi A. et al. (2015) Science, 347. [4] Langevin Y. et al. (2016) Icarus 271, 76-97. [5] Hornung K. et al. (2016) Planetary and Space Science, 133, 63-75. [6] Merouane S. et al. (2017) Mon. Not. Roy. Astron. Soc., 469, S459-S474. [7] Bardyn A. et al. (2017) Mon. Not. Roy. Astron. Soc., 469, S712-S722. [8] Fray et al. (2017) Mon. Not. Roy. Astron. Soc., 469, S506-S516. [9] Stenzel et al. (2017) Mon. Not. Roy. Astron. Soc., 469, S492-S505.

## 42nd COSPAR Scientific Assembly 2018

Committee on Space Research,

14 - 22 July 2018, Pasadena, CA, USA

<https://www.cospar-assembly.org/abstractcd/COSPAR-18/>



<b>B1.1</b>	<p><b>Dust composition of comet 67P as measured by the COSIMA mass spectrometer over two years of the ROSETTA mission</b></p>  	<p>B1.1-0010-18 <b>Accepted</b></p>
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