
Scientifique, Institut national des sciences de l'Univers : UMS832, Université Joseph Fourier - Grenoble 1, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274, Institut national des sciences de l'Univers : UMS832, Institut national des sciences de l'Univers : UMR5274 – France

¹³Finnish Meteorological Institute – Erik Palmenin aukio 1, P.O. Box 503, 00 101 Helsinki, Finland, Finland

¹⁴European Space Agency – Noordwijk, Netherlands

¹⁵RISE, Bioscience and Materials/Chemistry and Materials – Stockholm, Sweden

¹⁶Laboratoire de Physique et Chimie de l'Environnement et de l'Espace – Centre National de la Recherche Scientifique : UMR7328 – 3A, Avenue de la Recherche Scientifique 45071 Orléans cedex 2, France

¹⁷Institute of Statistics and Mathematical Methods in Economics – Vienna University of Technology, Vienna, Austria

Abstract

Over the two years of the Rosetta mission accompanying the comet, the COmetary Secondary Ion Mass Analyzer (COSIMA), on board the orbiter, had collected *in situ* more than 35,000 dust particles and particle fragments in the inner coma of the comet 67P/CG (67P/Churyumov-Gerasimenko). These particle agglomerates with size ranging from ~ 50 to $\sim 1000 \mu\text{m}$, were captured at a low impact velocity ($< 10 \text{ m/s}$) on metal targets and imaged and identified *in situ* with the COSIMA optical microscope COSISCOPE. Among all the dust particles collected, around 250 were chemically analyzed by the secondary ion mass spectrometry (SIMS) technique.

We have compared the global composition measured for 67P/CG's dust 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. We have demonstrated that the organic matter of 67P/CG was different from all the semi-volatile compounds analyzed during the

*Corresponding author: robin.isnard@lisa.u-pec.fr

†Speaker

‡Corresponding author: christelle.brois@cncs-orleans.fr

calibration step. However, similarities with Insoluble Organic Matter (IOM) extracted from carbonaceous chondrites are notable. Moreover, we have demonstrated that cometary particles from 67P are among the most carbon-rich objects in the Solar System, containing about 50% in mass of organic matter. Estimated H/C elemental ratio of the 67P/CG cometary organic matter is also reported.

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