Abstract

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M. Hilchenbach, J. Kissel, Y. Langevin, C. Briois, H. von Hoerner, A. Koch, R. Schulz, J. Silén, K. Altwegg, L. Colangeli, H. Cottin, C. Engrand, H. Fischer, A. Glasmachers, E. Grün, G. Haerendel, H. Henkel, H. Höfner, K. Hornung, E.K. Jessberger, H. Lehto, K. Lehto, F. Raulin, L. Le Roy, J. Rynö, W. Steiger, T. Stephan, L. Thirkell, R. Thomas, K. Torkar, K. Varmuza, K.P. Wanczek, N. Altobelli, D. Baklouti, A. Bardyn, N. Fray, H. Krüger, N. Ligier, Z. Lin, P. Martin, S. Merouane, F.R. Orthous-Daunay, J. Paquette, C. Revillet, S. Siljeström, O. Stenzel, B. Zaprudin:

Comet 67P/Churyumov–Gerasimenko: Close-up on dust particle fragments.

The COmetary Secondary Ion Mass Analyser instrument on board ESA´s *Rosetta* mission has collected dust particles in the coma of comet 67P/Churyumov–Gerasimenko. During the early-orbit phase of the *Rosetta* mission, particles and particle agglomerates have been imaged and analyzed in the inner coma at distances between 100 km and 10 km off the cometary nucleus and at more than 3 AU from the Sun.

We identified 585 particles of more than 14 μm in size. The particles are collected at low impact speeds and constitute a sample of the dust particles in the inner coma impacting and fragmenting on the targets. The sizes of the particles range from 14 μm up to submillimeter sizes and the differential dust flux size distribution is fitted with a power law exponent of −3.1. After impact, the larger particles tend to stick together, spread out or consist of single or a group of clumps, and the flocculent morphology of the fragmented particles is revealed.

The elemental composition of the dust particles is heterogeneous and the particles could contain typical silicates like olivine and pyroxenes, as well as iron sulfides. The sodium to iron elemental ratio is enriched with regard to abundances in CI carbonaceous chondrites by a factor from ~1.5 to ~15. No clear evidence for organic matter has been identified.

The composition and morphology of the collected dust particles appear to be similar to that of interplanetary dust particles.