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Characterization of the refractory organic matter present in the dust particles of 67P/Churyumov-Gerasimenko.

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The Cometary Secondary Ion Mass Analyser (COSIMA), a miniaturized time-of-flight secondary ion mass spectrometer (ToF-SIMS), is one of the dust particle instruments onboard the orbiter of the Rosetta mission that arrived to comet 67P/Churyumov-Gerasimenko in mid-2014. COSIMA analyses the mineral and organic composition of dust particles that are captured on metal targets exposed to space [1, 2].
The mass spectra acquired by COSIMA show that refractory organic matter is ubiquitous in cometary dust particles [2]. The nature of this carbonaceous material will be discussed. We will highlight the abundance of organic matter in these dust particles as well as the nitrogen to carbon elemental ratio of this refractory organic matter. These results obtained on the dust particles of 67P will be compared to those from other astrophysical objects (carbonaceous chondrites, IDPs, micro-meteorites). This comparison could provide clues on the origin and evolution of the cometary organic matter.

References: [1] Hilchenbach, M. et al. (2016) ApJ, 816, L32. [2] Schulz, R. et al. (2015) Nature, 518, 216-218. [3] Fray, N. et al. (2016) Nature, 538, 72-74.