Light element isotopic composition of Ultra-Carbonaceous Antarctic Micrometeorites (UCAMMs).

J. DUPRAT[1*], C. ENGRAND[1], N. BARDIN[1], E. DARTOIS[2], D. BAKLOUTI[2], K. BENZERARA[3], L. DELAUCHE[1], E. DOBRICA[4], M. GODARD[1], J.-L. GUERQUIN-KERN[5], Y. KAKAZU[1], H. LEROUX[6], E. QUIRICO[7], L. REMUSAT[3], G. SLODZIAN[1], T.-D. WU[5].

[1]CSNSM, CNRS/IN2P3-Univ. Paris Sud, Univ. Paris Saclay, 91405 Orsay, France, (*Jean.Duprat@csnsm.in2p3.fr), [2]IAS CNRS/INSU-Univ. Paris-Sud, Université Paris Saclay, 91405 Orsay, France; [3]IMPMC, Sorbonne Universités, CNRS, MNHN, UPMC, IRD Paris, France; [4]Dpt Earth and Planet. Sci., Univ. New Mexico, Albuquerque, USA; [5]Institut Curie; INSERM; CNRS, 91405 Orsay, France; [6]UMET, CNRS/Univ. Lille1, 59655 Villeneuve d'Ascq, France; [7]UJF-Grenoble CNRS-INSU, IPAG, 38041 Grenoble, France.

Ultracarbonaceous Antarctic Micrometeorites (UCAMMs) are characterized by a high amount of organic matter (OM) (> 50 vol%) [1, 2] exhibiting extreme deuterium excesses [2] and a high nitrogen concentration [3-5]. These samples most probably originate from a cometary reservoir in the outer solar system. We performed light elements (H, C and N) isotopic analyses on UCAMM fragments using a newly developed high mass resolution (HMR) protocol with the NanoSIMS-50 [6]. The OM exhibits a wide range of hydrogen and nitrogen isotopic compositions [7-9] and, together with XANES and TEM data, it appears that it contains various components with distinct mineral concentrations. We will present a senario accounting for the measured elemental composition and in which the heterogeneous isotopic compositions observed are inherited from precursors formed by GCR irradiation of N-rich ices at the sub-surface of a parent body orbiting at large heliocentric distances [5, 10].

This study was funded by the ANR project OGRESSE (11-BS56-026-01), DIM-ACAV, CNES and the PICT-IBiSA imaging facility in the Institut Curie (Orsay). The CONCORDIA station is a joint project of French and Italian polar institutes (IPEV and PNRA).

[1] Nakamura, T., et al., MAPS, Suppl., 2005. 40 #5046. [2] Duprat, J., et al., Science, 2010. 328: p. 742-745. [3] Yabuta, H., et al., MAPS Suppl., 2012. 75: p. 5196. [4] Yabuta, H., et al. LPSC. 2012, #2239, [5] Dartois, E., et al., Icarus, 2013. 224: p. 243-252. [6] Slodzian, G., et al., Microsc. & Microanal., 2014. 20: p. 577-581. [7] Bardin, N., et al. Int. J. Mass Spectrom. 2015. 393: 17-24. [8] Engrand, C., et al. LPSC. 2015 #1902. [9] Bardin, N., et al. MAPS Suppl. 2015 # 5275. [10] Auge et al. (2016) A&A in revision.