C/N AND OTHER ELEMENTAL RATIOS OF CHONDRITIC POROUS IDPS AND A FLUFFY CONCORDIA MICROMETEORITE

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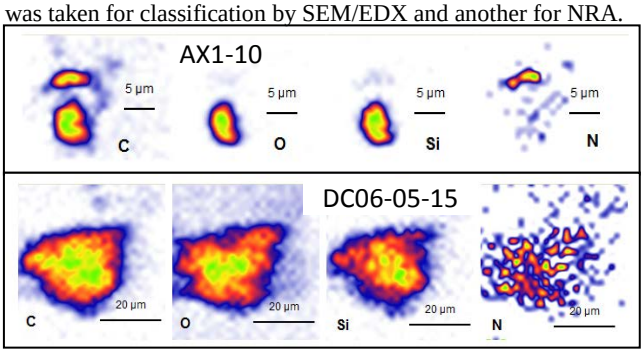
Introduction: Chondritic porous interplanetary dust particles (CP-IDPs) may be cometary in origin [1], as may ultracarbonaceous (UCAMMs) [2] and 'fluffy' [3] micrometeorites from the Concordia collection. They are all rich in organics, which can rim grains and may have helped glue grains together during accretion [4]. The organics also contain nitrogen the input of which to Earth has potential biological importance. We report C/N ratios, and other properties of CP-IDPs and a Concordia fluffy micrometeorite.

Experimental Methods: Three cluster IDPs were obtained: L2036AW1-4 (originally 10 μm) from cluster #4, L2036AX1-10 (14 μm) from cluster #10 and L2036AY1-9 (15 μm) from cluster #9 [6]. After IR spectroscopy, samples were potted in S, microtomed, and pressed into high-purity indium for SEM/EDX, synchrotron-XRF (SXRF), and nuclear reaction analysis (NRA). One split of Concordia particle DC06-05-15 (originally ~50 μm) was taken for classification by SEM/EDX and another for NRA.



Results: We observed little or no NRA signal from sample AY1; evidently most of it was lost. AX1-10 has two carbonaceous domains with distinct C/N ratios (atom), 29.7±1.4 and 2.9±0.4. The whole-particle C/N ratio is 9.5±0.6. Higher count rates (green) in central areas reflect greater particle thickness. C and O maps for AW1 and DC06 are more uniform; the respective C/N ratios of 16.6±2.6 and 14.0±2.0 lie between the bulk CI and CM ratios of 12.7 and 16.9 [7], and in the UCAMM range of 7-20 [2], but are distinctly lower than the unheated ratios, >25, for insoluble organic meteorite residues [8]. EDX spectra indicate a sulfide grain in AX1 and suggest the presence of pyroxenes in both AX1 and AW1. SXRF on AW1 gave a CI-like pattern, with CI-normalized Cr/Fe=0.64; Mn/Fe=0.66; and Ni/Fe=0.98.

References: [1] Brownlee D. et al. (1995) *LPS 26*, 183-184. [2] Dartois E. et al., (2013) *Icarus 224*, 243-253. [3] Dobrică E. et al. (2009) *MPS 44*, 1643-1661. [5] Flynn G. et al. (2010) *LPS* 1079.pdf. [6] Nakamura-Messenger K. (2012) *MPS 75*, 5325.pdf. [6] Matrajt G. et al. (2013) *GCA*, in press. [7] Lodders K. & Fegley B. (1998) *Planet. Scientist's Companion*. [8] Alexander C.M.O'D. et al. (2007) *GCA 71*, 4380-4403.