

UNUSUAL CHEMICAL DIVERSITY IN SOLVENT SOLUBLE POLAR FRACTIONS OF THE SUTTER'S MILL CARBONACEOUS CHONDRITE.

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Introduction: On 22 April 2012, a fireball was observed over northern California, and since about 50 individual meteorites (430 g to date) were recovered in a strewn field around the Sutter's Mill historic site [1]. Especially for the structural characterization of the soluble organic matter, this fresh carbonaceous chondrite is of high importance because of its limited contamination and the recovery of two different samples before and after a rain event. Here we report on the chemical diversity of the polar fraction in the methanol extracts of two selected samples using high field ultrahigh-resolution mass spectrometry. This technique was recently introduced to the field of meteoritics and enabled the description of thousands of C, H, N, O, S based molecules simultaneously out of a couple of CM2 type carbonaceous chondrites [2, 3] as well as out of shergottites [4]. We analyzed 25 mg of the Henningsen-Lotus parking lot freshly fallen fragment, designated SM2 and 25 mg of the SM12 fragment that was collected after a rain event.

Sample preparation: The extraction was done with LC/MS grade methanol as described earlier in [2, 3] in the case of other chondrites. The analysis was followed using flow injection electrospray negative mode ultrahigh resolution mass spectrometry (ESI(-)-ICR-FT/MS, Bruker Daltonics SOLARIX 12 Tesla ion cyclotron resonance Fourier transforme MS).

Results and conclusions: We observed thousands of signals including many isotopologues that could be converted into only a few hundreds of C, H, O, N, S, P bearing molecules. Compared to our previous results on other CM2 carbonaceous chondrites (Murchison, Maribo and various NWA samples), the spectra were rather poor in terms of signal abundances and specifically showed negative mass defects characteristic of highly oxygenated species or organometallic compounds. Sutter's Mill samples have the particularity to show only few structural characteristics when compared to most of the other meteorites (ordinary and carbonaceous chondrites) so far investigated by the same technique.

References:

[1] Jenniskens et al. 2012. this volume. [2] Schmitt-Kopplin et al. 2010. PNAS 1070:2763-2768. [3] Haack et al. 2012 *Meteoritics & Planetary Science* 47:30-50. [4] Schmitt-Kopplin et al. this volume.

Additional Information: We thank the finders of the Sutter's Mill meteorite for collecting material and making it available for analysis.