INDIGENOUS AMINO ACIDS PRESENT IN CR PRIMITIVE METEORITES.

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Introduction: The CR chondrites are thought to contain the most primitive meteoritic insoluble organic material [1,2], which closely resembles the insoluble organic matter found in the most primitive interplanetary dust particles (IDPs) [2]. However, their soluble organic inventory has not been extensively studied.

Techniques: We have analyzed the amino acid content of the Antarctic CR2s EET92042 and GRA95229, and the CR1 GRO95577 using high performance liquid chromatography with UV fluorescence detection (HPLC-FD) and gas chromatography-mass spectrometry (GC-MS). Additionally, compound-specific carbon isotopic measurements for most of the individual amino acids from the EET92042 and GRA95229 meteorites were achieved by gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS).

Results: Our results show that the EET92042 and GRA95229 meteorites are among the most amino acid-rich carbonaceous chondrites, with total amino acid concentrations of 180 and 249 ppm, respectively [3]. Racemic enantiomeric ratios, as well as the highly enriched $\delta^{13}C$ values [3], indicate that primitive organic matter was preserved in these meteorites. The GRO95577 meteorite, however, is depleted in amino acids (less than 1 ppm). The variation in amino acid abundances amongst CRs seems to be related to the degree of aqueous alteration they experienced. The same appears to be true for the CMs [3].

In order to further investigate the soluble organic inventory of CR chondrites, analysis of the amino acid content of MET00426 and QUE99177 is currently being carried out. These are the least altered CR chondrites identified to date, based on their mineralogical characteristics [4]. Our analysis indicates that these two CRs also have high total amino acid abundances and amino acid distributions similar to EET92042 and GRA95229.

Conclusions: The Antarctic CR2s EET92042 and GRA95229 have the highest amino acid abundances ever detected. This suggests that their soluble organic inventories are more primitive than any other chondrites and, therefore, closer to the original material accreted by chondrites. The analysis of the amino acids present in Antarctic CR meteorites will help to reveal the processes that formed the prebiotic organic material in the early solar system that may ultimately have been delivered to the Earth and other planets.

References: [1] Cody G. D. and Alexander C. M. O'D. 2005. *Geochimica et Cosmochimica Acta* 69: 1085–1097. [2] Busemann H. *et al.* 2006. *Science* 312: 727-730. [3] Martins Z. *et al.* 2007. *Meteoritics & Planetary Science*, in press. [4] Abreu N. M. and Brearley A. J. 2006. Abstract #2395. 37th Lunar and Planetary Science Conference.