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Aberration-corrected scanning TEM investigations on organic matter in the most pristine chondritic samples.

Vollmer*, C., Leitner, J., Busemann, H., Spring, N., Ramasse, Q., and Kepaptsoglou, D. M. *Institut für Mineralogie, Universität Münster, Corrensstr. 24, D-48149 Münster. christian.vollmer@wwu.de.

Some extraterrestrial samples contain carbonaceous "hotspots", highly anomalous in D/H, $^{13}C/^{12}C$, and/or $^{15}N/^{14}N$, which may form in the parent solar molecular cloud or the outermost cool regions of the young solar nebula recording low temperature fractionation reactions [e.g., 1]. These hotspots may represent the most primitive organic matter accessible for analysis on Earth. However, due to their fragile constitution, it is required to examine these organic materials with transmission electron microscopy (TEM) techniques under certain low-dose conditions, i.e., a reduced acceleration voltage (60 kV), to induce as little damage as possible [2]. Here we report on aberration-corrected Scanning TEM investigations of four isotopically anomalous carbonaceous hotspots previously identified by NanoSIMS ion imaging within the CR chondrite NWA 852 and one chondritic porous IDP from the L2036 collector.

References: [1] Busemann H. et al. 2006, Science 312, 727. [2] Krivanek O. et al. 2010, Ultramicroscopy 110, 935.

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