MINERALOGY AND OXYGEN ISOTOPE COMPOSITION OF NEW SAMPLES FROM THE ALMAHATA SITTA STREWN FIELD.

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Introduction: Almahata Sitta is a spectacular breccia containing many different ureilitic and chondritic lithologies [e.g., 1-3]. Earlier, 40 different samples (23 ureilitic and 17 chondritic samples [1,2]) were studied. Here, the mineralogical characteristics of 30 and the oxygen isotope compositions of nine new samples will be presented.

Mineralogy: Among the 30 new samples are nine chondrites and 21 ureilites. The chondrites can be subdivided into one ordinary chondrite (MS-197: L4/5), one carbonaceous chondrite (MS-181: CB_a [4]), and seven E chondrites (6 EL and 1 EH). MS-179 is a very spectacular breccia, in which several distinct EL chondrite lithologies were mixed together (sometimes only weakly lithified). Enstatite in these is chemically quite similar but the discovery of olivine in chondrules from at least three portions indicates the presence of primitive lithologies thus making MS-179 an EL3-5 chondrite. Among the ureilitic samples are 13 coarse-grained rocks (grain size: up to ~2 mm) and eight with finer average grain sizes (≤100 µm). Some samples are transitional with variable grain sizes (MS-25, MS-205) or are breccias exhibiting different lithologies within one sample (MS-190, MS-191). Although our samples are very small, some coarse-gained ureilites appear to be rich in pyroxene (e.g., MS-183, MS-184, MS-187, MS-194). MS-202 is a coarse-grained rock with an unusual texture similar to MS-156 [1], whereas MS-185 is an ultrafine-grained ureilite (grain size: <10 µm).

Oxygen isotopes: The oxygen isotopes (data in ‰) of 9 samples were studied by laser fluorination gas mass spectrometry (see [1] for details). Among these samples are 5 chondrites and 4 ureilites. Most interesting is the identification of the CB-chondrite MS-181 ($\delta^{17}O$ = -1.57, $\delta^{18}O$ = 1.15, $\Delta^{17}O$ = -2.18). One L-chondrite was identified (MS-197; $\delta^{17}O$ = 3.96. $\delta^{18}O$ = 5.19, $\Delta^{17}O$ = 1.23) as well as three E chondrites (MS-189: $\delta^{17}O$ = 3.08, $\delta^{18}O$ = 5.95, $\Delta^{17}O$ = -0.04; MS-200: $\delta^{17}O$ = 3.37, $\delta^{18}O$ = 6.18, $\Delta^{17}O$ = 0.13; and MS-201: $\delta^{17}O$ = 3.50, $\delta^{18}O$ = 6.08, $\Delta^{17}O$ = 0.31). The two pyroxene-rich ureilitic samples MS-183 ($\delta^{17}O$ = 1.94, $\delta^{18}O$ = 6.21, $\Delta^{17}O$ = -1.33) and MS-184 ($\delta^{17}O$ = 3.17, $\delta^{18}O$ = 7.77, $\Delta^{17}O$ = -0.91) show quite different oxygen isotope compositions. The other two ureilites are MS-188 ($\delta^{17}O$ = 2.97, $\delta^{18}O$ = 7.44, $\Delta^{17}O$ = -0.94) and MS-190 ($\delta^{17}O$ = 3.59, $\delta^{18}O$ = 8.25, $\Delta^{17}O$ = -0.75).

Conclusions: This study confirms earlier results [1] that asteroid 2008 TC_3 is a spectacular polymict breccia containing various chondritic and ureilitic materials. Based on these findings it can be assumed that additional meteorite types will be identified among the individuals of the Almahata Sitta meteorite shower.

References: [1] Bischoff A. et al. 2010. *Meteoritics & Planetary Science* 45:1638-1656. [2] Horstmann et al. 2010. *Meteoritics & Planetary Science* 45:1657-1667. [3] Zolensky et al. 2010. *Meteoritics & Planetary Science* 45:1618-1637. [4] Bischoff et al. 2012. *Meteoritics & Planetary Science* this issue.