

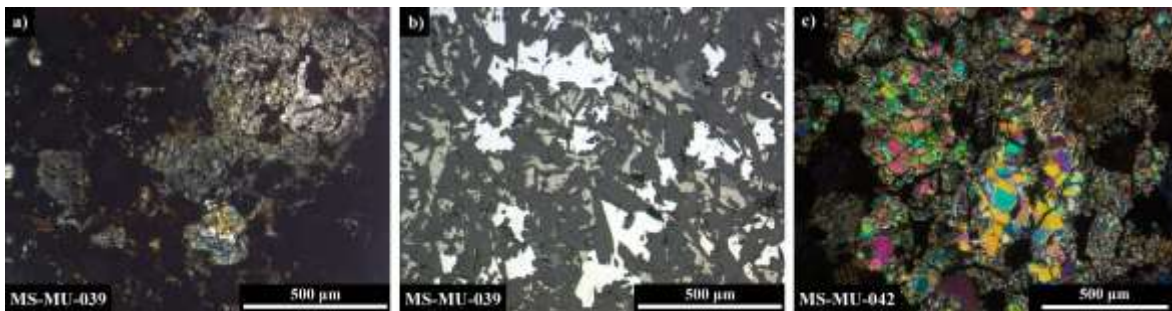
NEWS FROM THE ALMAHATA SITTA STREWN FIELD - SEVEN NEW SAMPLES: THREE UREILITES, THREE ENSTATITE CHONDRITES, AND ONE ORDINARY CHONDRITE.

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Introduction: After asteroid 2008 TC3 impacted Earth in 2008 many different meteorite types (achondritic and chondritic) were identified among the numerous meteorite fragments (e.g., [1-10]). The recognition of scientifically valuable samples is still ongoing [11,12]. Here, the petrography and mineralogy of 7 new samples (MS-MU-039 – MS-MU-045) are presented.

Results: The 7 new samples represent one single meteorite type (achondritic or chondritic) weighing between 2.3g (MS-MU-045) and 7.0g (MS-MU-041). The presence of a single meteorite type is the typical characteristic of the individual fragments, although a very interesting exception was recently described [12] showing that complex breccias also exist among the Almahata Sitta samples. However, within one of the new enstatite chondrites two different enstatitic lithologies were recognized and will be discussed below.

E-chondrites: The three identified enstatite chondrites are small: While two E-chondrites MS-MU-041 (7.0g) and MS-MU-044 (4.9g) are two completely different EH₅ chondrites (see [13] for the new classification system), the third sample MS-MU-039 (6.1g) is a EL_b chondrite. It consists of a small area with a well-preserved chondritic texture (EL_b3/4; Fig. 1a) and a larger area with a melt texture (Fig. 1b). The entire melt lithology resembles the metal-sulfide-sulfide intergrowths (MSSI) that often occur as isolated nodules and aggregates in many E-chondrites (e.g., [14,15]). Metal in MS-MU-041 has concentrations of Si and Ni of ~3 and ~7.5 wt%, respectively, whereas metal within MS-MU-044 has 2.4 wt% Si and 6.8 wt% Ni. The Cr-concentration in troilite in MS-MU-041 is slightly below 2 wt%, whereas troilite in MS-MU-044 has 2.9 wt% Cr.



Ordinary chondrite: MS-MU-043 (4.5g) is a H4 ordinary chondrite with equilibrated olivine (Fa_{18.0±0.3}; 20 analyses) and somewhat unequilibrated low-Ca pyroxene (Fs_{14.0±4.8}; range: 5.0-21.3 mol% Fs; 19 analyses). Based on the occurrence of shock-darkened, olivine-rich fragments the rock is brecciated.

Ureilites: MS-MU-040 (4.1g) and MS-MU-045 (2.3g) are heavily-shocked, fine-grained ureilites. MS-MU-040 olivine has Fa core contents of 15-17 mol%, while the sample MS-MU-045 has olivines with a Fa core of ~8 mol%. MS-MU-042 (5.0g) is an ureilite with a variable texture (Fig. 1c). Besides fine-grained areas, areas with relatively large olivines exist. The large olivines have cores with about 22 mol% Fa.

Conclusions: Again, very valuable meteorite samples from the Almahata Sitta strewn field are available for scientific work. The finding of a large melt lithology resembling MSSI in other E-chondrites may support the results of [14] that the MSSI nodules formed pre-accretionary as melts rather than being condensates [15]. Every new sample confirms the importance and peculiarity of asteroid 2008 TC3 considering mixing of meteoritic materials and regolith processing.

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