ALMAHATA SITTA METEORITE – COMPILATION OF MAGNETIC SUSCEPTIBILITY DATABASE

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The fall and discovery of a large number of fragments/individuals of the Almahata Sitta meteorite in the desert of N Sudan has significantly deepened our knowledge concerning the formation, structure and life cycle of asteroids [1,2]. In contrast to earlier findings, Almahata Sitta - classified as a polymict ureilite - does not only contain small clasts or fragments of different meteorite lithologies but consists of individuals of a growing number of different meteorite types and classes (rubble pile asteroid): various ureilite types and related lithologies (several unknown before) and a growing number of ordinary, carbonaceous and enstatite chondrites. Even unique and new meteorite lithologies such as Trachy-Andesites or an individual with affinity to Rumuruti chondrites have been discovered [2].

In our contribution (poster) we will provide an overview of the magnetic signature (magnetic susceptibility MS) of all so far by us investigated Almahata Sitta individuals and samples. Enstatite chondrites are treated in a different contribution elsewhere. Three sample sets are discriminated in the following tables, details are found in earlier contributions [3] and in Horstmann and Bischoff [2]: AS (AHS), MS and MS-MU. Following the scheme introduced within our LPSC 2017 contribution [3] we have extended our database of the MS values incorporating now all investigated samples (tab. 1). Abbreviations in the following tables are as follows: c-g: coarse grained ureilites; f-g: fine-grained ureilites (vgs or complex textured ureilites are included). Ureilite falls include Novo- Urei, Haverö, Jalanash and Dyalpur (no samples from Lahrauli available so far), so we can incorporate 5 of the 6 ureilite falls.

Ureilite Type (or related)		Individuals / samples	MS / error
Trachy - Andesite		**2 / 7**	**3.45 +/- 0.05**
AS	c - g	9 / several each	4.74 +/- 0.10
MS	c - g	1 / several	4.64
MS - MU	c - g	7 / 10	4.88 +/- 0.10
All	**c - g**		**4.80 +/- 0.15**
AS	f - g	2 / several each	5.03 +/- 0.10
MS	f - g	2 / several each	5.03 +/- 0.10
MS - MU	f - g	9 / 10	5.03(5) +/- 0.10
All	**f - g**		**5.03 +/- 0.10**
Pla – Ol – Pyx rich		**1 / 5**	**5.20 +/- 0.05**
Fine – grained, metal - rich		**1 / 2**	**5.26 +/- 0.02**
Ureilite falls		**4**	**4.99 +/- 0.10**

In the following table 2 the MS values of non – ureilitic lithologies detected within the Almahata Sitta sample suite are summarized (Enstatite chondrites are treated in another contribution).

Sample / Individual	Meteorite Type	MS / error
MS - CH	Rumuruti – like chondrite	4.40 +/- 0.02
MS - 11	H 5/6	5.14 +/- 0.01
MS - 181	Cba Bencubbinite	5.50 +/- 0.02
MS - MU 013	H 5	5.16 +/- 0.02
MS - MU 019/036	Enstatite Achondrite, metal-rich	5.58 +/- 0.10

MS values reflect the multitude of meteorite types agglomerated within the 2008TC3 rubble pile asteroid. More details will be provided in our poster. Our database will allow a quick and reliable identification and classification of the numerous existing Almahata Sitta individuals, hopefully soon available for all interested researchers.

References:

[1] Jenniskens P., et al., 2009. Nature, 458, 485-488. [2] Horstmann M., Bischoff A., 2014. Chemie der Erde,74/2, 149-183 (and references herein). [3] Hoffmann V.H. et al., 2017. LPSC Conf., #2365, and references herein.