DAR AL GANI 013 - A NEW SAHARAN RUMURUTI-CHONDRITE (R3-6) WITH HIGHLY UNEQUILIBRATED (TYPE 3) FRAGMENTS; A. Jäckel[1], A. Bischoff[1], R.N. Clayton[2], and T.K. Mayeda[2], [1]Institut für Planetologie, Westfälische Wilhelms-Universität, Wilhelm-Klemm-Str. 10, D-48149 Münster, Germany, [2]Enrico Fermi Institute, University of Chicago, Chicago, Illinois 60637, USA.

The Rumuruti (R) chondrite group has a new member, Dar al Gani 013. Like most R-chondrites Dar al Gani 013 is a chondritic breccia consisting of various types of lithic and mineral clasts embedded in a fine-grained, olivine-rich matrix. These include highly unequilibrated type <3.5 clasts, type 4 and type 6 fragments, brecciated clasts and impact melt fragments. The oxygen isotope composition of Dar al Gani 013 shows high $\delta^{17}O$ (5.38) and high $\delta^{18}O$ (5.88) values. These data are very similar to those of Acfer 217 another Saharan R-chondrite. In the $\delta^{17}O$ vs. $\delta^{18}O$-diagram they lie directly side by side. Based on the find locations and on significant petrographic differences these two meteorites are not paired. The chemical composition of Dar al Gani 013 is given by Palme et al. [1].

Introduction: In May of 1995, the single stone Dar al Gani 013 weighing 205 g was recovered from the Libyan part of the Sahara (27°07.77'N, 16°20.61'E). The R-chondrite group with samples from Australia (Carlisle Lakes), Antarctica (e.g., Allan Hills 85151, Yamato 75302, Pecora Escarpment 91002), Kenya (Rumuruti), and from the Sahara (Acfer 217) comprises now ten meteorites. Based on previous studies [2-4] R-chondrites are characterized as oxidized, olivine-rich (~70 vol%) and metal-poor meteorites with high $\delta^{17}O$ values. Most olivines are Fa-rich (~39 mole%) and contain detectable amounts of NiO (~0.25 wt%). Except for the unbrecciated Carlisle Lakes meteorite all other R-chondrites are regolith breccias [5] containing solar wind-implanted noble gases.

A polished thin section of Dar al Gani 013 was studied by Scanning Electron Microscopy (SEM) and an electron microprobe.

Results: Bulk rock/host matrix: The bulk rock of Dar al Gani 013 is severely weathered (W4) [5]. Only some Fe,Ni-grains were detected within forsteritic olivines of the type 3 fragments. All metals and most sulfides of the matrix were destroyed during weathering. The degree of shock metamorphism of the bulk rock Dar al Gani 013 is certainly very low (S1,[6]). The host matrix of this breccia consists of a mixture of small-grained equilibrated and unequilibrated components.

As shown in Figure 1 the meteorite contains various types of lithic clasts, which can be characterized as follows (Table 1):

Type 3 clasts: Several type 3 clasts were encountered having a perfect chondritic texture. These clasts consist of chondrules and chondrule fragments embedded within a dark, fine-grained matrix. Olivines of the chondrules are highly unequilibrated (Table 1). Based on the coefficient of variation the subtype is certainly below 3.5. The fine-grained matrix appears to consist of tiny olivine crystals. The composition of matrix olivines indicates a higher Fa-content (~Fa_{40-50}) than typically found in other R-chondrites and in the matrix of the equilibrated clasts (~Fa_{39}). These clasts may represent the most primitive lithology identified in R-chondrites so far.

Type 4 clasts: Type 4 clasts are up to 1 cm in size and show a perfect chondritic texture. Olivines within chondrule and matrix are equilibrated (Table 1). The pyroxenes still show variations concerning the Fs-content.

Type 5 and type 6 clasts: Some fragments are highly equilibrated and recrystallized. Both, olivines and pyroxenes are well equilibrated and the shapes of former chondrules are barely visible due to severe recrystallization during metamorphism.

Impact melt clasts: Several large fragments were encountered that are impact melts. These clast-free fragments consist of highly zoned olivine xenocrysts (Fa_{20-51}) embedded in a feldspar-normative mesostasis. The mesostasis is rich in K_2O. These fragments are probably identical to the K-rich impact melt analyzed by Palme et al. [1].

Dark fine-grained clasts: An unequilibrated fine-grained clast occurs in Dar al Gani 013 that may represent a breccia clast consisting of various mineral fragments "sintered" together to form their own breccia. Olivines and pyroxenes wihin this fragment are unequilibrated (Table 1).

References: [1] Palme H. et al. (1996) *LPS, XXVI*, this issue; [2] Bischoff A. et al. (1994) *Meteoritics, 29*, 264-274; [3] Schulze H. et al. (1994) *Meteoritics, 29*, 275-286; [4] Rubin A.E. and Kallemeyn G.W. (1994) *Meteoritics, 29*, 255-264; [5] Wlotzka F. (1993) *Meteoritics, 28,* 460; [6] Stöffler D. et al. (1991) *GCA, 55,* 3845-3867.

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Table 1: Olivine compositions of main types of lithic clasts within Dar al Gani 013; Fa-contents in mole%; n = number of analyses; *) olivines >50 µm.

clast	Type 3	Type 4	Type 6	dark, fine-grained clast	impact melt fragment
n	21*	33	10	16	44
mean (Fa)	23.9	39.2	39.0	31.2	33.4
range (Fa)	0.5 - 44.6	36.7 - 43.0	38.4 - 40.7	6.2 - 48.1	19.5 - 50.9
standard deviation	16.8	1.0	0.6	13.6	7.4
coefficient of variation	70.3%	2.6%	1.5%	43.6%	22.2%

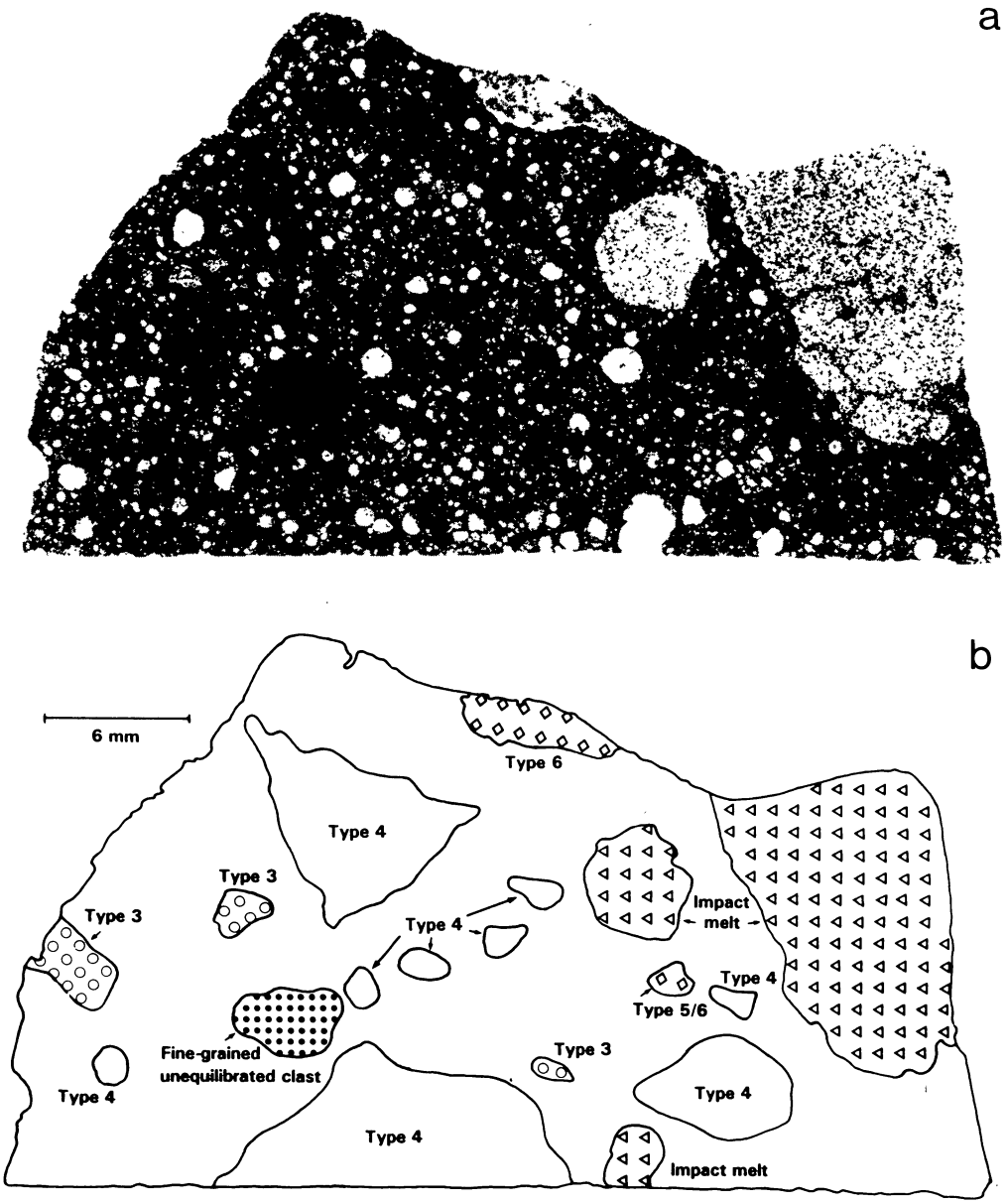

Figure 1: Transmitted light photomicrograph (a) and a sketch map (b) of Dar al Gani 013 showing the brecciated nature of this sample. Large lithic clasts as well as chondrule and mineral fragments are embedded in a dark and fine-grained matrix.