

DaG 983: A COMPLEX (POLYMICT, FELDSPAR CUMULATE, IMPACT MELT BRECCIA) EUCRITE FROM LIBYA. A. Patzer¹, J.Schlüter², L. Schultz³, D. H. Hill¹, W. V. Boynton¹ and F. Thiedig⁴. ¹Lunar and Planetary Lab, Univ. of Arizona, Tucson, AZ 85721, ²Mineral. Museum, Univ. of Hamburg, D-20146 Hamburg, ³Max-Planck-Institut f. Chemie, D-55022 Mainz, ⁴Univ. of Münster, D-48149 Münster.

Introduction: We have been conducting petrographic and chemical analyses of the mineral phases in the new eucrite Dar al Gani (DaG) 983. The 933 g meteorite was recovered in the Libyan desert last year. We will also present bulk noble gas and INAA data.

Petrographic description: In hand specimen, DaG 983 shows a light gray, brecciated texture, several vesicle-bearing melt veins, and open cracks (Fig. 1). Occasionally, cracks and vesicles contain microcrystalline aggregates of terrestrial gypsum.

Microscopically, three basic components can be distinguished: A considerable fraction of the meteorite is composed of pyroxene and feldspar megacrysts (up to 10 mm). They are embedded in a groundmass of variably coarse-grained pyroxene and plagioclase. The sample also shows recrystallized melt pockets and veins. The pockets locally display a spinifex-texture. In modal terms, DaG 983 contains about 47 vol% pyroxene, 34 % plagioclase, 12 % melt, 3.5 % silica, 1.5 % ilmenite, 1.0 % chromite as well as accessory phosphates and troilite.

DaG 983 exhibits attributes of severe shock metamorphism including heavily fractionated mineral phases and strong mosaicism. Most of the plagioclase has been converted into maskelynite.

First chemical results: The megacrysts are made of pigeonite (Fs_{37.9} Wo_{4.4}) and plagioclase (An_{94.8}). The matrix of the rock comprises plagioclase (An_{93.6}) and relatively Fe-rich pigeonite (Fs_{54.6} Wo_{3.1}) with thin exsolution lamellae of augite (Fs_{25.0} Wo_{40.9}). Pigeonite of the spinifex-textured melt pockets is composed similarly to the pyroxene in the groundmass (Fs_{55.3} Wo_{2.1}) while the associated feldspar reveals a more sodic composition (An_{84.3}).

Preliminary conclusions: The overall composition of DaG 983 is that of a eucrite. It further categorizes as an impact melt breccia containing pyroxene and feldspar megacrysts as well as melt veins and pockets. The recrystallized melt areas were most likely induced by a major impact event as the entire sample is strongly shocked (S5, [1]). The pyroxene megacrysts are relatively Mg-rich suggesting a cumulate origin (e.g. [2]). The pyroxenes of the highly brecciated basaltic host eucrite display a more ferroan composition.

References: [1] Stöffler D. et al. (1988) In *Meteorites and the Early Solar System* (eds. J. F. Kerridge and M. S. Matthews), Univ. of Arizona Press, Tucson, Arizona, USA, 165-201. [2] Hsu W. and Crozaz G. (1997) *GCA*, 61, 1293-1302.



Fig. 1: DaG 983 (50 x 70 mm; Photo K.C. Lyncker).