67749

Granulitic Breccia with clast of KREEP basalt

11.5 grams

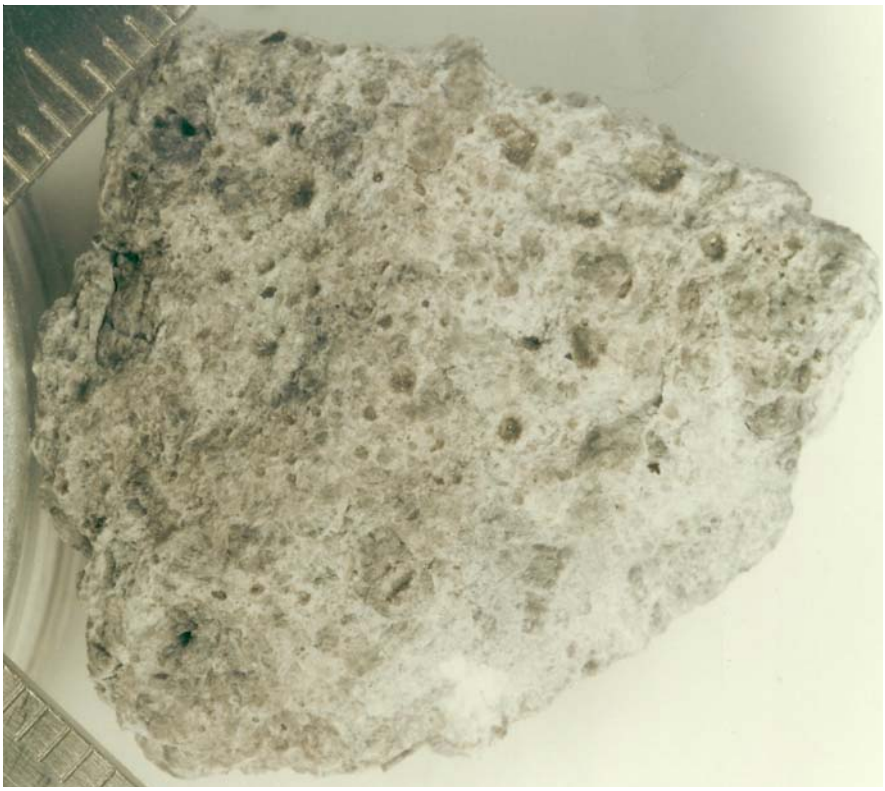


Figure 1: Photo of 67749. Scale marked in mm. S72-49570

Introduction

67749 is a rake sample collected from the rim of North Ray Crater – see section on 67701. This small fragment is a polymict breccia with important clasts.

Petrography

Stoffler et al. (1985) called 67749 a "granulitic breccia". The matrix is feldspathic, plagioclase is An_{93-98}, and lithic clasts include cataclastic anorthosite and basaltic impact melt.

However, in this small breccia sample, Steele and Smith (1973) described a clast of KREEP basalt and gave the mode and mineral compositions (figures 3 and 4). Ryder and Norman (1980) state that "*the uniform, clast-free texture and Fe-rich mafic minerals and sodic plagioclases suggest that this clast is a fragment of volcanic KREEP, not an impact melt"*.

Mineralogical Mode 67749

Stoffler et al. 1985

Plagioclase	88.5 %
Pyroxene	11.2
Opaques	0.3

Mineralogical Mode KREEP basalt

Steele and Smith 1973

Plagioclase	35 - 40 %
Pyroxene	35 - 40
Opaques	5
Mesostasis	20

Chemistry

The REE diagram (figure 5) for this rock does not indicate much KREEP in the portion analyzed.

Radiogenic age dating

Not

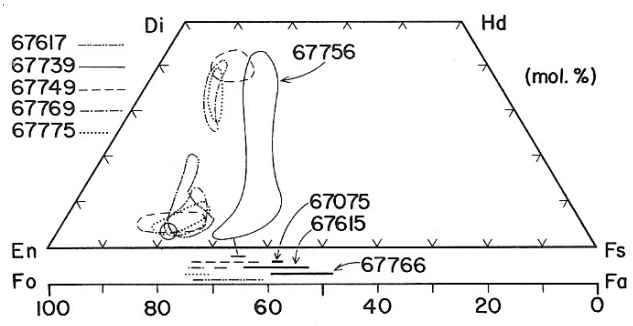


Figure 2: Pyorxene and olivine in matrix of 67749.

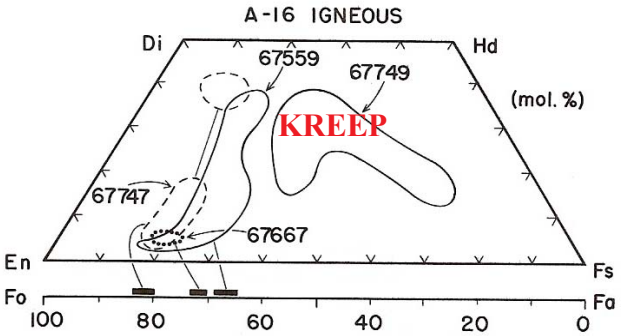


Figure 3: Pyroxene in KREEP basalt clast in 67749 (Steele and Smith 1980).

Table 1. Chemical composition of 67749

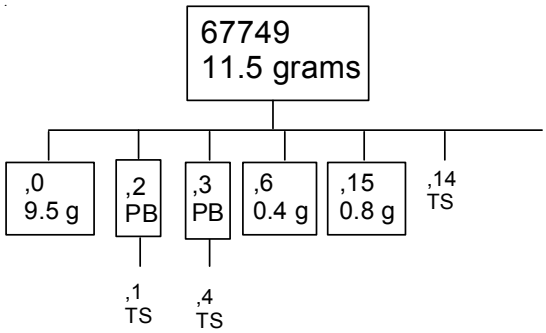
reference	Stoffler85	
weight		
SiO2 %	43.25	(a)
TiO2	0.26	(a)
Al2O3	29.76	(a)
FeO	3.67	(a)
MnO		
MgO	3.28	(a)
CaO	16.33	(a)
Na2O	0.49	(a)
K2O	0.02	(a)
P2O5	0.04	(a)
S %		
sum		

(a) DBA

Figure 4: OK, this is it, the KREEP basalt at Apollo 16 (from Ryder and Norman 1980).

Processing

There are three thin sections.



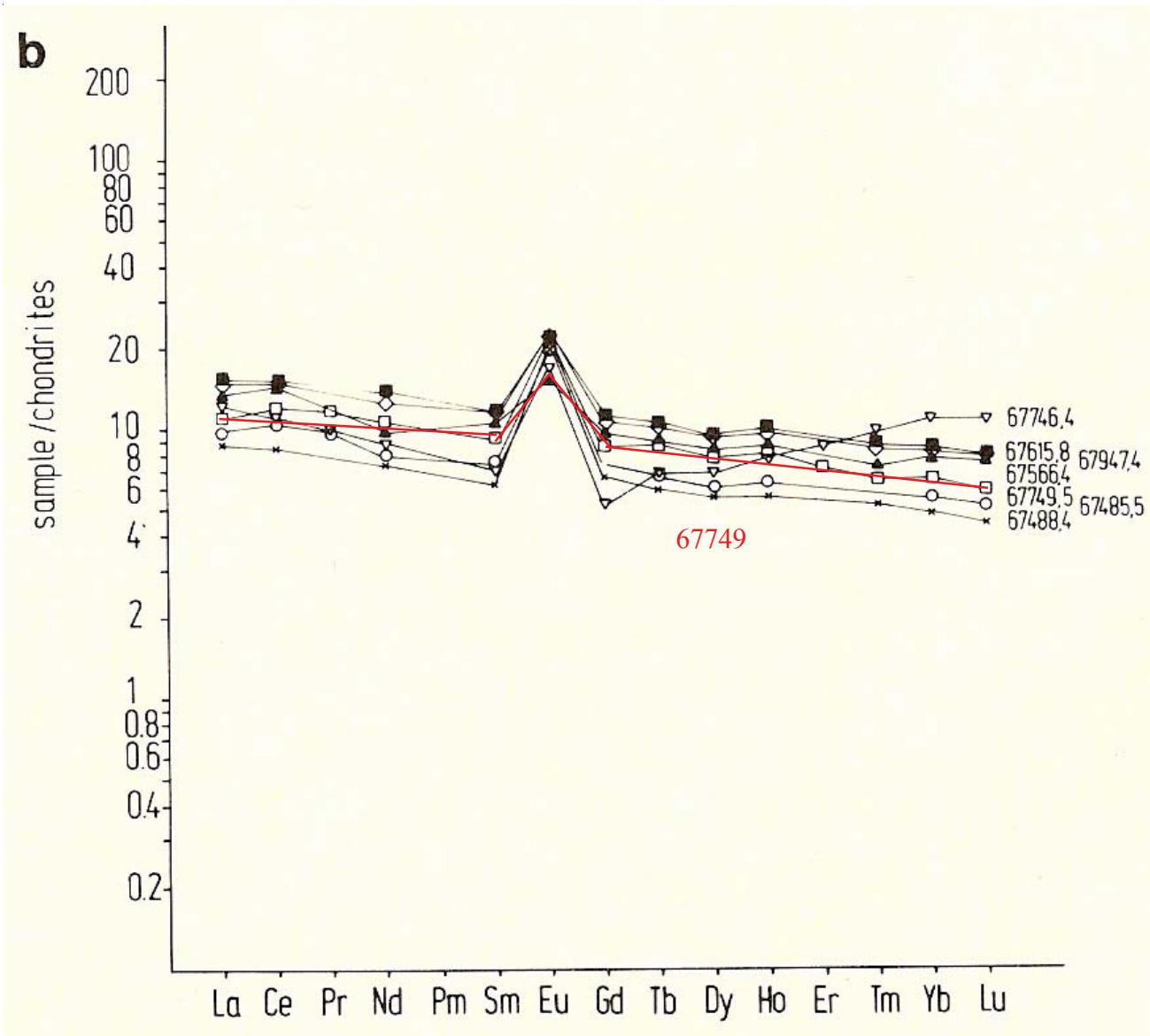


Figure 5: Normalized rare-earth-element diagram for 67749 compared with other "granulitc breccias" from North ray Crater (Stoffler et al. 1985).

References for 67749

Butler P. (1972a) Lunar Sample Information Catalog Apollo 16. Lunar Receiving Laboratory. MSC 03210 Curator's Catalog. pp. 370.

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Ryder G. and Norman M.D. (1980) Catalog of Apollo 16 rocks (3 vol.). Curator's Office pub. #52, JSC #16904

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Steele I.M. and Smith J.V. (1973) Mineralogy and petrology of some Apollo 16 rocks and fines: General petrologic model of the moon. *Proc. 4th Lunar Sci. Conf.* 519-536.

Stöffler D., Bischoff A., Borchardt R., Burghele A., Deutsch A., Jessberger E.K., Ostertag R., Palme H., Spettel B., Reimold W.U., Wacker K. and Wanke H. (1985) Composition and evolution of the lunar crust in the Descartes highlands. *Proc. 15th Lunar Planet. Sci. Conf.* in J. Geophys. Res. **90**, C449-C506.

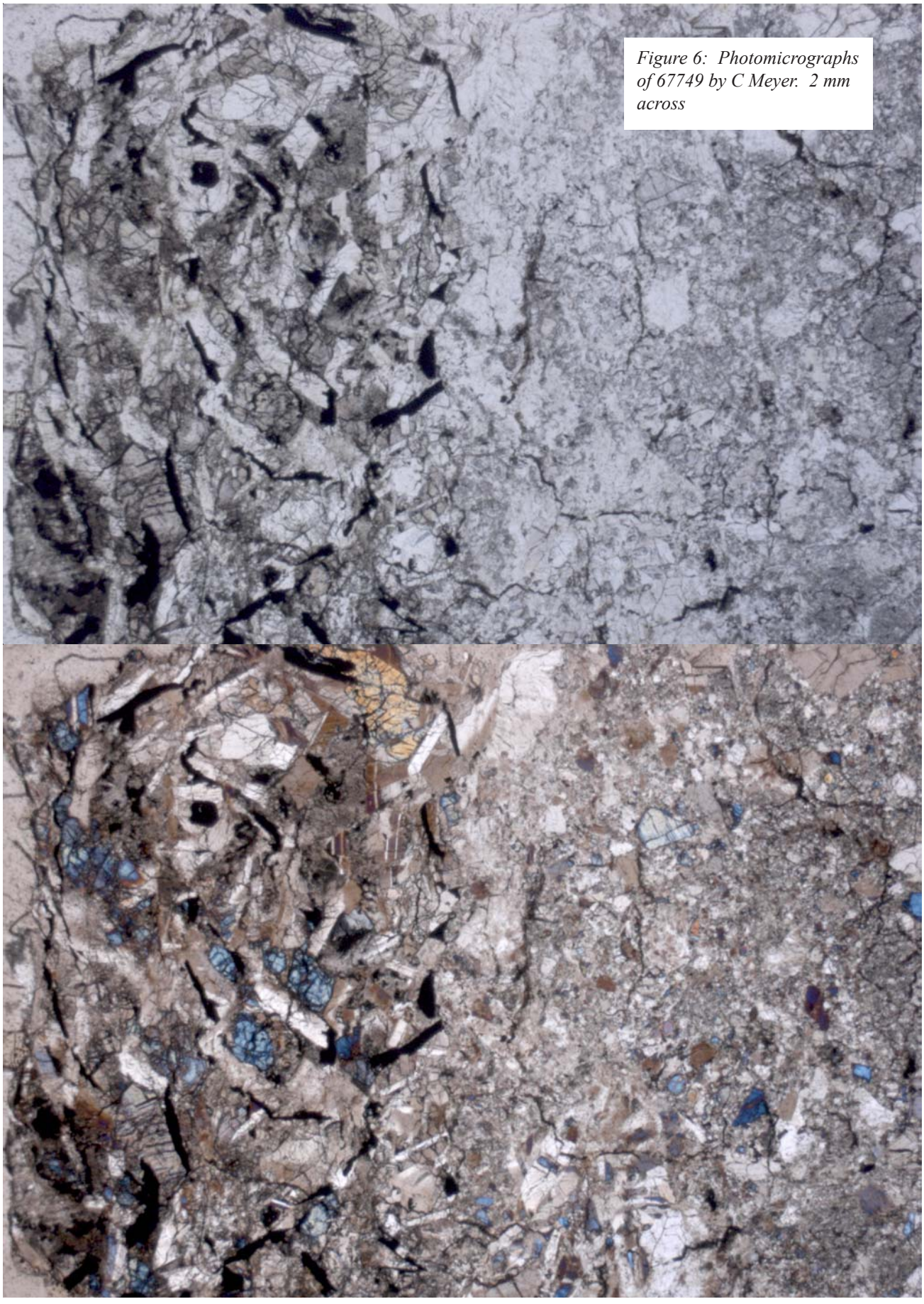

Figure 6: Photomicrographs of 67749 by C Meyer. 2 mm across