

15529
Vesicular Mare Basalt
1531 grams



Figure 1: Photo of 15529. Sample is 10 cm across (cube is 1 inch). NASA S87-48191.

Introduction

Lunar sample 15529 is a very vesicular mare basalt (figure 1) that remains unstudied. It was collected from near the edge of Hadley Rille in an area called “The Terrace”. The lunar regolith was thin in this area, with abundant rock samples (basalts) exposed (Swann et al. 1971).

Dirt fills some vesicles, but not all, and the sample has no obvious zap pits.

Petrography

Note similarity of 15529 to 15556 and 15016. Vesicles are 30% by volume; average 4 mm, up to 7 mm (Butler

1971). The relatively low silica content indicates that 15529 is probably related to the olivine-normative clan of Apollo 15 basalts. The mineral mode reported in the original catalog seems too high in plagioclase content.

Mineralogical Mode for 15529

	Sample Catalog Butler 1971
Olivine	
Pyroxene	45-55
Plagioclase	45-55
Silica	
Opaques	1

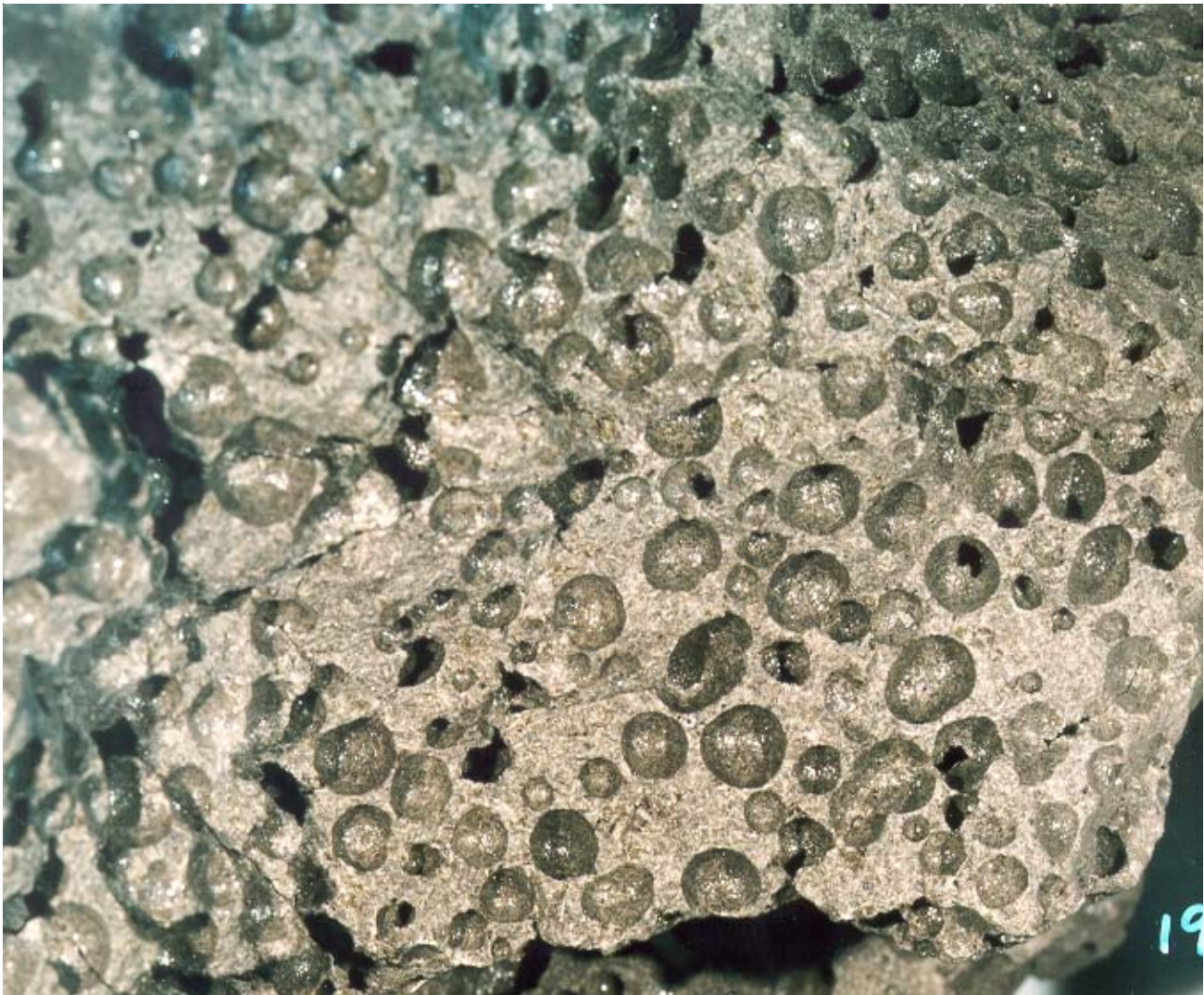


Figure 2: Closeup photo of freshly broken surface of 15529 showing numerous large vesicles. Largest vesicle is 4 mm. NASA S97-16850.

Chemistry

Neal (2001) and Ryder and Schuraytz B.C. (2001) reported chemical analyses (table, and figure 4). Rhodes and Blanchard (1983) reported that they had also analyzed 15529, but gave no data.

Radiogenic age dating

None

Other Studies

Garvin et al. (1982) calculated the gas pressure from the vesicle size and viscosity.

Processing

There are only two (small) thin sections.

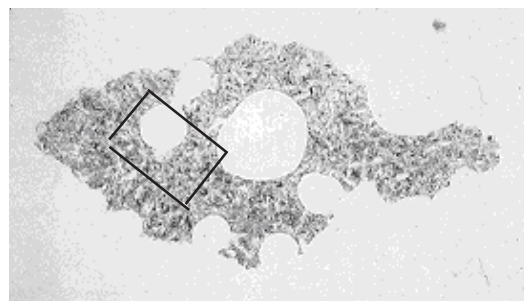


Figure 3: Thin section of 15529,14. Scale about 1 cm.

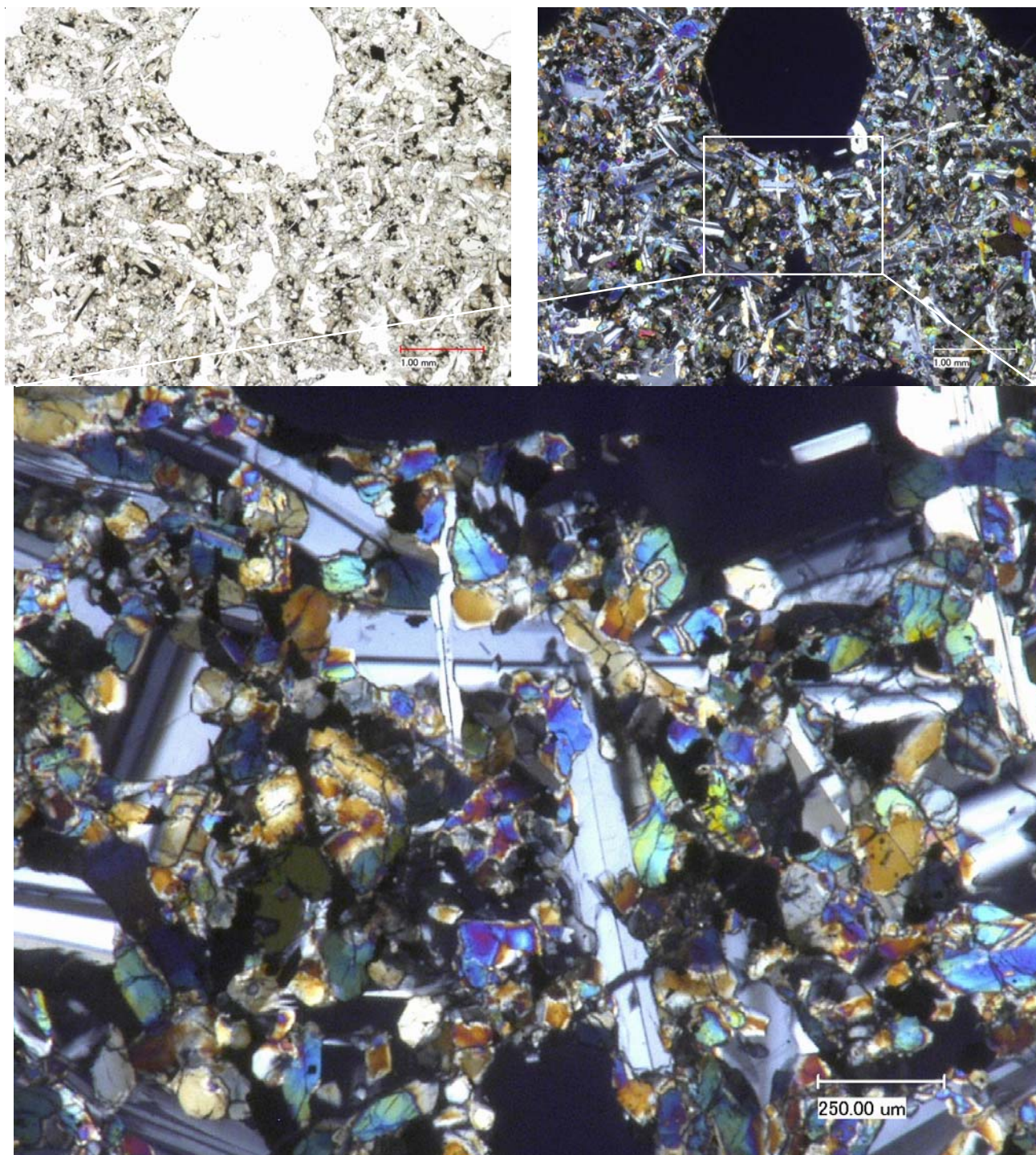


Figure 4: Photomicrographs of thin section 15529,14 by C Meyer @ 30 and 150x.

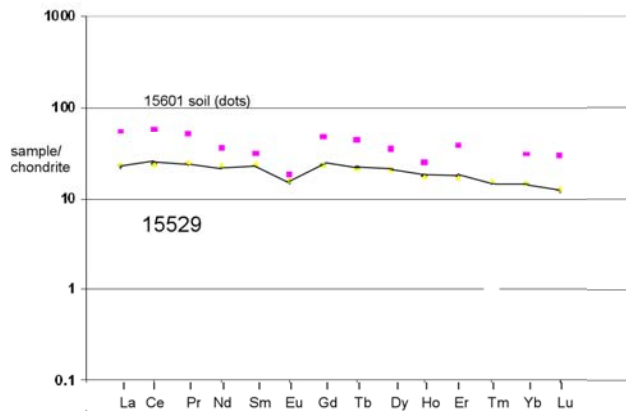


Figure 5: Normalized rare-earth-element diagram for 15529 (data from Neal 2001), compared with 15601 soil.

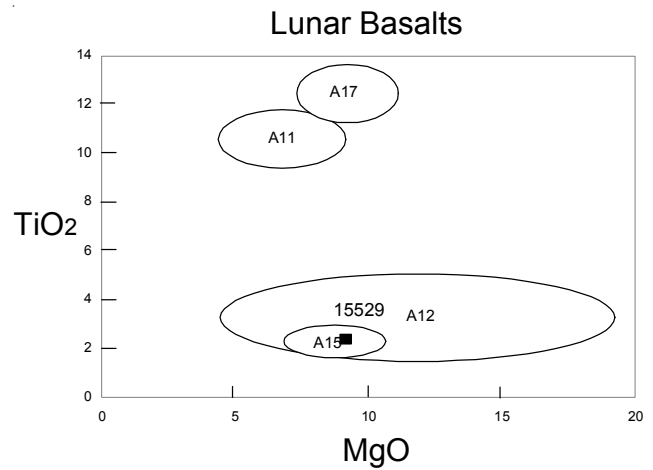


Figure 6: Chemical composition of 15529 compared with that of other lunar basalts.

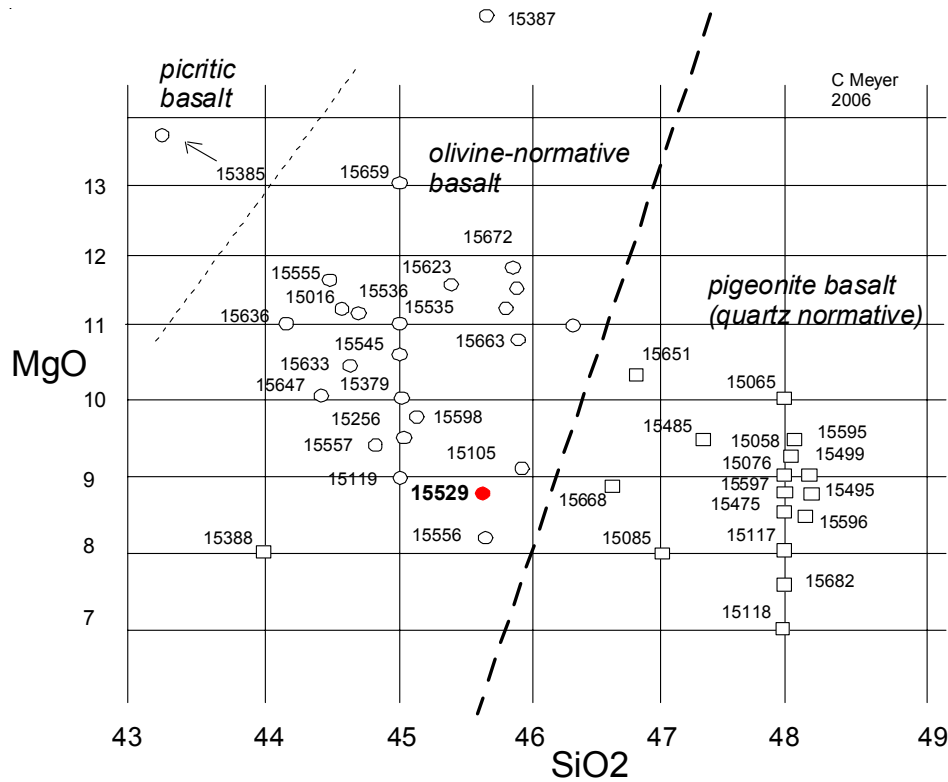


Figure 7: The big picture.

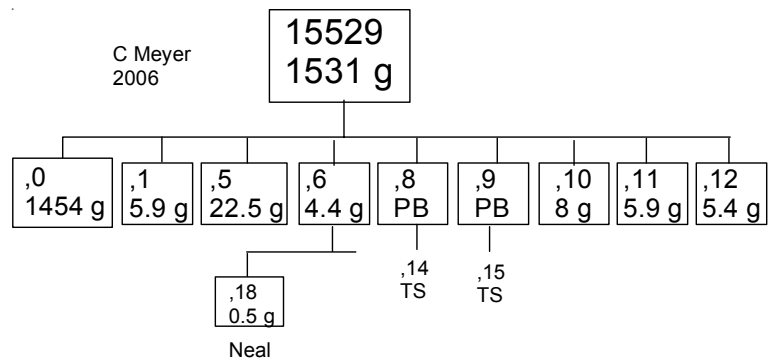


Table 1. Chemical composition of 15529.

reference weight	Ryder 2001		Neal 2001	
SiO ₂ %	45.7	(a)		
TiO ₂	2.58	(a)		
Al ₂ O ₃	9.19	(a)		
FeO	21.84	(a)	21.9	(b)
MnO	0.29	(a)		
MgO	8.91	(a)		
CaO	10.27	(a)		
Na ₂ O	0.244	(a)	0.264	(b)
K ₂ O	0.044	(a)		
P ₂ O ₅	0.068	(a)		
S %				
sum				
Sc ppm			45	(b) 44.3 (c)
V				249 (c)
Cr	4364	(a)	4320	(b) 4168 (c)
Co			48.9	(b) 53 (c)
Ni	44	(a)	55	(b) 53 (c)
Cu	9	(a)	79	(b) 16 (c)
Zn				22 (c)
Ga				3.9 (c)
Ge ppb				
As				
Se				
Rb	2	(a)		0.92 (c)
Sr	101	(a)		103 (c)
Y	28	(a)		29.4 (c)
Zr	89	(a)		100.5 (c)
Nb	10	(a)		6.65 (c)
Mo				0.12 (c)
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				0.15 (c)
Ba			57	(b) 55.4 (c)
La			5.1	(b) 5.39 (c)
Ce			15.5	(b) 14.8 (c)
Pr				2.18 (c)
Nd			7	(b) 9.98 (c)
Sm			3.7	(b) 3.42 (c)
Eu			0.91	(b) 0.87 (c)
Gd				4.6 (c)
Tb			0.79	(b) 0.79 (c)
Dy				5.05 (c)
Ho				0.99 (c)
Er				2.83 (c)
Tm				0.36 (c)
Yb			2.27	(b) 2.38 (c)
Lu			0.32	(b) 0.3 (c)
Hf			2.62	(b) 2.63 (c)
Ta			0.4	(b) 0.51 (c)
W ppb				50 (c)
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				0.07 (c)
Th ppm			0.4	(b) 0.02 (c)
U ppm				

technique: (a) XRF, (b) INAA, (c) ICP-MS

References for 15529

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