

**77545**  
**Poikilitic Impact Melt Breccia**  
29.5 grams

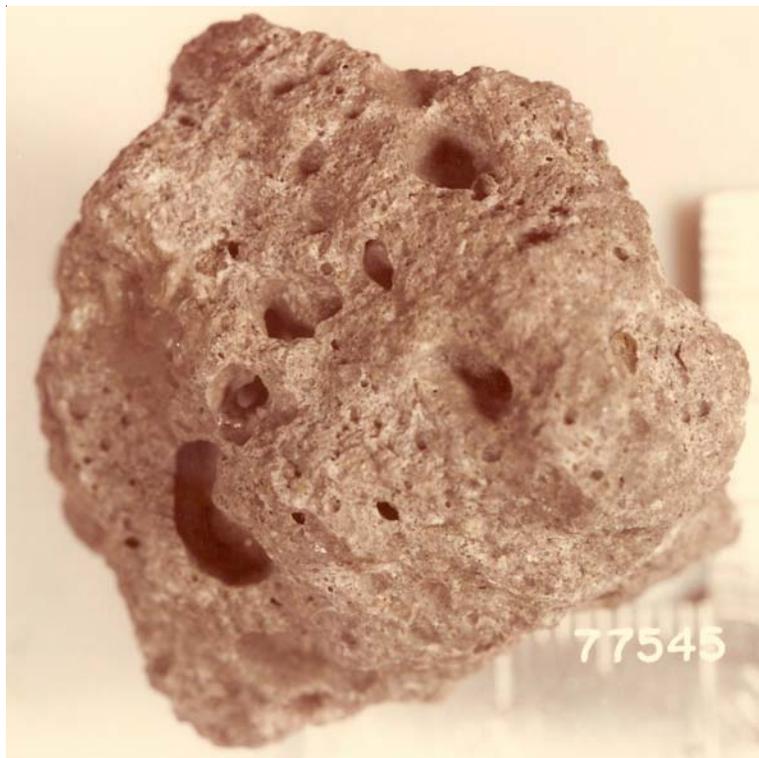


Figure 1: Photo of 77545 showing large vesicles. S73-31348. Sample is 3 cm. across.

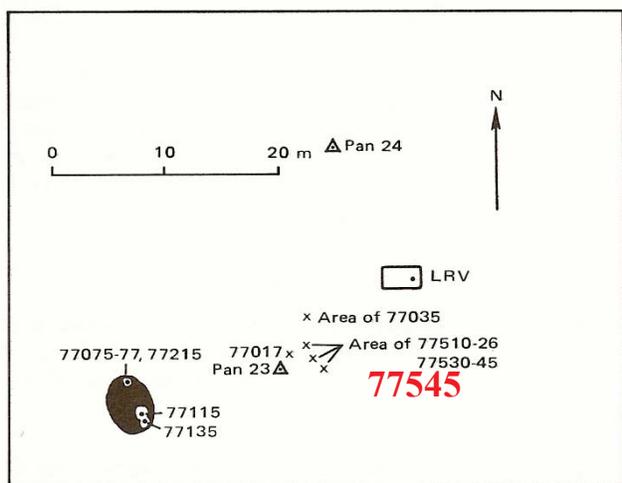


Figure 2: Map of station 7, Apollo 17.

### **Introduction**

Sample 77545 was collected as a rake sample from the soil at station 7 (figure 2). It is a vesicular impact melt breccia similar in texture and composition to 77135, collected from the large boulder nearby. This sample of impact melt has large vesicles (figure 1).

### **Petrography**

The texture of 77545 is poikiloblastic with interlocking irregular pigeonite oikocrysts enclosing laths and tablets of plagioclase and minor olivine (figure 3). Ilmenite is also poikilitic. Mineral clasts are abundant (mostly plagioclase), but lithic clasts are rare. Warner et al. (1977) give the mineral mode of the matrix of 77545 as 53.2% plagioclase, 44% mafic and 1.6% ilmenite.

The composition of pyroxene and olivine is given in figure 4. Plagioclase is  $An_{82-98}$ . Warner et al. (1978)

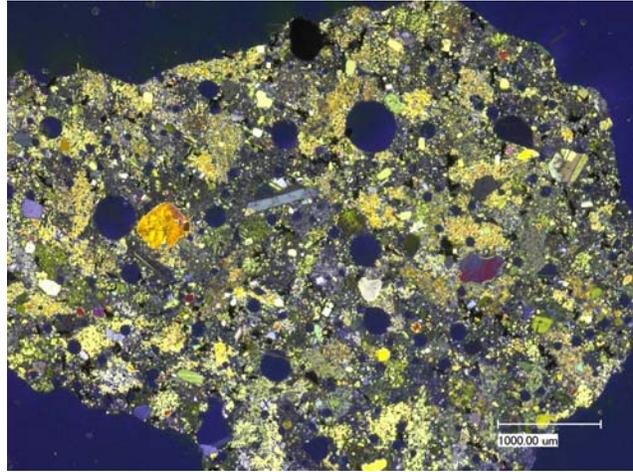
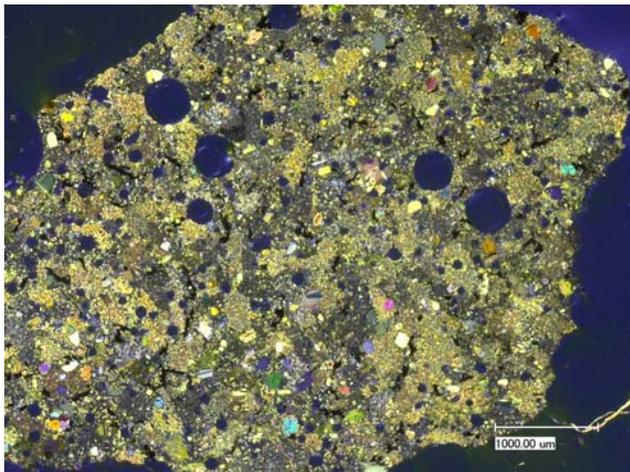
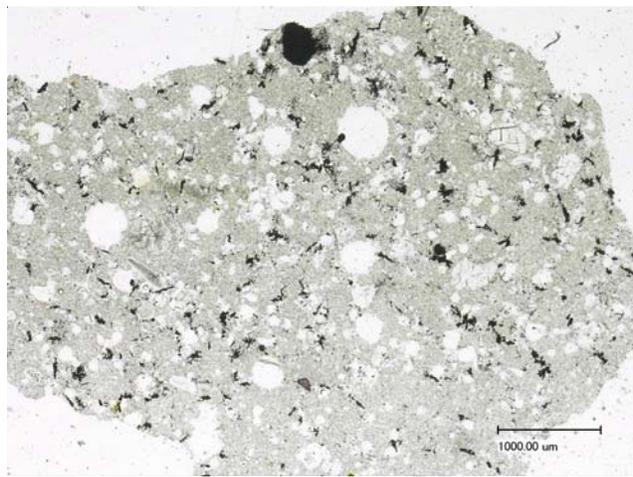
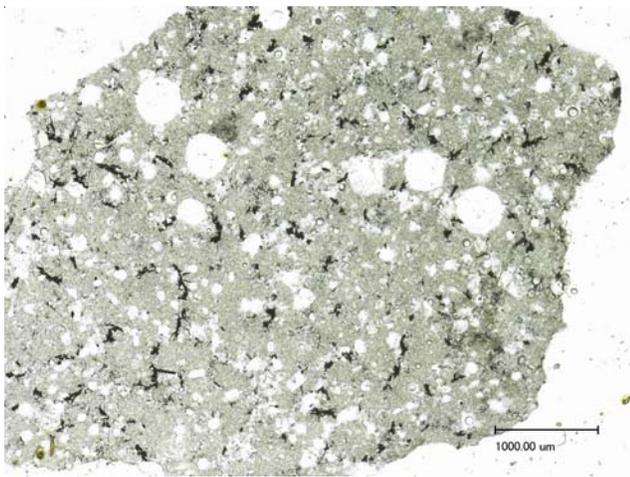


Figure 3a: Photomicrographs of thin section 77545,6 by C Meyer @50x.

Figure 3b: Photomicrographs of thin section 77545,7 by C Meyer @50x.

also report the composition of ilmenite, chromite and armalcolite.

### ***Significant clast***

A large angular clast of olivine was studied by Warner et al. (1977). The clast has a granoblastic texture, with mm size olivine grains intersecting at near 120 deg triple junctions. The olivine in the clast is Fo<sub>89</sub> and there are chromite grains located along the olivine grain boundaries.

### **Chemistry**

The analysis by Wasson et al. (1977) is similar to that for 77135 (figure 5).

### **Processing**

77545 has been chipped, not sawn. There are 6 thin sections.

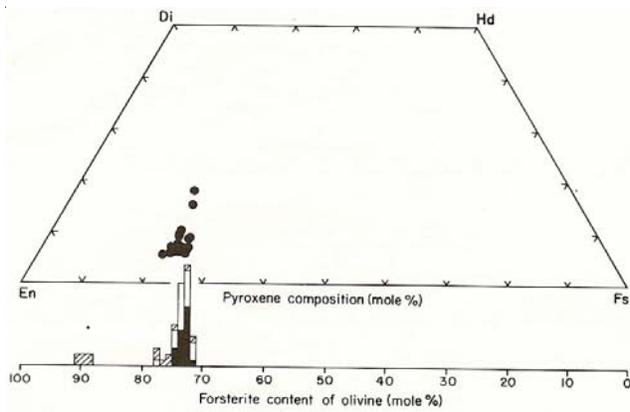


Figure 4: Pyroxene and olivine composition of matrix of 77545 (Warner et al. 1977).

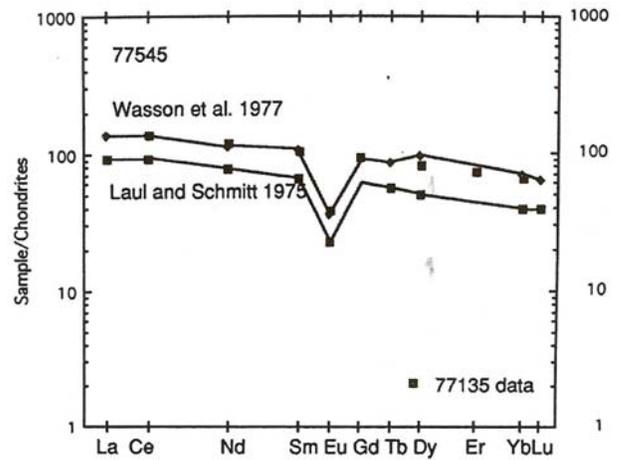
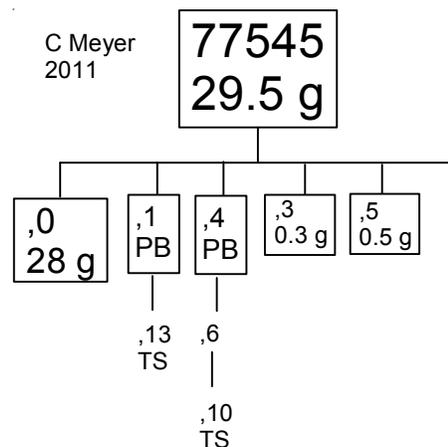


Figure 5: Normalized rare-earth-element diagram for 77545.

### Mineral Mode ( Warner et al. 1977)

	Vol. %
Matrix	74.6
Mineral clasts	9.4
Lithic clasts	16
Mineral clasts	
Plagioclase	6.7
Olivine/Pyroxene	2.7
Opaque	
Metal/troilite	
Other	
Lithic Clasts	
ANT	14.9
Devit. Anorthosite	0.9
Breccia	
Other	0.2
Percent of matrix	
Plagioclase	53.2
Olivine/pyroxene	44
Opaque	1.6
Metal/troilite	0.2
Other	1



**Table 1. Chemical composition of 77545.**

reference weight	Laul75	Warner77	Wasson77		
SiO <sub>2</sub> %					
TiO <sub>2</sub>	1.2	(a) 1.2	1.5	1.8	(a)
Al <sub>2</sub> O <sub>3</sub>	10.9	(a) 10.9	18.7	19.8	(a)
FeO	10.3	(a) 10.3	8.9	9.7	(a)
MnO	0.11	(a) 0.11		0.12	(a)
MgO	10	(a) 10	12.93	13.8	(a)
CaO	6.6	(a) 6.6	11	11.9	(a)
Na <sub>2</sub> O	0.47	(a) 0.47	0.71	0.7	(a)
K <sub>2</sub> O	0.14	(a) 0.14	0.24	0.29	(a)
P <sub>2</sub> O <sub>5</sub>					
S %					
sum					
Sc ppm	11	(a)	17	17.6	(a)
V	70	(a)		49	(a)
Cr		3558	1400	1440	(a)
Co	67	(a)	13.5	17.5	(a)
Ni	600	(a)	60	60	(a)
Cu					
Zn			1.9		
Ga			5.5	5.3	
Ge ppb			50	120	
As					
Se					
Rb					
Sr					
Y					
Zr	240	(a)	560	590	(a)
Nb					
Mo					
Ru					
Rh					
Pd ppb					
Ag ppb					
Cd ppb			2.8	10	
In ppb			0.35	0.32	
Sn ppb					
Sb ppb					
Te ppb					
Cs ppm					
Ba	220	(a)	340	380	(a)
La	21.5	(a)	32.2	35.7	(a)
Ce	55	(a)	82	85	(a)
Pr					
Nd	35	(a)	51	59	(a)
Sm	9.8	(a)	15.4	15.3	(a)
Eu	1.3	(a)	2	2.15	(a)
Gd					
Tb	2	(a)	3.1	3.2	(a)
Dy	12	(a)	23	19	(a)
Ho					
Er					
Tm					
Yb	6.3	(a)	11	11.6	(a)
Lu	0.94	(a)	1.52	1.62	(a)
Hf	8.2	(a)	11.8	12.1	(a)
Ta	1	(a)	1.4	1.5	(a)
W ppb					
Re ppb					
Os ppb					
Ir ppb	7	(a)	1		(a)
Pt ppb					
Au ppb	2	(a)	0.8	1.5	(a)
Th ppm	3.2	(a)	5.4	5.3	(a)
U ppm	0.9	(a)	1.4	1.4	(a)
technique	(a) INAA				

**References for 77545**

Butler P. (1973) Lunar Sample Information Catalog Apollo 17. Lunar Receiving Laboratory. MSC 03211 Curator's Catalog. pp. 447.

Laul J.C. and Schmitt R.A. (1975c) Chemical composition of Apollo 17 samples: Boulder breccias (2), rake breccias (8), and others (abs). *Lunar Sci.* **VI**, 489-491. Lunar Planetary Institute, Houston.

LSPET (1973) Apollo 17 lunar samples: Chemical and petrographic description. *Science* **182**, 659-672.

LSPET (1973) Preliminary Examination of lunar samples. Apollo 17 Preliminary Science Rpt. NASA SP-330. 7-1 – 7-46.

Meyer C. (1994) **Catalog of Apollo 17 rocks**: Volume 4. Curator's Office JSC 26088 pp. 644 76 78

Meyer C. (2010) Lunar Sample Compendium (abs#1016). *The 41<sup>st</sup> Lunar Planet. Sci. Conf.* @ The Woodlands

Muehlberger W.R. and many others (1973) Preliminary Geological Investigation of the Apollo 17 Landing Site. *In Apollo 17 Preliminary Science Report*. NASA SP-330.

Meyer C. (1994) **Catalog of Apollo 17 rocks**: Volume 4. Curator's Office JSC 26088 pp. 644

Warner R.D., Taylor G.J. and Keil K. (1977b) Petrology of crystalline matrix breccias from Apollo 17 rake samples. *Proc. 8<sup>th</sup> Lunar Sci. Conf.* 1987-2006.

Warner R.D., Keil K., Nehru C.E. and Taylor G.J. (1978) Catalogue of Apollo 17 rake samples from Stations 1a, 2, 7, and 8. *Spec. Publ. #18*, UNM Institute of Meteoritics, Albuquerque. 88 pp.

Wasson J.T., Warren P.H., Kallemeyn G.W., McEwing C.E., Mitdefehldt D.W. and Boynton W.V. (1977) SCCRV, a major component of highlands rocks. *Proc. 8<sup>th</sup> Lunar Sci. Conf.* 2237-2252.

Wolfe E.W., Bailey N.G., Lucchitta B.K., Muehlberger W.R., Scott D.H., Sutton R.L and Wilshire H.G. (1981) The geologic investigation of the Taurus-Littrow Valley: Apollo 17 Landing Site. *US Geol. Survey Prof. Paper*, 1080, pp. 280.