

15245 FRAGMENTS OF REGOLITH BRECCIA AND GLASS ST. 6 115.5 g

INTRODUCTION: 15245 consists of 89 pieces ranging from smooth breccia pieces to glass-coated and cemented breccias, to agglutinates. The pieces were arranged in order of increasing degree of porosity, irregularity of surface, and amount of glass, and were individually numbered (1 to 89) accordingly (see Fig. 1 and 2 for examples). The breccias are all friable regolith breccias containing glass as spherules, shards, and lapilli, and those analyzed have compositions similar to the local regolith. Some of the vesicular glasses have a few zap pits. The samples constituting 15245 were scooped from the floor of a 1 m crater (with regolith 15240), approximately 20 m south and upslope from the LRV at Station 6, which was described as a "fresh little crater."



Fig. 1a



Fig. 1b



Fig. 1c

Figure 1. Example photographs of 15245 pieces. a) regolith breccias ,1 to ,16. S-71-47912; b) glass-coated regolith breccias ,40 to ,47. S-71-47927; c) glassy agglutinates ,85 to ,89. S-71-47990.

PETROLOGY: Few pieces have been inspected other than macroscopically. Thin sections ,107 and ,117, from piece ,24, are of brown glassy regolith breccia (Fig. 3), which is not very porous. The fragment contains glass as blebs, shards, and lapilli, and includes colorless, green, yellow, and orange/red varieties. The red glass is more abundant than is usual for regolith breccias and is almost all as tiny spheres. Lithic fragments are small, and include glassy breccias, feldspathic crystalline breccias, including melt and granulitic anorthosites, and some KREEP-basalt fragments. Mare basalt fragments are not obvious. McKay et al. (1984) listed I_s/FeO of 29 to 44 for ,118 (from ,18) and 29-45 for ,120 (from ,19) respectively; Korotev (1984, unpublished) listed these both with an I_s/FeO of 41. Both of the fragments are regolith breccias. These are submature indices, yet the thin sections contain almost no identifiable agglutinates. Nagle (1982a) listed 15245 as showing the characteristics expected of rocks produced by subcrater lithification and Nagle (1982b) gave grain size distributions and statistics, and also data on rounding, packing, and clast orientation, but no specific split number was listed.

Fabel et al. (1972) gave x-ray emission shift data for $SiK\beta$, $AlK\beta$ and $OK\alpha$ for a brown-black spatter glass (,56). Microprobe analyses include heterogeneous zones indicating that mineral inclusions of plagioclase and pyroxene in the glass were analyzed.

CHEMISTRY: Chemical analyses of regolith breccia fragments are listed in Table 1. Rare earth elements are shown in Figure 4. The C and N analysis of Moore et al. (1973) and Moore and Lewis (1976) is on a glass-rich piece, but it is not known whether the analysis was of breccia, glass, or both. The analyses are all very similar to each other and to Station 6 soils, indicating that the breccias were made by shallow-level lithification of local soil (somehow destroying agglutinates). Most analyses in Table 1 were reported without discussion.

RARE GASES: Megrue (1972, 1973a,b) analyzed ,53, a "glassy agglutinate," to determine the gradient of He, Ne, and Ar in the sample. The gases were identified as of solar wind origin, and fractionated by the thermal event which produced the glass. The average $^4He/^{20}Ne$ is 23, $^4He/^{36}Ar = 71$, and the corresponding fines are 23 and 50% greater. The gases were found below the normal penetration depth of a few microns, suggesting that the glass formed from previously irradiated lunar soil. Other ratios found within the glass and the breccia fines are: $^4He/^3He = 2500 \pm 100$, $^{20}Ne/^{22}Ne = 12.5 \pm 0.2$, $^{21}Ne/^{22}Ne = 0.038 \pm 0.002$, $^{36}Ar/^{38}Ar = 5.2 \pm 0.01$. A lithic fragment showed no solar gas, but contained cosmogenic and radiogenic argon. Megrue (1973b) suggested that the soil was transported from Dune to St. 6, because of the similarity of fractionated solar gases, in the matrix of 15498,55 and in 15245,53. However, the silicate chemistry of these two samples is substantially different, a fact unknown to Megrue (1973b).

PROCESSING AND SUBDIVISIONS: All subdivisions have been made by chipping, following general numbering of individual pieces according to macroscopic characteristics. Only ,8, ,17, ,18, ,37, ,38, ,53, ,56, ,57, ,59, and ,60 have been subdivided. ,37 and ,38 are stored at Brooks.



Figure 2. Glass-coated regolith breccia 15245,37. S-75-33758

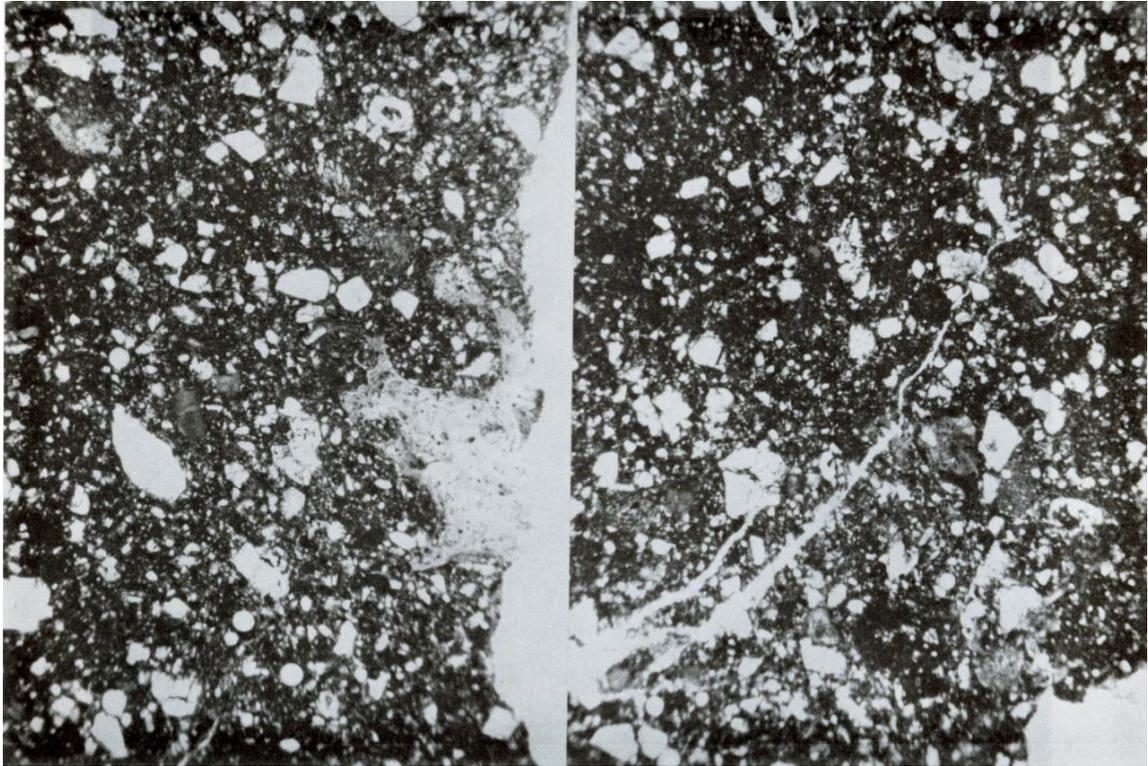


Fig.3a

Fig. 3b

Figure 3. Photomicrographs of 15245,107.
Widths about 2mm. Transmitted light.

TABLE 15245-1. Chemical analyses of 15245 fragments

wt. %	,17	,8	,18 (,118)	,19 (,120)	,60	,60
SiO2		48.41				
TiO2	1.24		1.45			
Al2O3	15.78	17.37	16.3			
FeO	12.0	11.67	11.8	11.9		
MgO	10.0	10.84	10.6			
CaO	9.8	10.78	10.2	11.4		
Nb2O	0.46	0.474	0.47	0.49		
K2O		0.205				
F2O5						
(ppm)						
Sc	21.9	23.5	22.8	22.6		
V	76	83.9	69			
Cr	3295	2210	2160	2180		
Mn	1690	1230	1240			
Co	38.8	35.9	38.5	37.1		
Ni	180	215	229	192		
Nb	6.3					
Sr	115	160	145	130		
Y						
Zr		368	350	410		
Nb						
Hf	10.5	8.92	9.7	10.2		
Ba	210	290	257	277		
Th	3.98	4.6	4.3	4.6		
U	1.02		1.13	1.10		
Pb						
La	25	26.3	25.7	27.5		
Ce		71.2	68	73		
Pr						
Nd		45.6	38	40		
Sm	12.1	11.1	12.0	13.1		
Eu	1.80	1.42	1.44	1.49		
Gd						
Tb	2.71	2.57	2.36	2.58		
Dy	10.0	15.5				
Ho		3.7				
Er						
Tm						
Yb	10.7	8.62	8.4	8.9		
Lu		1.16	1.16	1.25		
Li						
Be						
B						
C					132	130(a)
N						78
S						
F						
Cl						
Br						
Cu						
Zn						
(ppb)						
I						
At						
Ga						
Ge						
As						
Se						
Mo						
Tc						
Ru						
Rh						
Pd						
Ag						
Cd						
In						
Sn						
Sb						
Te						
Cs	490	280	290	290		
Ta	1250	1080	1170	1250		
W						
Re						
Os						
Ir		8	8.7	6.7		
Pt						
Ni			3.1	2.0		
Hg						
Tl						
Bi						
	(1)	(2)	(3)	(3)	(4)	(5)

References to Table 15245-1

References and methods:

- (1) Brunfelt et al. (1972): INAA
- (2) Wanke et al. (1976, 1977): XRF, INAA, RNAA
- (3) Korotev (1984, unpublished): INAA
- (4) Moore et al. (1973): pyrolysis, gas chromatography
- (5) Moore and Lewis (1976): pyrolysis, gas chromatography

Notes:

- (a) Seems to be repeated report of the Moore et al. (1973) data.

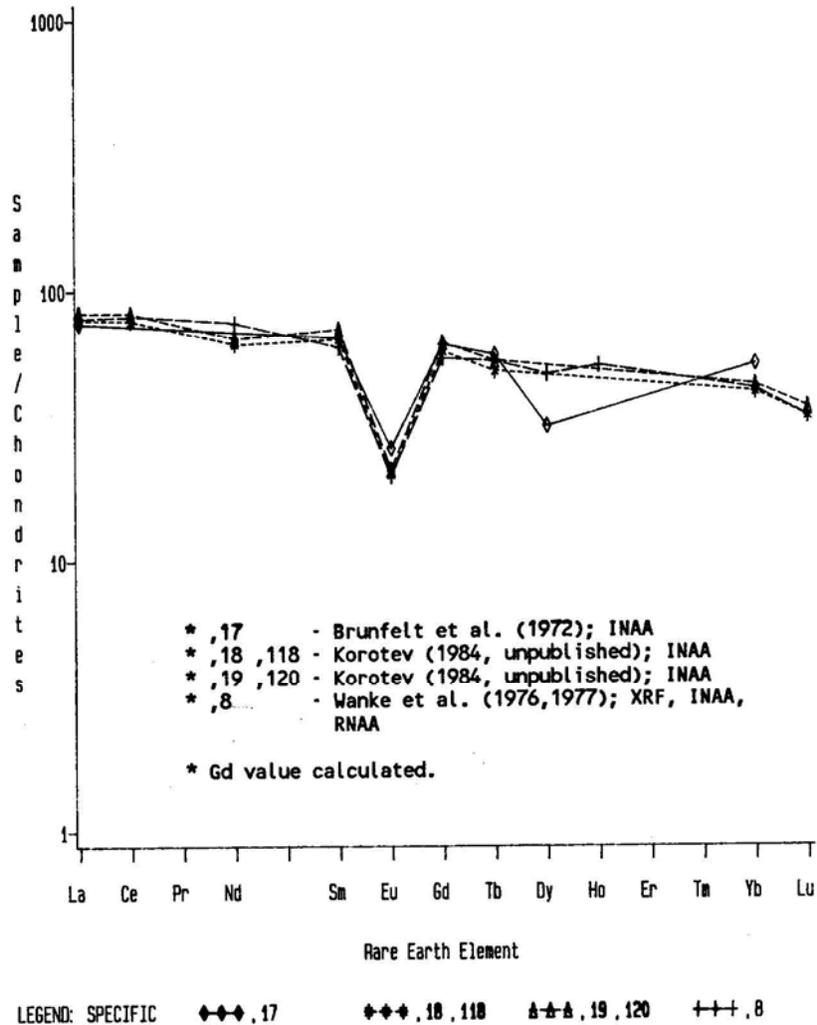


Figure 4. Rare earths in 15245 regolith breccias.