15285 REGOLITH BRECCIA, GLASS-COATED ST. 6 264.2 g

INTRODUCTION: 15285 is a medium dark gray regolith breccia which is partly glass-coated (Fig. 1). Its composition is similar to local soils. It contains a normal complement of regolith breccia constituents and fragments of mare basalt, KREEP basalt, and poikilitic melt clasts in addition to glass and mineral fragments. 15285 was collected (with 15259, 15265 to 15269, and 15286 to 15289) from the crest of an inner bench on the northeast wall of the 12 m crater, downslope 15 m from the LRV. Like several other samples, it was lying very close to 15265-15267 and could have spalled from it, although its composition is not the same. Its orientation is known.

Figure 1. Post-split view of 15285 showing interior matrix and exterior glass coat. S72-15189

PETROLOGY: 15285 is a regolith breccia (Fig. 2). Wentworth and McKay (1984) found it to be compact, with a density of 2.35 g/cc (intrinsic density of 3.11 g/cc), with a calculated porosity of 23.8%. O'Kelley et al. (1972) listed a density of 2.4 g/cc.

The matrix of 15285 is fairly dark and has a vague foliation. Glass exists as spheres and shards which are mainly colorless or devitrified to brown, with some yellow and very rare red/orange shards. Lithic clasts include mare basalts, KREEP basalts, and various

highlands breccias. One fragment is a high-Ti mare basalt, apparently unique in Apollo 15 breccias. Mineral clasts include some which are heavily shocked. The glass coat is gray, and very vesicular, and has tiny vesicles along its sharp contact with the breccia.

Engelhardt et al. (1972, 1973) described 15285 as a regolith breccia with a mafic/plagioclase ratio of 1.2, and noted that its matrix was fragmental and perhaps partly glassy. They mentioned ophitic and intersertal basalts, and "Apennine Mountain" fragments (plagioclase-rich breccias). Lovering and Wark (1973) depicted an Apollo 15 KREEP basalt ("KREEP-rich non-mare basalt") in one thin section. Reid et al. (1977) noted that 15285 contained poikilitic clasts, and was one of only two Apollo 15 breccias they studied which contained such material. They also depicted an Apollo 15 KREEP basalt clast and gave brief mineral data for it. Sewell et al. (1974) presented defocussed beam analyses of several clasts with a range of compositions, and also presented a variety of glass analyses. This data was used in the summary petrology of Gleadow et al. (1974) without specific reference.

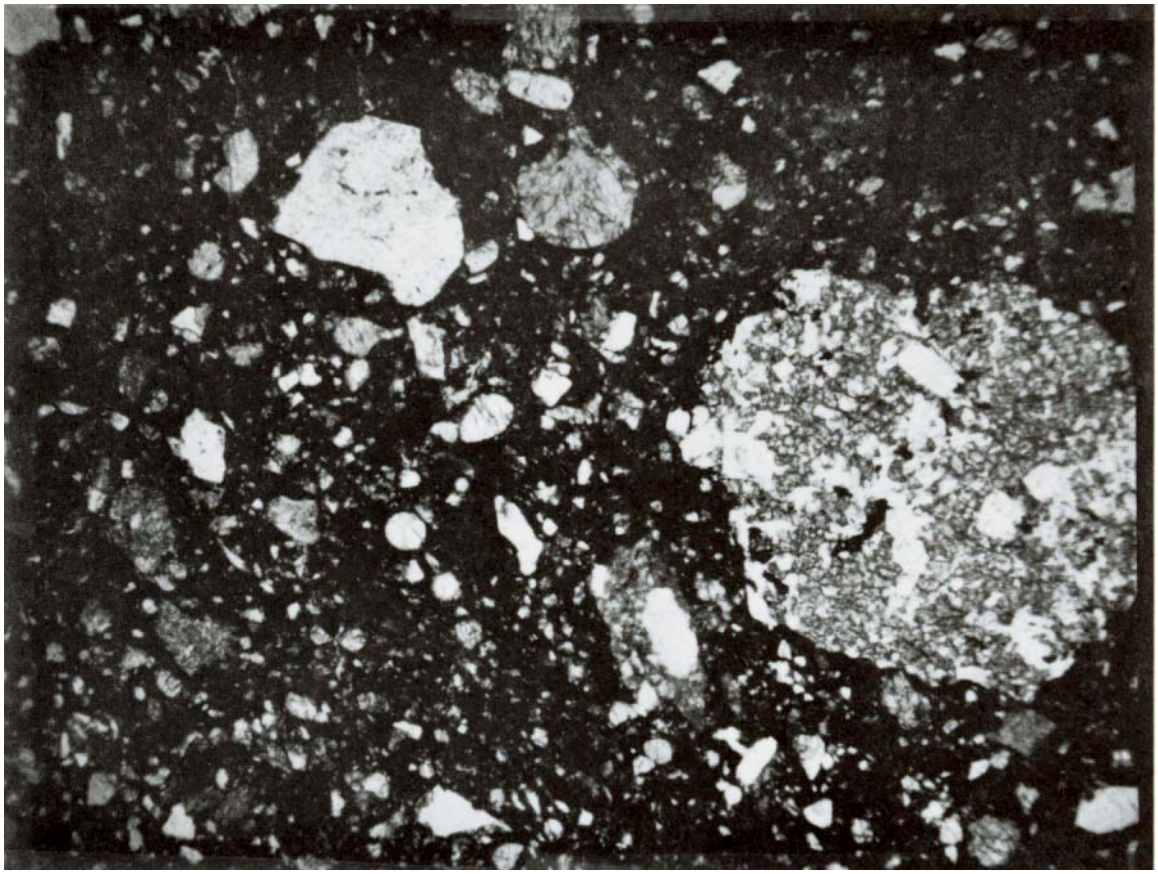

Figure 2. Photomicrograph of 15285,57.
Width about 2 mm. Transmitted light.
Large clast is a poikilitic impact melt.

CHEMISTRY: Chemical analyses for 15285 breccia are listed in Table 1 and rare earths are shown in Figure 3. The authors presented little specific discussion. The compositions are similar to each other and to local soils, although the "total" analysis by S.R. Taylor et al. (1973) has higher iron and slightly lower alumina than either other analyses or the local soil. The two rare earths determined by Christian et al. (1973) appear anomalous. S.R. Taylor (1973) and S.R. Taylor et al. (1972) plotted the analysis as a 30% highland basalt (HB) and 70% low-K Fra Mauro (LKFM) mixture; S.R. Taylor et al. (1973) changed these figures to 11.8% HB and 88.2% LKFM for their "total" analysis and 9.7% HB and 90.3% LKFM for their "black" analysis. Gros et al. (1976) referred to 15285 as a "misclassified soil breccia" for some unknown reason.

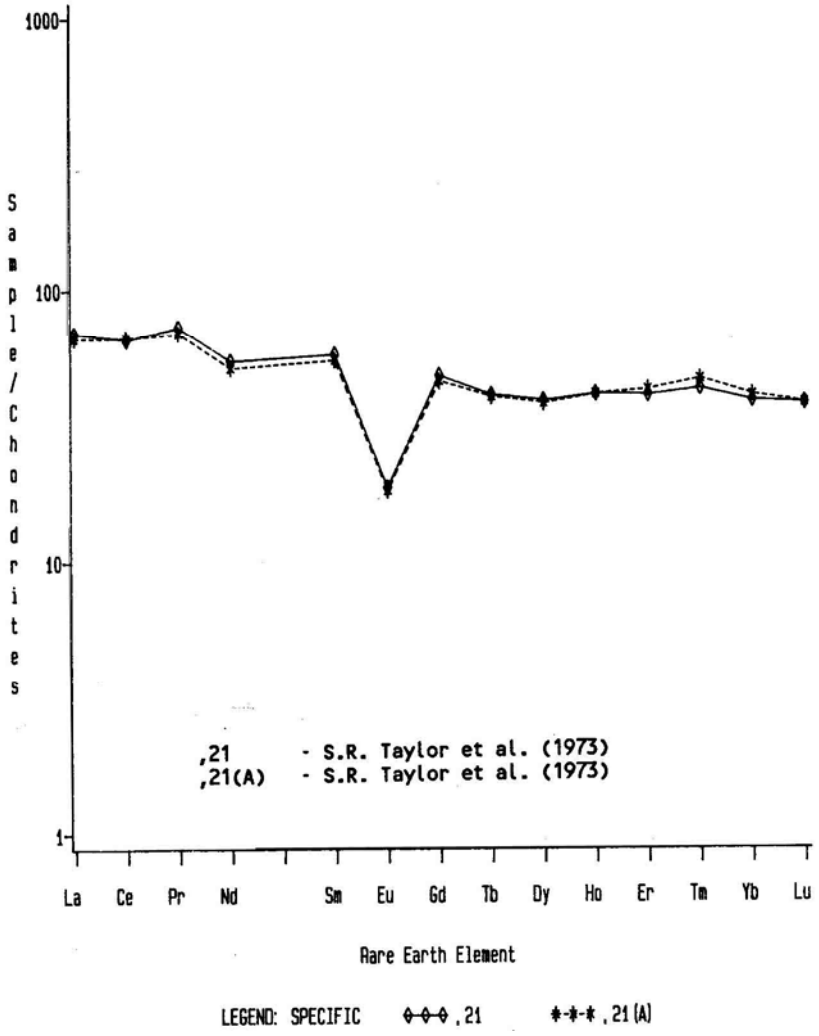

Figure 3. Rare earths in 15285 matrix.

EXPOSURE: O'Kelley et al. (1972a,b,c) and Eldridge et al. (1972) presented disintegration count data for radionuclides, without discussion. Yokoyama et al. (1974) used the ^{22}Na-^{26}Al method to determine that ^{26}Al activity was unsaturated, hence the surface residence time has been less than about 1 m.y. Bhattacharya (1976) included 15285 in a track study, but presented little specific data.

PROCESSING AND SUBDIVISIONS: Pieces were chipped from several parts of 15285 (e.g., Figs. 1, 4). ,1 (not shown) produced thin sections ,6 to ,15 which are of interior breccia. ,16 produced thin section ,43. ,25 produced thin sections ,31 and ,32, also interior breccia. ,54 produced thin sections ,36 and ,55 to ,59, which are of breccia and glass coat. ,0 is now 221 g and no other split is as large at 7 g.

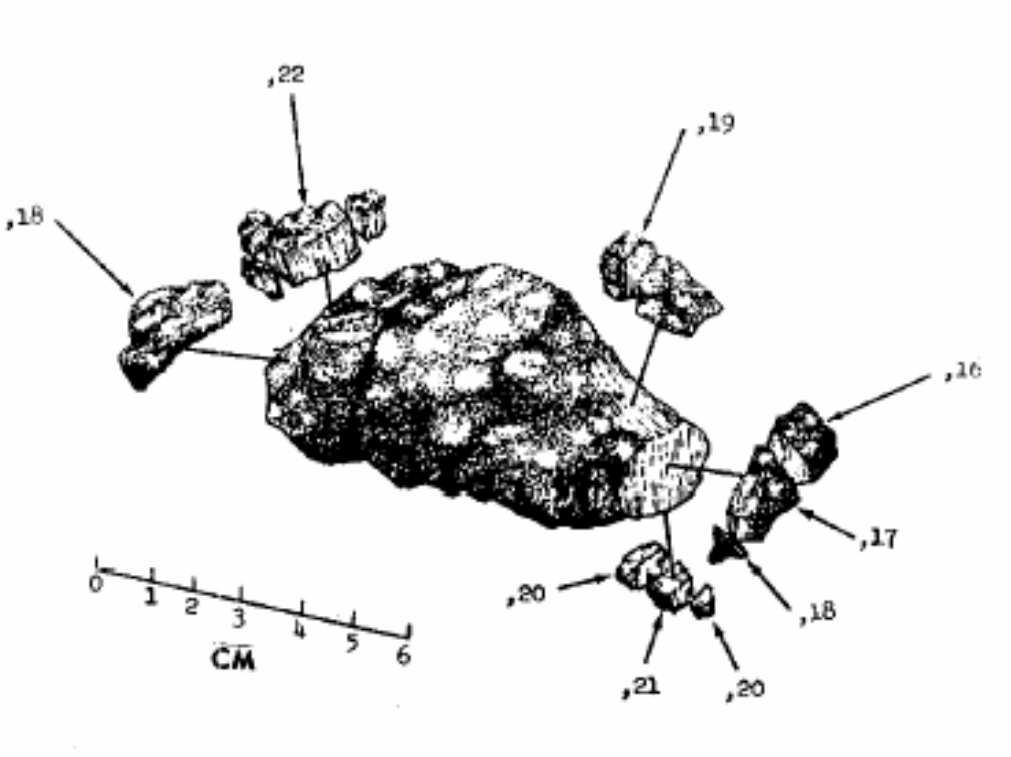

Figure 4. Part of chipping of 15285.

TABLE 15285-1. Chemical analyses of breccia

		.21	,21(a)	,5	,24	,18	,0
Wt %	SiO2	45.6	46.7	45.71			
	TiO2	1.34	1.31	1.56			
	Al2O3	15.2	15.7	16.55			
	FeO	15.0	12.9	12.83			
	MgO	11.6	11.4	11.05			
	CaO	10.3	10.8	10.76			
	Na2O	0.44	0.38	0.46			
	K2O		0.15	0.27			0.192
	P2O5			0.26			
(ppm)	Sc	17.0	19.0	24			
	V	102.0	98.0	68			
	Cr	2600	3100	2054			
	Mn	1300		1400			
	Co	56.0	66.0	36			
	Ni	300	190	180	198		
	Rb	4.1	4.5	4.8	4.77		
	Sr			120			
	Y	80.0	65.0	84			
	Zr	340.0	322.0	390			
	Nb	24.0	23.0	22			
	Hf	6.5	7.7				
	Ba	280	260	270			
	Th	3.5	4.2				3.4
	U	0.81	1.03		0.980		0.93
	Pb	1.7	3.6	2.8			
	La	23.0	22.0	15			
	Ce	58.0	59.0				
	Pr	8.2	7.8				
	Nd	33.0	31.0				
	Sm	10.5	10.0				
	Eu	1.3	1.27				
	Gd	12.0	11.4				
	Tb	1.93	1.9				
	Dy	12.4	12.1				
	Ho	2.9	2.9				
	Er	8.2	8.6				
	Tm	1.3	1.4				
	Yb	7.8	8.2	11			
	Lu	1.3	1.3				
	Li			8.0			
	Be			2.6			
	B						
	C						
	N						
	S					1170	
	F						
	Cl						
	Br				0.121		
	Cu	9.2	11.2	8.8			
	Zn			18	22.4		
(ppb)	I						
	At						
	Ga	3600	4500	4200			
	Ge				391		
	As						
	Se				220	290	
	Mo						
	Tc						
	Ru						
	Rh						
	Pd				6.8		
	Ag				7.62	9.9	
	Cd				57.0		
	In				3.94		
	Sn	270	290				
	Sb				1.39		
	Te				12.1		
	Cs	150	190		234		
	Ta						
	W	80	300				
	Re				0.480	0.49	
	Os				6.69	6.5	
	Ir				5.18	6.7	
	Pt						
	Au				2.25	3.1	
	Hg						
	Tl				3.2	2.3	
	Bi				0.78	0.60	
		(1)	(1)	(2)	(3)	(4)	(5)

References and methods:

(1) S.R. Taylor et al. (1973); electron probe, spark source mass spectrography, emission spec.
(2) Christian et al. (1976); XRF, semi-micro, emission spectrographic
(3) Gros et al. (1976); RNAA
(4) Hughes et al. (1973); RNAA
(5) O'Kelley et al. (1972a,b,c); gamma ray spectroscopy

Notes:

(a) listed as "black"