15027 REGOLITH BRECCIA/VESICULAR GLASS ST. LM 51.0 g

INTRODUCTION: 15027 is varied, from a vesicular glass phase to a glassy regolith breccia (Fig. 1). At least the glass phase is considerably enriched in rare-earths over local regolith compositions. Macroscopically, the boundary between glass and breccia is not distinct. The vesicles are up to 4 mm across. The sample is medium gray, blocky to angular, and tough. One prominent clast is a basalt of unknown type visible on the "S" face (Fig. 1). 15027 has many zap pits on one side, few on others.

15027 was collected and bagged with 15017 to 15019, and 15028; all were lying in a subdued l-m crater 4 m south of the LM + Z footpad. Its sampling was documented and its orientation known.

PETROLOGY: Thin sections represent two pieces chipped from different places, and show a brown, glassy, fairly dense regolith breccia (Fig. 2) which is faintly foliated in places. It contains many glass fragments and spheres, many of which are devitrified, especially around their margins. Clasts are mainly mineral, glass, and small basaltic fragments. The vesicular glass portion is brown and clast-poor, and the transition from glass to breccia is fairly rapid and distinct, suggesting a separate identity.

Figure 1. Pre-chip view of 15027. S-71-43635

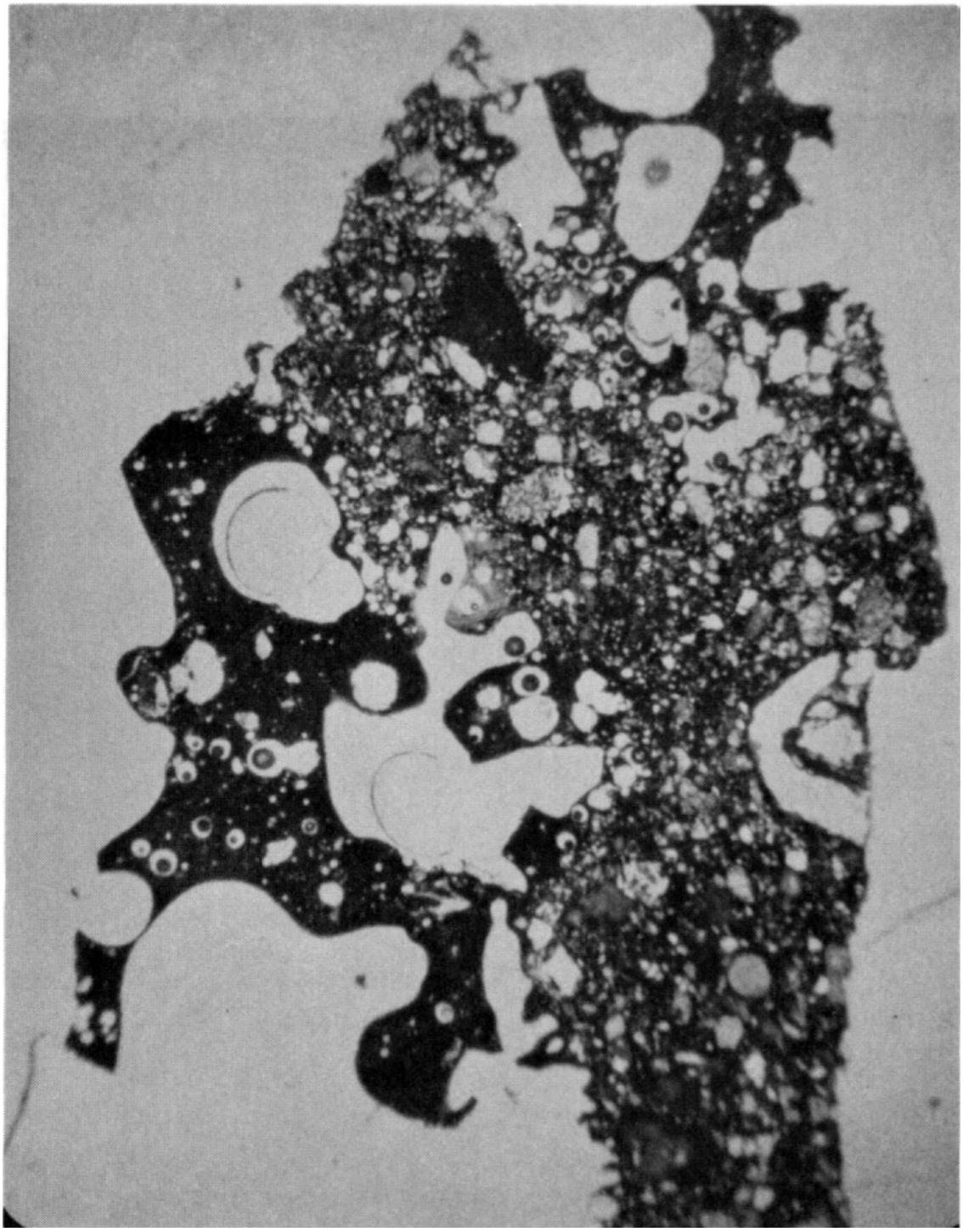

Figure 2. Photomicrograph of 15027,6.
Width about 2 mm. Transmitted light.
View shows both vesicular glass and glassy breccia.

CHEMISTRY: The chemical analysis (Table 1, Fig. 3) is of the vesicular glass, according to data pack photographs of the allocated material, which was vesicular. Although its major elements are fairly similar to local regolith, the incompatible elements are enriched almost two-fold, and the chemistry is very similar to 15028, collected close by. TiO_2 and especially SiO_2 are also enriched compared with local regolith. The sum of major elements (Wanke et al., 1977) is slightly more than 100% but the high SiO_2 appears to be real.

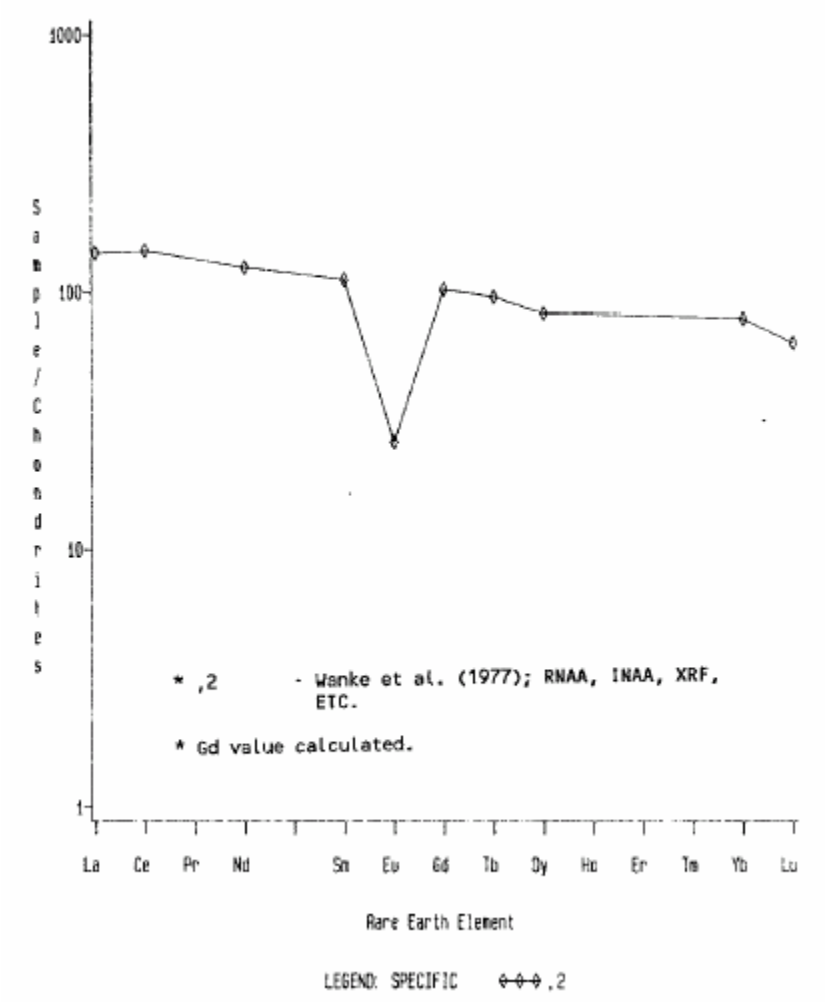

Figure 3. Rare earths in vesicular glass (Wanke et al., 1977).

TABLE 15027-1. Chemical analysis of vesicular glass in 15027.

		,2
Wt %	SiO2	49.35
	TiO2	1.89
	Al2O3	13.78
	FeO	14.23
	MgO	9.19
	CaO	10.44
	Na2O	0.601
	K2O	0.422
	P2O5	0.394
(ppm)	Sc	30.8
	V	97.9
	Cr	2620
	Mn	1500
	Co	38.9
	Ni	180
	Rb	
	Sr	145
	Y	158
	Zr	662
	Nb	47
	Hf	17.0
	Ba	515
	Th	7.45
	U	2.3
	Pb	
	La	47.3
	Ce	129
	Pr	
	Nd	75
	Sm	20.4
	Eu	1.81
	Gd	
	Tb	4.54
	Dy	26.4
	Ho	
	Er	
	Tm	
	Yb	15.7
	Lu	2.17
	Li	
	Be	
	B	
	C	
	N	
	S	1040
	F	
	Cl	
	Br	
	Cu	
	Zn	
(ppb)	I	
	At	
	Ga	
	Ge	
	As	
	Se	
	Mo	
	Tc	
	Ru	
	Rh	
	Pd	
	Ag	
	Cd	
	In	
	Sn	
	Sb	
	Te	
	Cs	
	Ta	2050
	W	
	Re	
	Os	
	Ir	3
	Pt	
	Au	
	Hg	
	Tl	
	Bi	
		(1)

References and methods:

(1) Wanke et al. (1977); RNAA, INAA, XRF, etc.

PROCESSING AND SUBDIVISIONS: Two small chips from separate places were combined to make ,1 (Fig. 4), from which thin sections ,6 and ,7 were made. One of the chips was included to sample the prominent basaltic clast (labeled A), but the clast does not appear in either thin section. A large piece broken off during processing (Fig. 4) was not given a daughter number but combined with ,0. Subsequently a further chipping produced ,2, which appears to be dominantly vesicular glass, for the chemical analysis. ,0 is now 48.64 g.

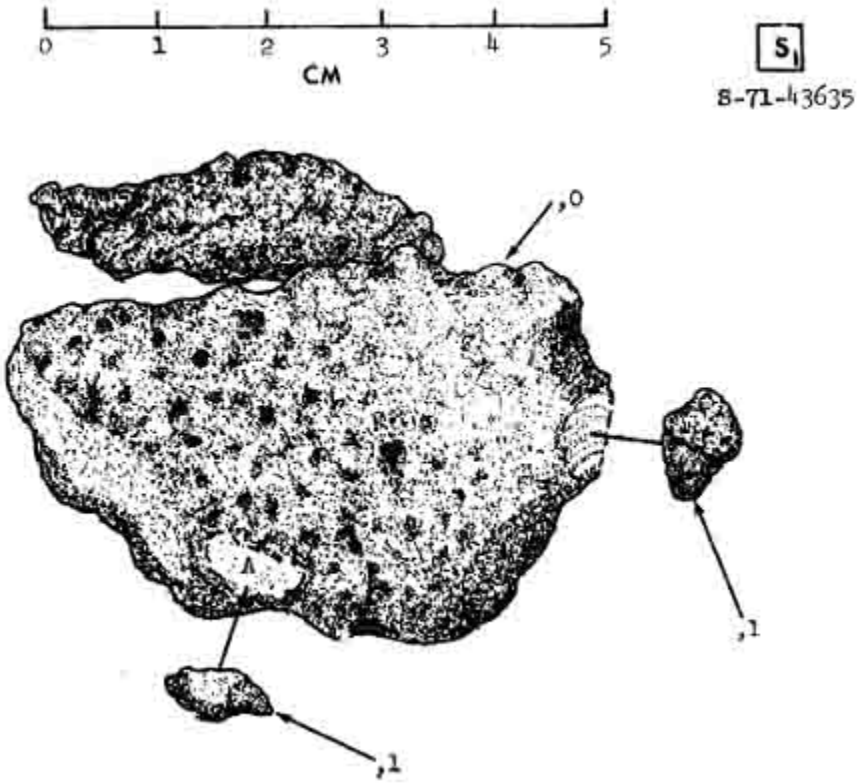

Figure 4. Original chipping of 15027.