15688 AGGLUTINITIC GLASS ST. 9A 5.30 g

INTRODUCTION: 15688 is a vesicular agglutinitic glass containing small fragments which are dominantly mare basalts (Fig. 1). In chemistry it is similar to an Apollo 15 mare basalt. 15688 was collected as part of the rake sample from Station 9A.

PETROLOGY: Dowty et al. (1973b) described the sample as a monomict microbreccia consisting of mare basalt. It is a dark vesicular glass containing clasts of mare basalt,

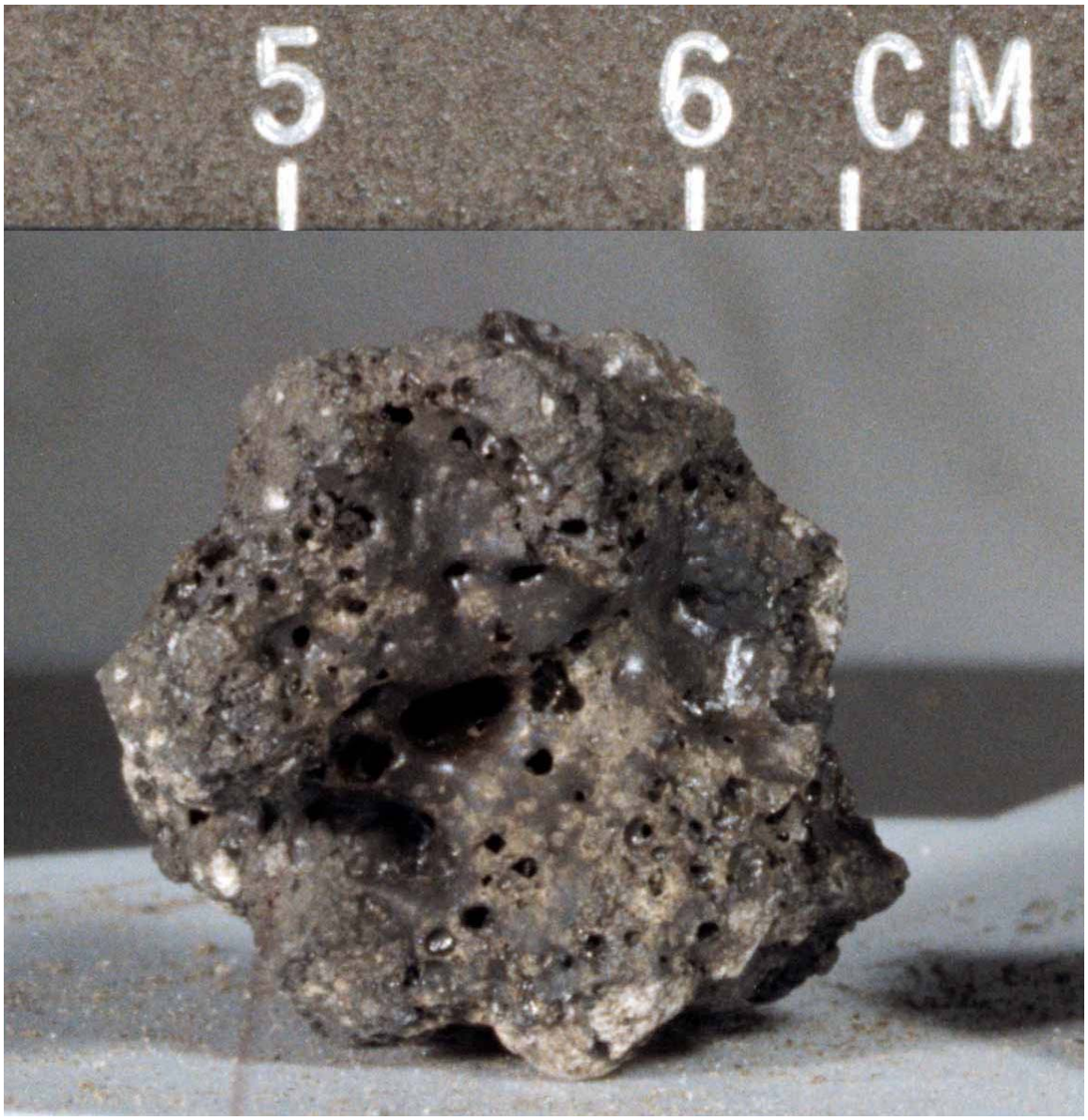

Fig. 1a

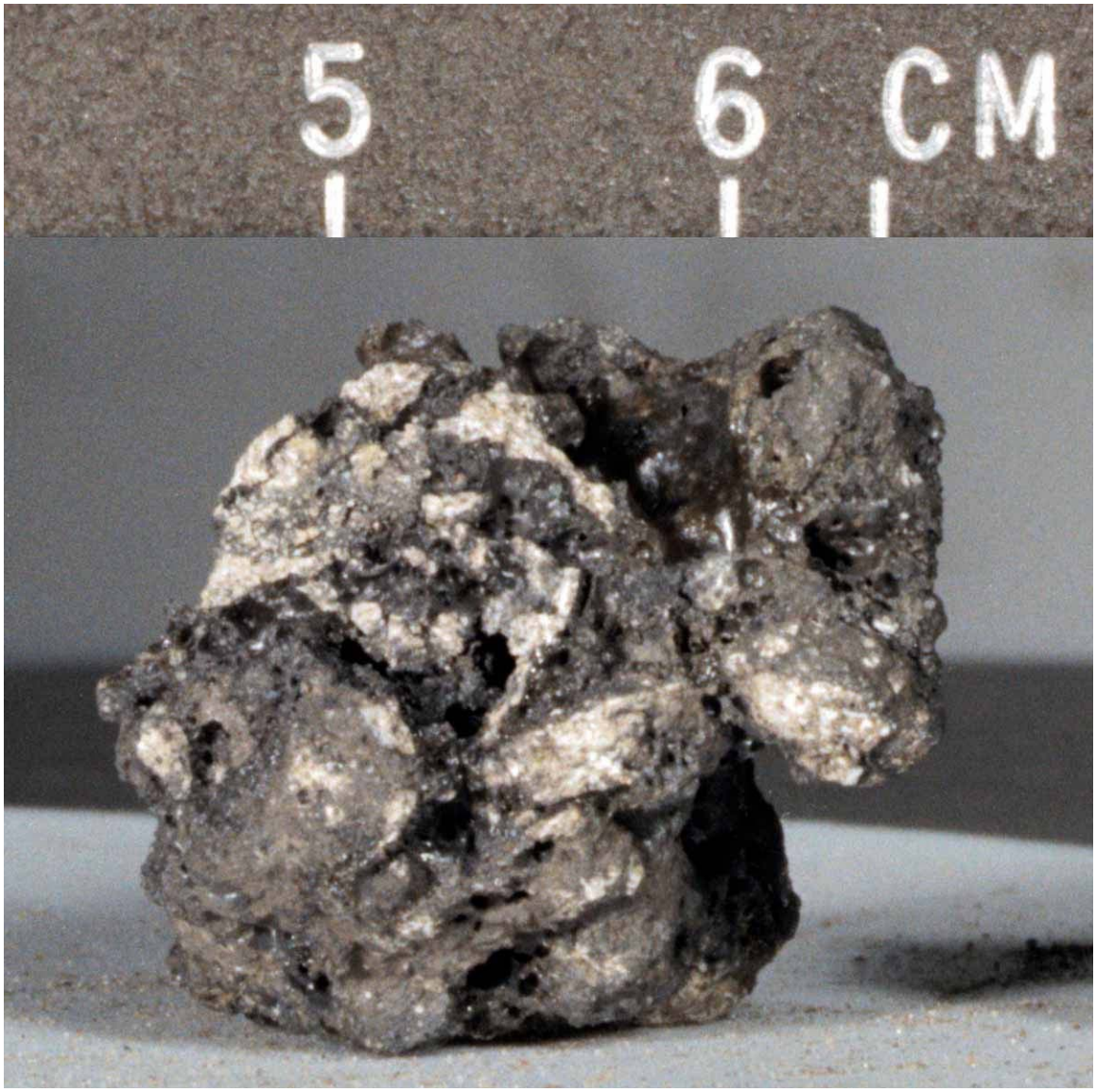

Fig. 1b

Figure 1. Pre-split views of 15688. a) S-71-49841; b) S-71-49842.

perhaps of the olivine-phyric type, and very few, if any, clasts of other types. McKay and Wentworth (1983) found it to be compact with a high fracture porosity, rare agglutinates and spheres, and abundant shock features. McKay et al. (1984) and Korotev (1984 unpublished) reported I_s/FeO of 0 (for ,13), i.e., totally immature. However, the measurement was probably made on a basalt fragment.

CHEMISTRY: Two analyses are listed in Table 1, with the rare earths shown in Figure 2. Helmke et al. (1973) considered 15688 to be a basalt; their analysis showed 3% normative olivine but they tentatively identified it with the quartz-normative basalt group. It is not clear what they analyzed, but it is clearly only barely if at all contaminated with

KREEP and may well be a basalt clast. Helmke and Haskin (1972) reported the same data but with Hf as 7 ppm (erroneous), Cr as 4200 ppm, and Zn as less than 5 ppm (they also erroneously labeled the sample 15668,2 instead of 15688,2 in one table). The analysis of Korotev (1984 unpublished) was, from data pack information, clearly made on basalt, not glassy fragments. The data are not clearly equitable with either an olivine-normative or a quartz-normative mare basalt; FeO and MgO suggest olivine-normative, whereas TiO_2 and SiO_2 (by difference) suggest quartz-normative.

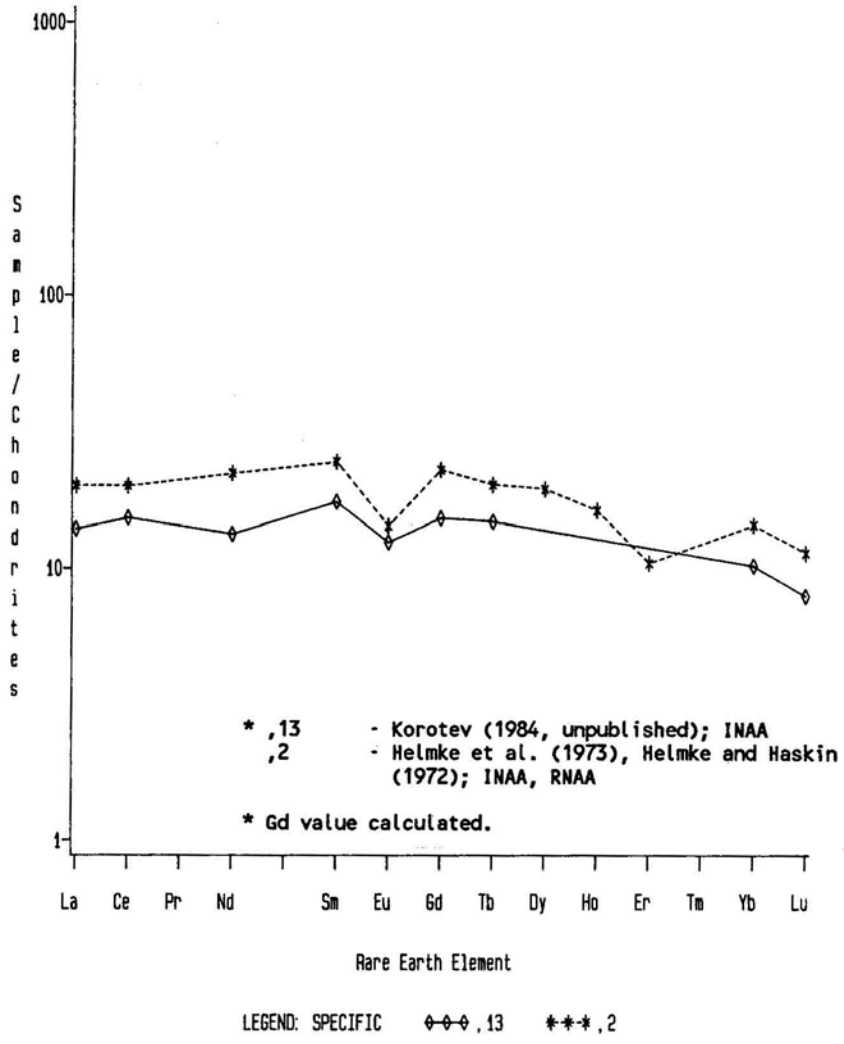

Figure 2. Rare earths on 15688 materials.

PROCESSING AND SUBDIVISIONS: 15688 was sawn to produce ,1; a small piece ,2 was also removed at the same time. ,1 was potted and partly used to make thin sections ,7 through ,10, all of which are dominantly bubbly agglutinitic glass. ,2 was used for chemical analysis. In 1983 interior matrix chips were removed (,13) leaving a mixed set of glass and basalt chips (,14). In data records, ,13 appears to be entirely mare basalt chips, accounting for the low I_s/FeO measured. ,0 is now 3.56 g.

TABLE 15688-1. Chemical analyses of 15688 materials

		,2	,13
Wt %	SiO2	47.7	
	TiO2	2.34	2.08
	Al2O3	9.93	8.4
	FeO	20.8	22.7
	MgO	9.92	10.4
	CaO	9.93	8.8
	Na2O	0.344	0.265
	K2O	0.074	
	P2O5		
(ppm)	Sc	39.5	42.6
	V		180
	Cr	4160	4050
	Mn	2080	2140
	Co	54	54.6
	Ni		63
	Rb	1.3	
	Sr		70
	Y		
	Zr		70
	Nb		
	Hf	2.8	2.45
	Ba		47
	Th		0.24
	U		<0.2
	Pb		
	La	6.62	4.61
	Ce	17.6	13.5
	Pr		
	Nd	13.3	8
	Sm	4.45	3.17
	Eu	0.99	0.86
	Gd	5.7	
	Tb	0.95	0.70
	Dy	6.2	
	Ho	1.14	
	Er	2.1	
	Tm		
	Yb	2.90	2.05
	Lu	0.394	0.272
	Li		
	Be		
	B		
	C		
	N		
	S		
	F		
	Cl		
	Br		
	Cu		
	Zn	5(a)	
(ppb)	I		
	At		
	Ga	3700	
	Ge		
	As		
	Se		
	Mo		
	Tc		
	Ru		
	Rh		
	Pd		
	Ag		
	Cd		
	In		
	Sn		
	Sb		
	Te		
	Cs	47	60
	Ta		420
	W		
	Re		
	Os		
	Ir		<2
	Pt		
	Au		<4
	Hg		
	Tl		
	Bi		
		(1)	(2)

References and methods:

(1) Helmke et al. (1973), Helmke and Haskin (1972); INAA, RNAA, AAS.
(2) Korotev (1984 unpulished); INAA.

Notes:

(a) ± 2 ppm