74235

Vitrophric Basalt

59 grams

Figure 1: Photo of 74235. Cube is 1 cm. S73-16017

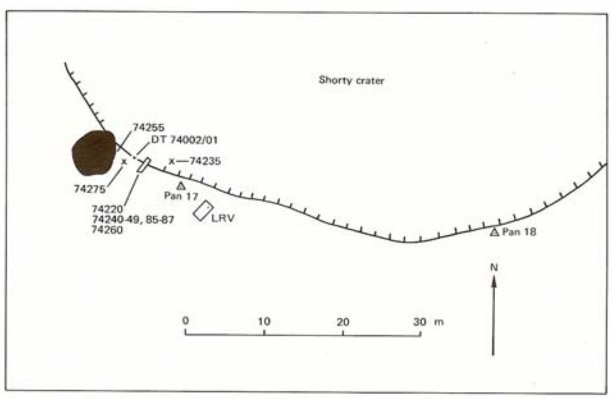


Figure 2: Map of station 4, Apollo 17.

Introduction

This sample was picked up from the lunar surface at the location of the trench on the rim Shorty Crater (see transcript in section 74240). It was originally thought to be a big piece of glass and was stowed in the astronauts pocket, then transferred to a bag in the LM after the EVA, where is was found to actually be a piece of fine-grained or aphanitic basalt. During PET it was described as having a metallic sheen (figure 1). Some of the wall of 74235 are defined by very large vesicles (3 cm dia.?).

74235 has an exposure age (175 m.y.), which is much longer than the age of Shorty Crater (~19 m.y.).

Petrography

74235 is described in the catalogs by Butler (1973) and Neal and Taylor (1993). Brown et al. (1975) classified it as type 1a (high-Ti) and gave a mineral mode. Thin blades of ilmenite and skeletal phenocrysts of olivine and pyroxene are scattered throughout a matrix of glass and feathery minerals. The sample represents a rapidly quenched volcanic liquid.

Usselman et al. (1975) determined the cooling rate of 150-250 deg./hr. for 74235 by dynamic experiments.

Transcript

(while the LMP was discussing the core with CC, the CDR made a discovery)

CMP What is that right there?

LMP Oh, it's a piece of glass, probably.

CDR Boy, it sure is. I've got a little piece of glass in my pocket (12E).

CDR There was this little piece of black glass – solid black glass.

Chemistry
Rose et al. (1975), Rhodes et al. (1976), Shih et al. (1975) and Neal (2001) have reported chemical analyses of 74235 (table 1, figures 4, 5, and 6). It is a type A magma.

Gibson et al. (1976) reported 2030 ppm S.

Radiogenic age dating
Apollo 17 mare basalts are generally considered 3.72 ± 0.04 b.y. old (see Paces et al. 1991).

Cosmogenic isotopes and exposure ages
Eugster et al. (1977) determined the exposure age of 74235 as 175 ± 25 m.y. by the ^{81}Kr method. Eberhardt et al. (1975) reported 180 m.y.

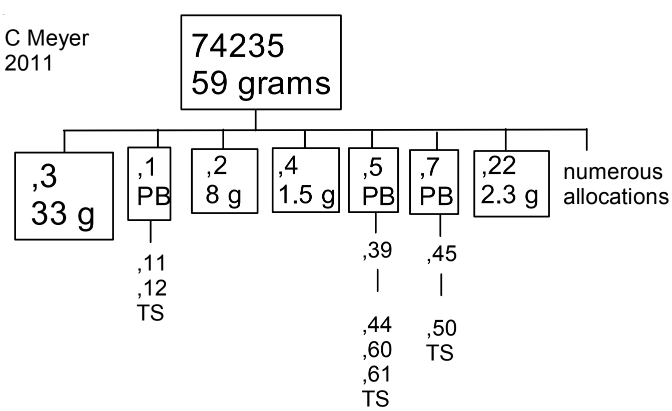
Other Studies
The rare gas content and isotopic ratios were determined by Eugster et al. (1977).

O'Hara and Humphries (1975) studied the early crystallization of armalcolite.

Nyquist et al. (1975) determined the Rb, Sr and $Sr^{87/86}$.

Nunes et al. (1974) determined U, Th and Pb isotopes.

Processing
There are 16 thin sections of 74235.



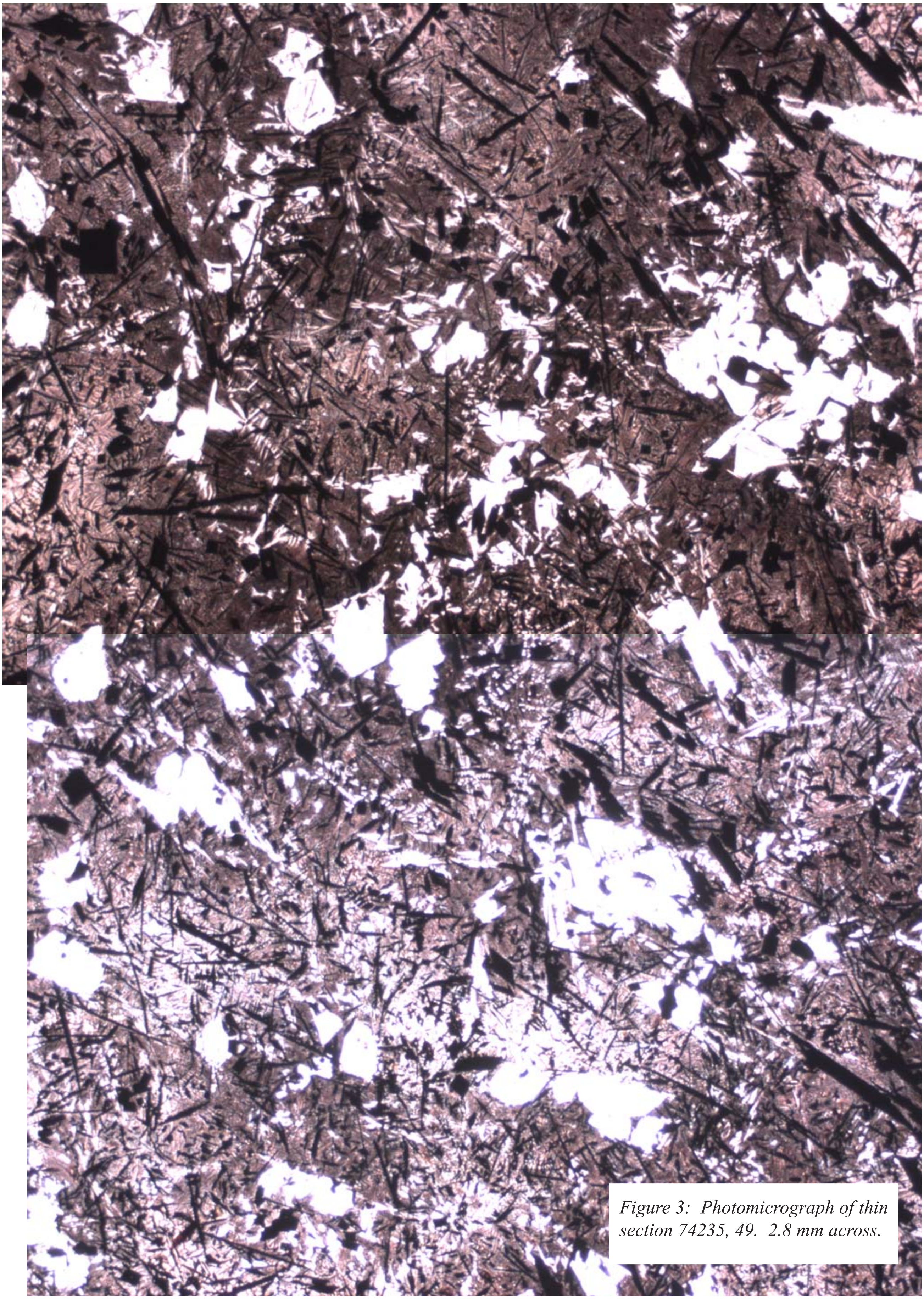


Figure 3: Photomicrograph of thin section 74235, 49. 2.8 mm across.

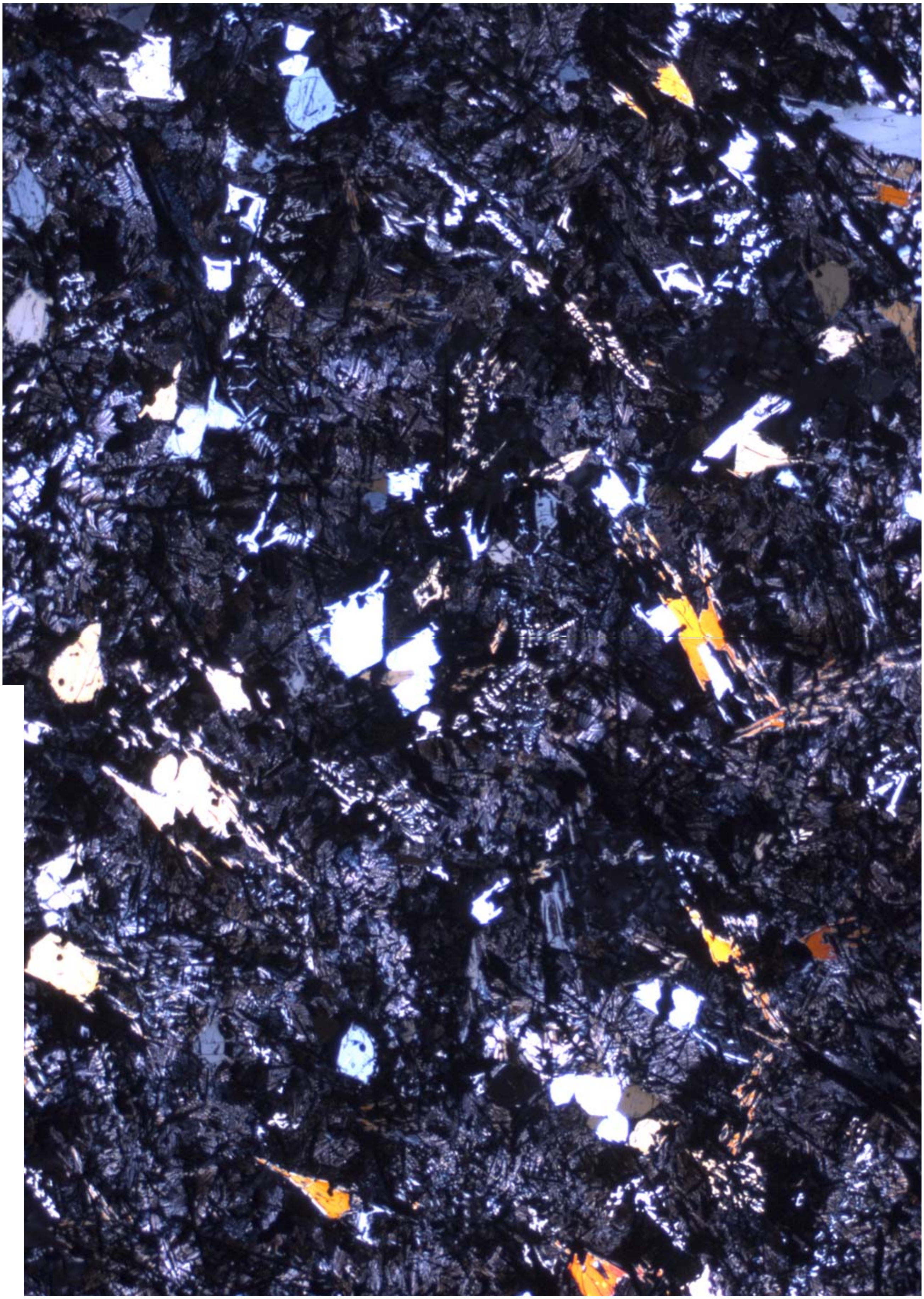


Table 1. Chemical composition of 74235.

reference	Rhodes76		Neal2001		Shih75 Wiesmann76		Rose75	
weight								
SiO2 %	38.62	(a)					39.42	(d)
TiO2	12.17	(a)					12.39	(d)
Al2O3	8.61	(a)					9.21	(d)
FeO	19.32	(a)					18.55	(d)
MnO	0.28	(a)					0.27	(d)
MgO	8.35	(a)					8.67	(d)
CaO	10.7	(a)					10.85	(d)
Na2O	0.4	(a)					0.37	(d)
K2O	0.07	(a)			0.067	(c)	0.08	(d)
P2O5	0.05	(a)					0.05	(d)
S %	0.15	(a)						
sum								
Sc ppm			85	(b)	81.4	(e)	76	(d)
V			137	(b)			61	(d)
Cr	3490	(a)	2906	(b)			3216	(d)
Co			23	(b)	19	(e)	30	(d)
Ni			2.16	(b)			1	(d)
Cu			49.6	(b)			29	(d)
Zn			106	(b)			3.7	(d)
Ga			3.92	(b)			8.3	(d)
Ge ppb								
As								
Se								
Rb			0.6	(b)	0.612	(c)	1	(d)
Sr			199	(b)	186	(c)	194	(d)
Y			134	(b)			160	(d)
Zr			256	(b)	263	(c)	362	(d)
Nb			27	(b)				
Mo			0.15	(b)				
Ru								
Rh								
Pd ppb								
Ag ppb								
Cd ppb								
In ppb								
Sn ppb								
Sb ppb			20	(b)				
Te ppb								
Cs ppm								
Ba			83	(b)	82.2	(c)	405	(d)
La			6.5	(b)	11.4	(c)		
Ce			25.5	(b)	22.8	(c)		
Pr			4.35	(b)				
Nd			25.9	(b)	25.3	(c)		
Sm			10.7	(b)	10.5	(c)		
Eu			1.95	(b)	2.1	(c)		
Gd			13.9	(b)	16.6	(c)		
Tb			2.82	(b)				
Dy			18.4	(b)	18.8	(c)		
Ho			3.95	(b)				
Er			11.1	(b)	11.1	(c)		
Tm			1.53	(b)				
Yb			11.1	(b)	9.85	(c)	13	(d)
Lu			1.42	(b)				
Hf			8.78	(b)				
Ta			1.79	(b)				
W ppb			80	(b)				
Re ppb								
Os ppb								
Ir ppb								
Pt ppb								
Au ppb								
Th ppm			0.36	(b)				
U ppm			0.1	(b)	0.126	(c)		

technique (a) XRF, (b) ICP-MS, (c) IDMS, (d) microchemical

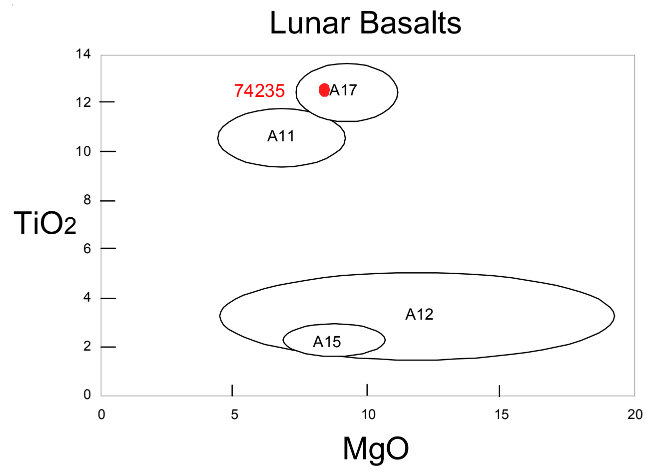


Figure 4: Composition of lunar basalts.

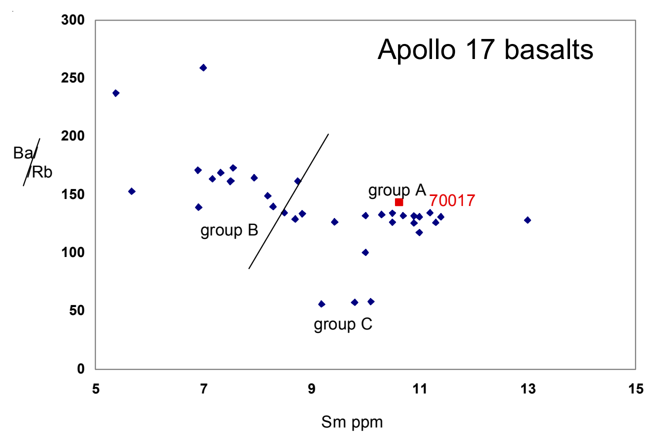


Figure 5: Trace element diagram for Apollo 17 basalts.

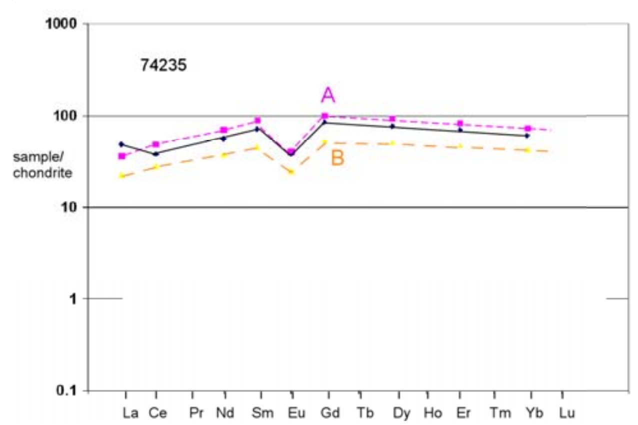


Figure 6: Normalized rare-earth-element diagram for 74235 compared with A and B types of Apollo 17 basalt.

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