71566 – 415.4 grams
71567 – 146 grams
71509 – 1.7 grams
71565 – 24.1 grams
Ilmenite Basalt

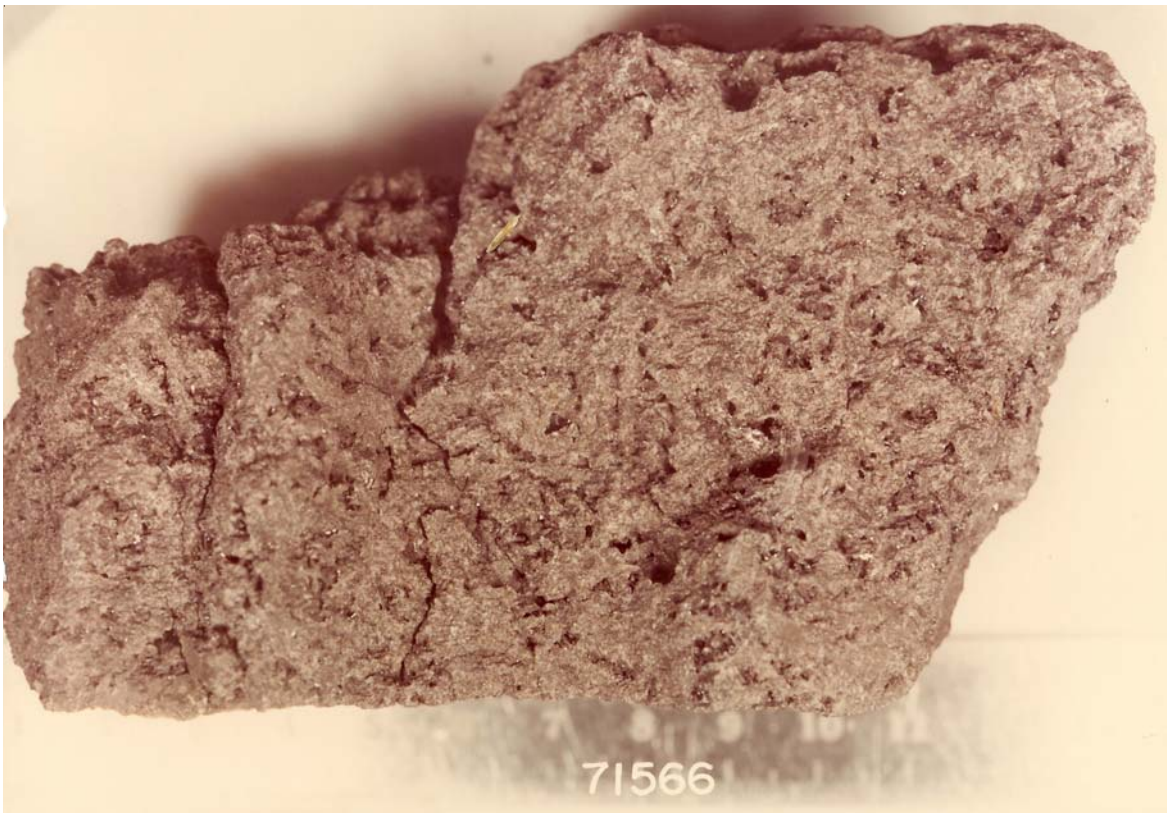

Figure 1: Photo of 71566. Sample is 10 cm long. S73-31330.

Introduction

71566, 71567 and 71565 are coarse-grain, plagioclase-poikilitic ilmenite basalts similar to 71509 (Warner et al. 1978). They have vugs and vesicles and contain aggregates of ilmenite and pyroxene (figures 5 and 6). *(note: also similar to 71556 etc.)*

71525 - 71596 etc. are rake samples collected as part of a comprehensive sample at station 1, taken near Steno Crater, Apollo 17. They include numerous small ilmenite basalts.

Petrography

Plagioclase plates are intergrown with pyroxene. Large pyroxene grains are sector-zoned and enclose ilmenite and resorbed olivine. Pyroxene zoning includes pigeonite (figure 4). Minor minerals include zirconolite, tranquilityite, armalcolite, baddeleyite and blebs if metallic iron with trace Co and Ni (Warner et al. 1976). Large "crinkled" areas of silica can be found in the intersitices (Neal and Taylor 1973).

Armalcolite: Warner et al. (1976) give detailed analyses of armalcolite in three of these samples.

Mineralogical Mode

	71509	71565	71566	71567
Olivine	1.8	0.6	0.6	0.6
Pyroxene	46.8	48.2	48.7	52.3
Plagioclase	32.3	31.8	32	27.4
Opaques	16.8	14.6	15.1	15.6
Silica	1	3.5	2.7	3
Meostasis	1.3	1.3	1.2	1.1

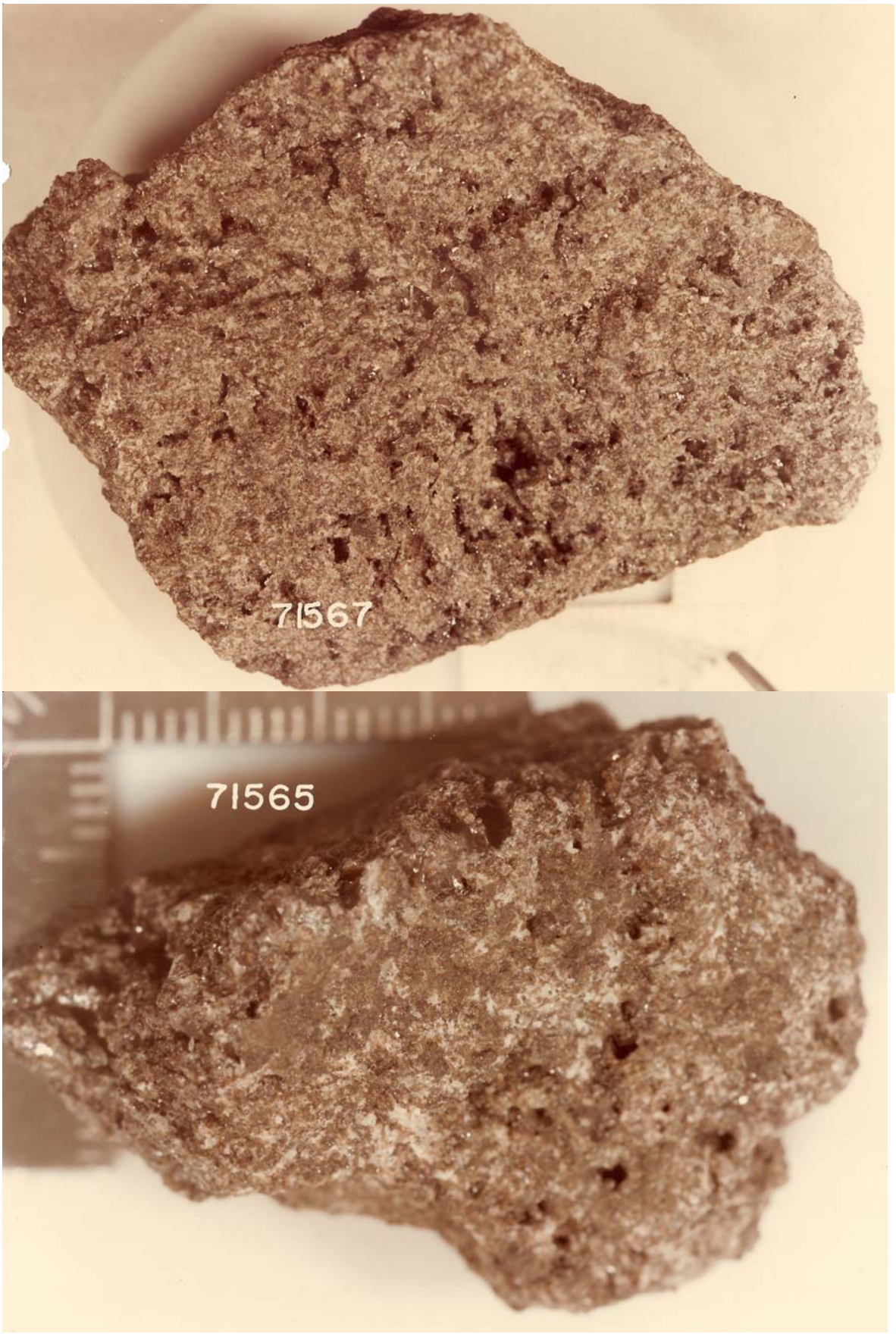

Figure 2: Photos of 71567 and 71565. Samples are about 10 cm and 4 cm across respectively. S73-31346 and S73-33451.

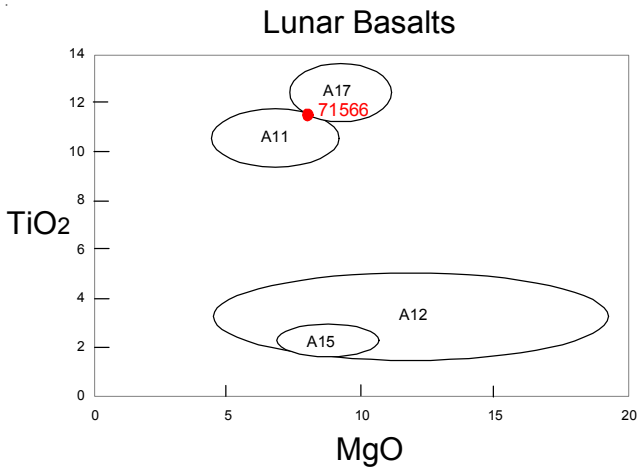

Figure 3: Composition of 71566.

Chemistry

Warner et al. (1975) and Rhodes et al. (1976) analyzed these samples (Tables 1 -3)(figures 3 and 8). Rhodes et al. termed the type U, but Neal and Taylor (1993) classified then as type A, based on trace element content.

Radiogenic age dating

none

Cosmogenic isotopes and exposure ages

O'Kelley et al. (1974) determined the cosmic-ray-induced activity of ^{22}Na = 49 dpm/kg., ^{26}Al = 50 dpm/kg., and ^{54}Mn = 95 dpm/kg. for 71566.

Processing

71566,4 is a display sample at the LodeStar Astronomy Center in Albuquerque, NM.

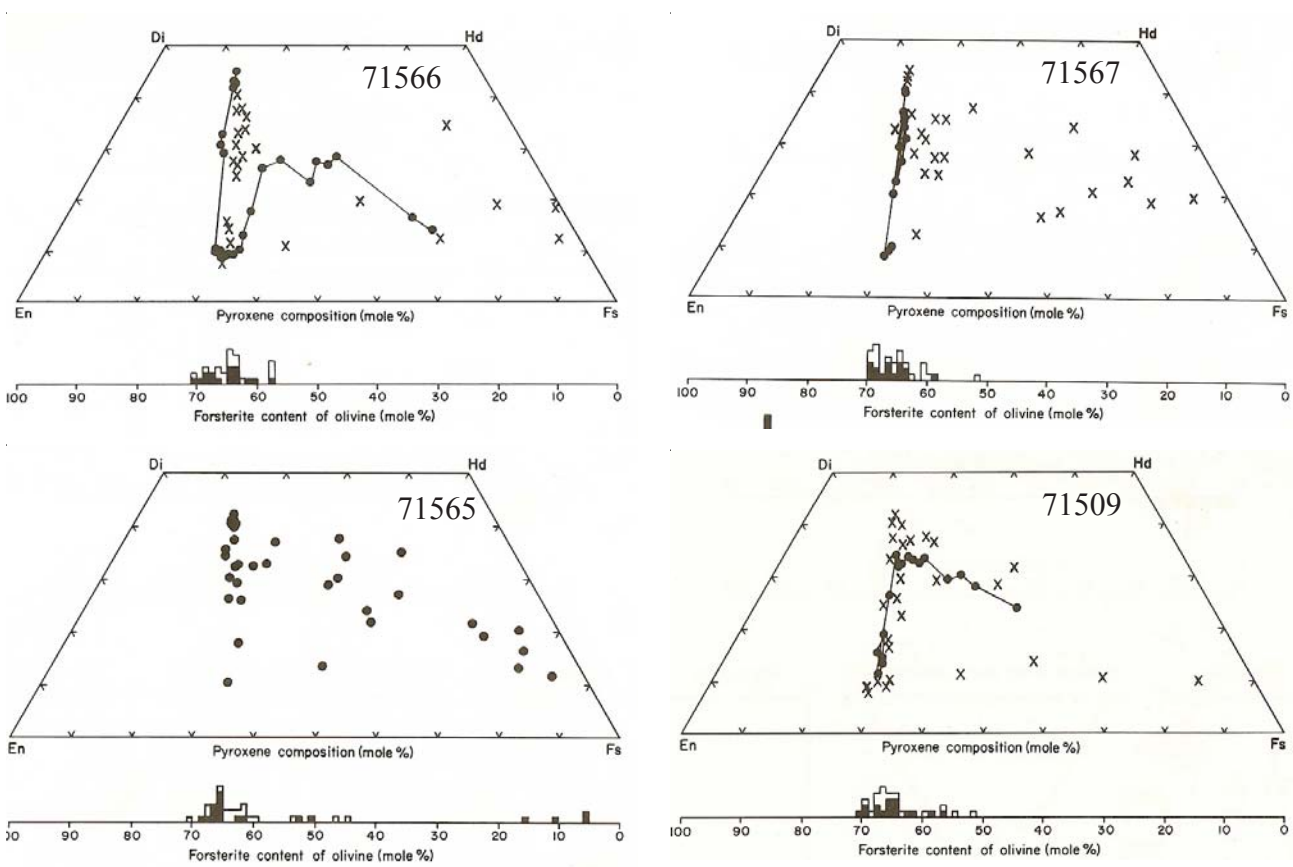

Figure 4: Composition of pyroxene and olivine in 71566 and related samples (Warner et al. 1978).

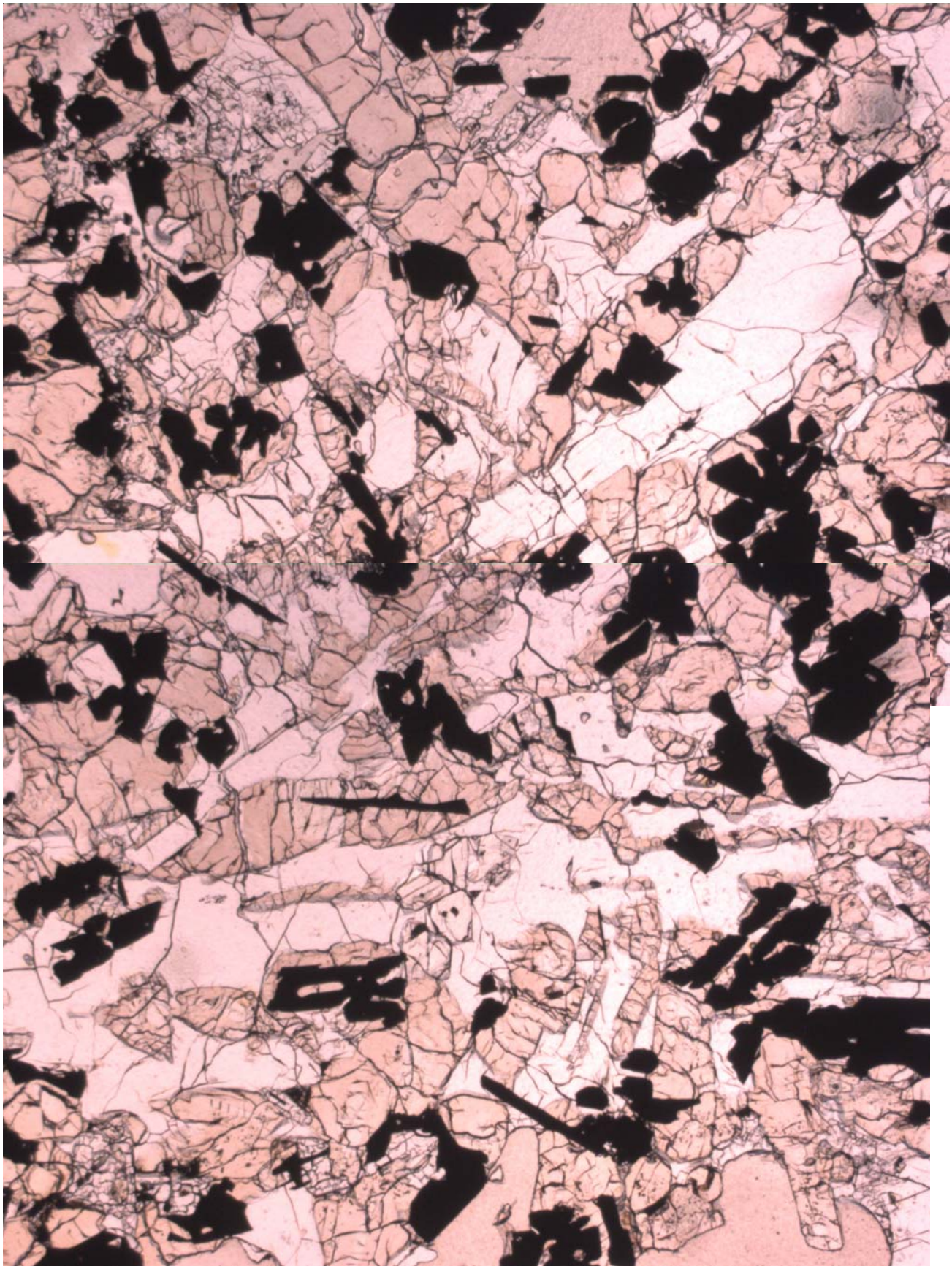

Figure 5a: Photomicrograph of thin section 71566,15. 2.8 mm across.

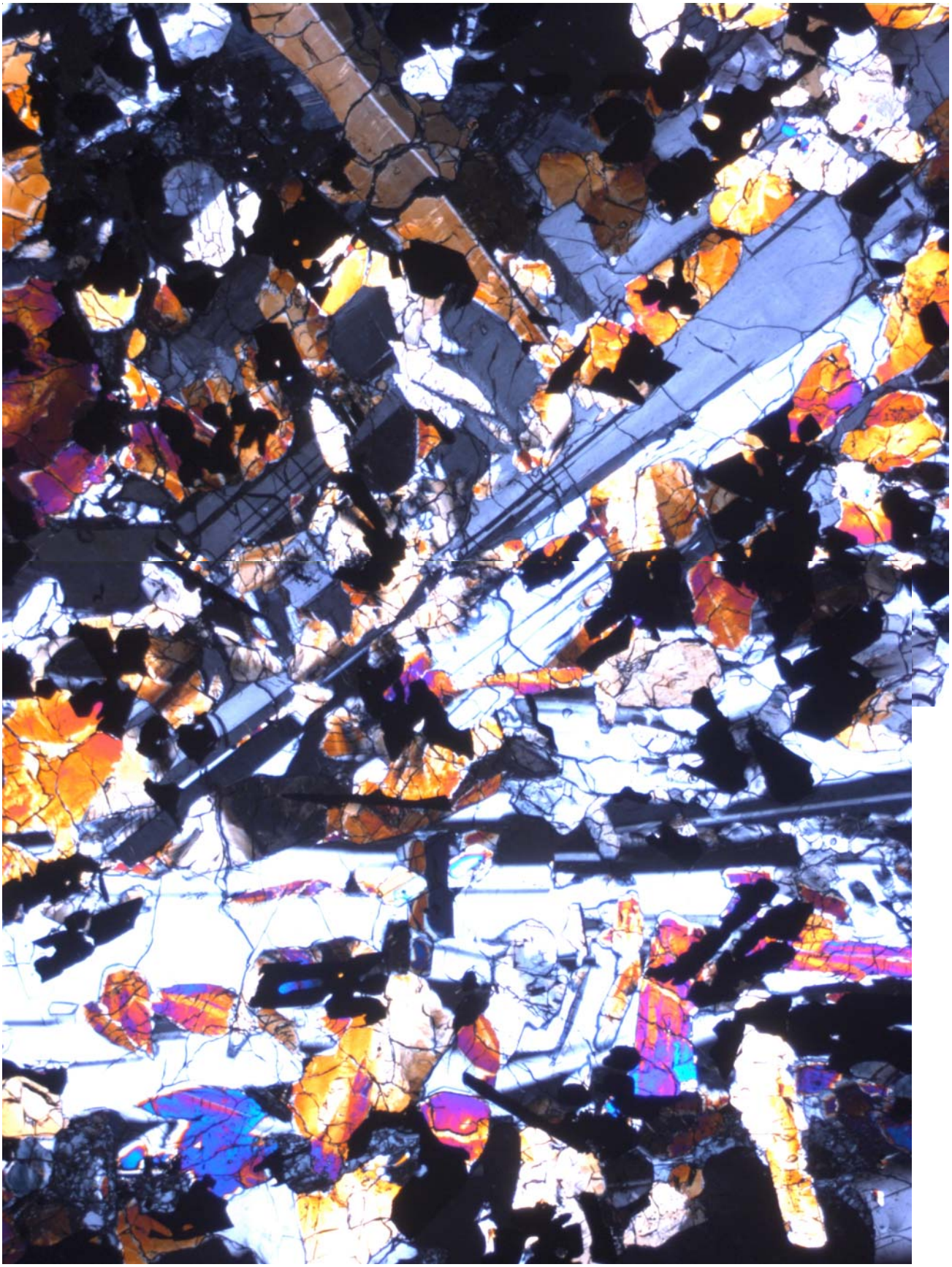

Figure 5b: Photomicrograph of thin section 71566,15. Crossed Nicols. 2.8 mm across.

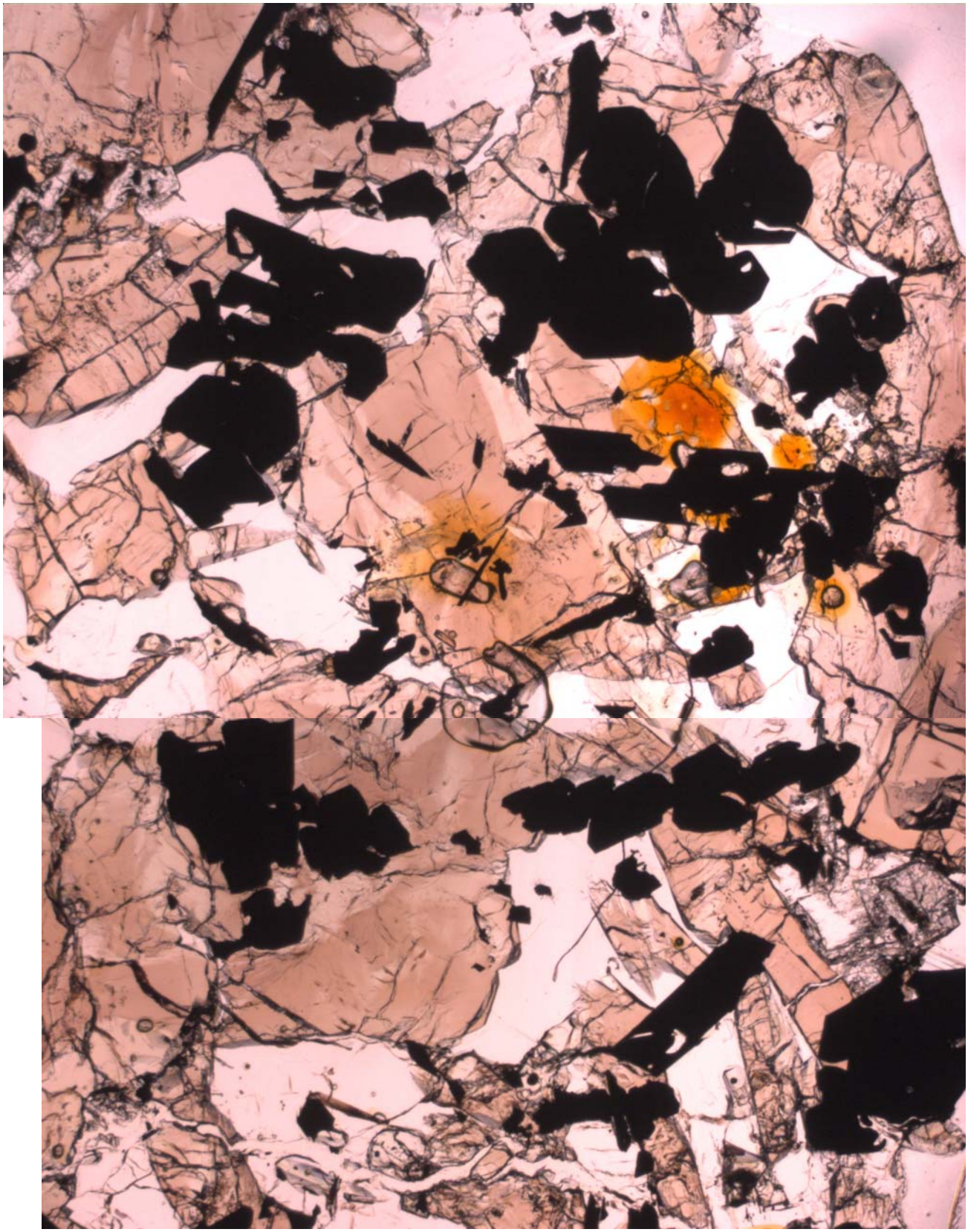

Figure 6a: Photomicrograph of thin section 71567,13. 2.8 mm acrsoss.

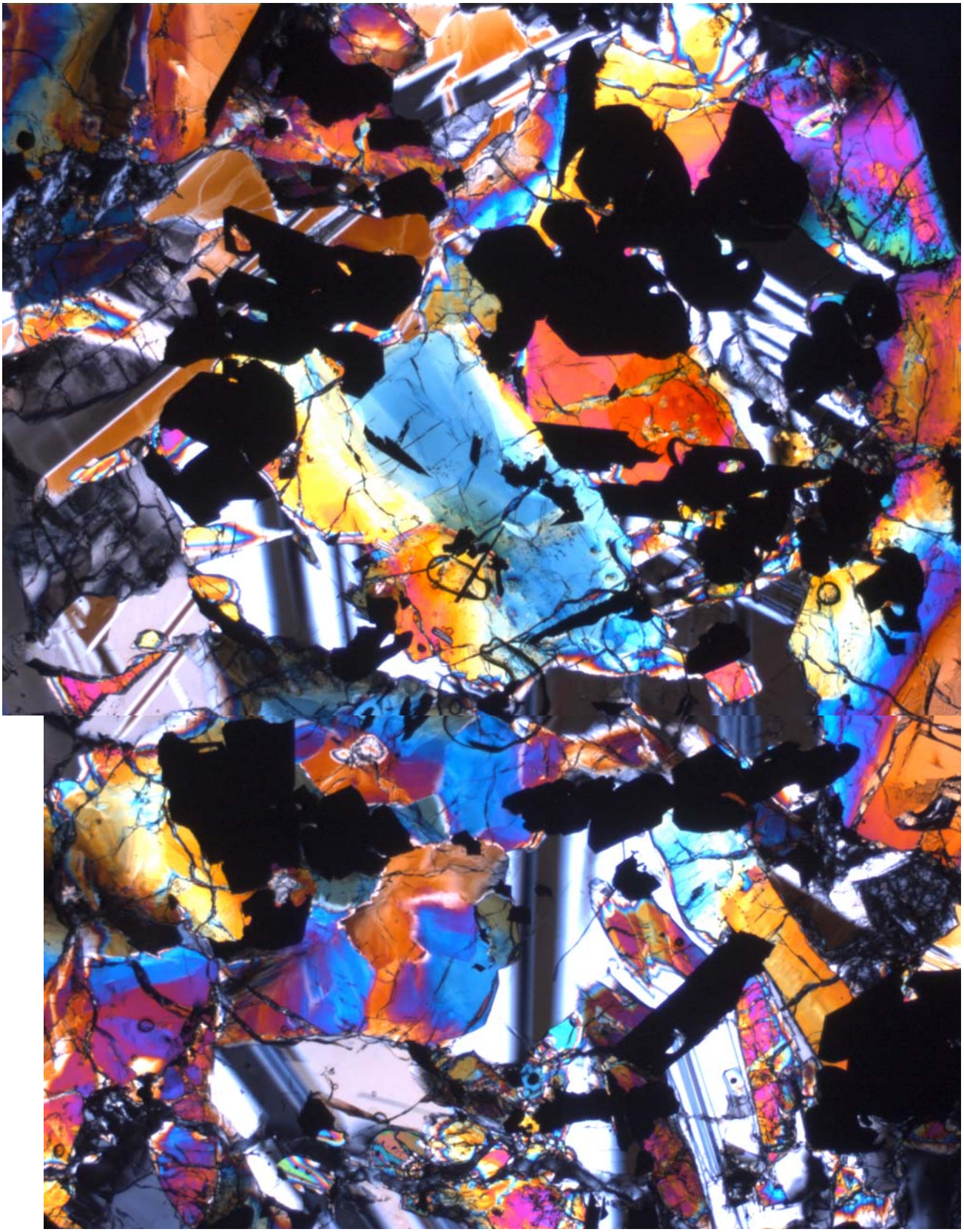

Figure 6b: Photomicrograph of thin section 71567,13. Crossed Nicols. 2.8 mm acrsoss.

Table 1. Chemical composition of 71566.

reference	Warner78		Rhodes76		Eldridge74	
weight	Warner75					
SiO2 %			39.27	(b)		
TiO2	11.5	(a)	12.01	(b)		
Al2O3	9.4	(a)	9.22	(b)		
FeO	18.4	(a)	18.73	(b)		
MnO	0.23	(a)	0.27	(b)		
MgO	8.2	(a)	8.4	(b)		
CaO	11	(a)	10.89	(b)		
Na2O	0.44	(a)	0.4	(b)	0.054	(d)
K2O	0.05	(a)	0.03	(b)		
P2O5			0.03	(b)		
S %			0.16	(b)		
sum						
Sc ppm	73	(c)	78	(c)		
V	90	(c)				
Cr			2600	(b)		
Co	20	(c)	18	(c)		
Ni						
Cu						
Zn						
Ga						
Ge ppb						
As						
Se						
Rb						
Sr						
Y						
Zr						
Nb						
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb						
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm						
Ba						
La	4.1	(c)	4.29	(c)		
Ce	20	(c)	17.2	(c)		
Pr						
Nd	18	(c)				
Sm	6.9	(c)	7.62	(c)		
Eu	1.7	(c)	1.75	(c)		
Gd						
Tb	1.8	(c)				
Dy	12	(c)				
Ho						
Er						
Tm						
Yb	6.4	(c)	7.9	(c)		
Lu	0.98	(c)	1.16	(c)		
Hf	6.6	(c)	7.8	(c)		
Ta	1.3	(c)				
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm					0.31	(d)
U ppm					0.092	(d)

technique (a) broad beam e probe, (b) XRF, (c) INAA, (d) radiation count.

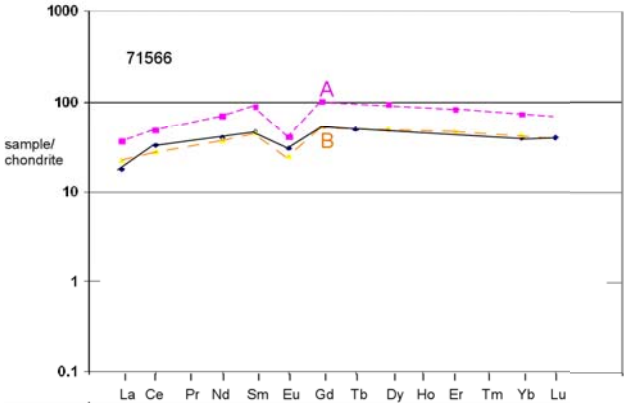

Figure 7: Normalized rare-earth-element diagram for 71566 and type A and B basalts.

Table 2. Chemical composition of 71567.

reference	Warner78		Rhodes76	
weight	Warner75			
SiO2 %			38.06	(b)
TiO2	11.4	(a)	12.98	(b)
Al2O3	9.3	(a)	8.59	(b)
FeO	18	(a)	19.4	(b)
MnO	0.23	(a)	0.28	(b)
MgO	7.5	(a)	8.83	(b)
CaO	10.3	(a)	10.57	(b)
Na2O	0.4	(a)	0.38	(b)
K2O	0.07	(a)	0.03	(b)
P2O5			0.02	(b)
S %			0.16	(b)
sum				
Sc ppm	73	(a)		
V	100	(a)		
Cr	1574	(a)	2942	(b)
Co	16.7	(a)		
Ni				
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb				
Sr				
Y				
Zr				
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				
Ba				
La	6	(a)		
Ce	24	(a)		
Pr				
Nd				
Sm	10.9	(a)		
Eu	2	(a)		
Gd				
Tb	2.6	(a)		
Dy	15	(a)		
Ho				
Er				
Tm				
Yb	9.4	(a)		
Lu	1.3	(a)		
Hf	8.4	(a)		
Ta	1.7	(a)		
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm				
U ppm				
technique:	*(a) INAA, (b) XRF*			

Table 3. Chemical composition of 71565.

reference	Warner75	
weight		
SiO2 %		
TiO2	10.8	(a)
Al2O3	10.1	(a)
FeO	17.6	(a)
MnO	0.225	(a)
MgO	7.5	(a)
CaO	11.7	(a)
Na2O	0.43	(a)
K2O	0.071	(a)
P2O5		
S %		
sum		
Sc ppm	76	(a)
V	90	(a)
Cr	2443	(a)
Co	16.1	(a)
Ni		
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr		
Y		
Zr		
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba		
La	6.4	(a)
Ce	26	(a)
Pr		
Nd		
Sm	9.2	(a)
Eu	2.11	(a)
Gd		
Tb	2.3	(a)
Dy	15	(a)
Ho		
Er		
Tm		
Yb	8.3	(a)
Lu	1.4	(a)
Hf	8	(a)
Ta	1.9	(a)
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm		
U ppm		
technique:	*(a) INAA*	

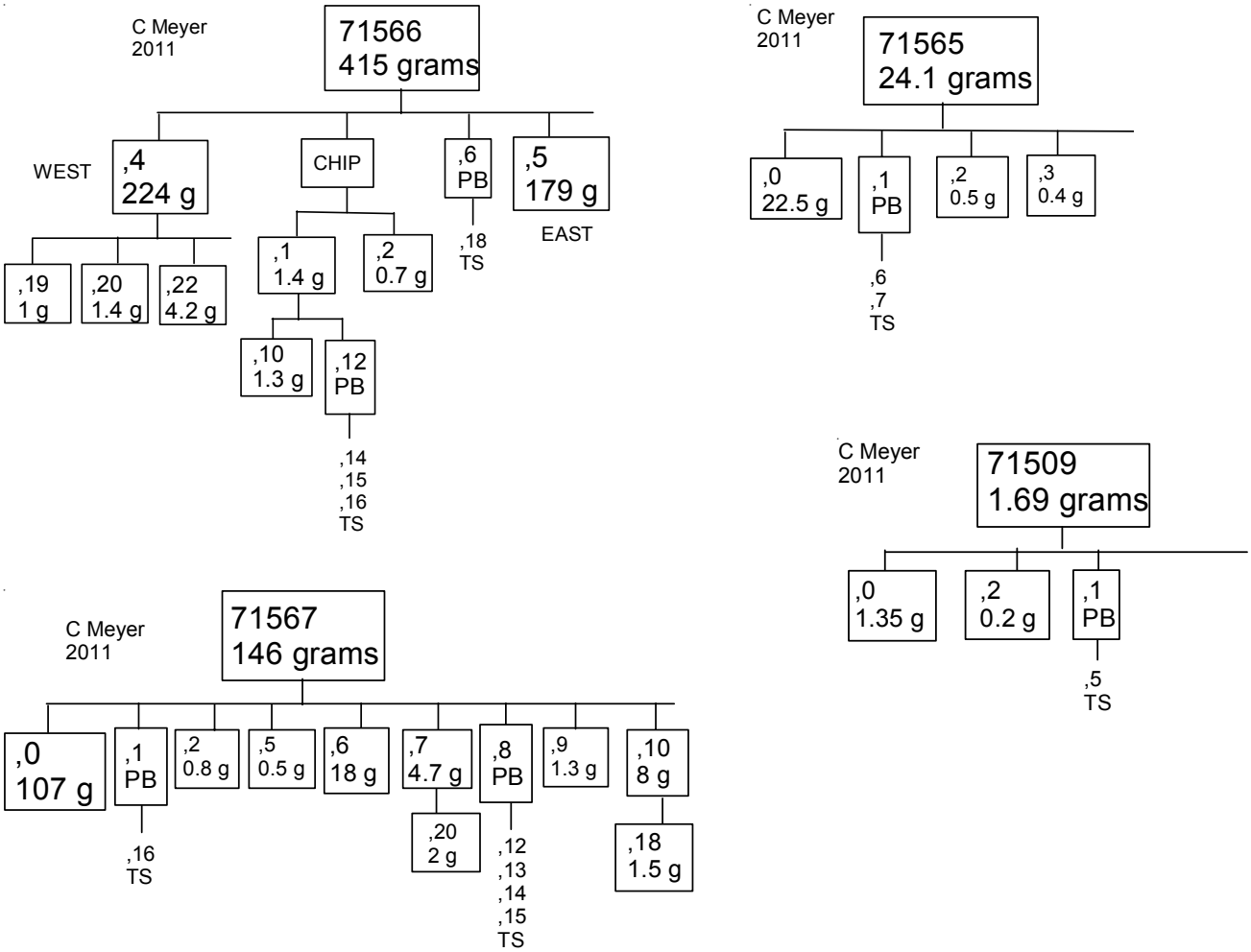

Figure 8: Subdivison of 71566 with cm scale and cube. S74-19016

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