

Northwest Africa 4932

Anorthositic impact melt breccia

93 g



Figure 1: NWA 4932 with 1 cm cube for scale (photo courtesy of G. Hupe).

Introduction, petrography, mineralogy and chemistry

Northwest Africa 4932 was found in 2007 (Weisberg et al., 2009), and is compositionally and texturally similar to SaU 300 (Fig. 1 and 2; Korotev et al., 2008, 2009b). It has elevated trace elements Sr and Ba, as is common in desert lunar meteorites (Korotev et al., 2009b). NWA 4932 is a feldspathic anorthositic breccia with impact melt patches; given its intermediate FeO content (~8 wt.%), it is distinct from many of the purely anorthositic end member breccias within the lunar meteorite collections (Korotev et al., 2009b). NWA 4932 and SaU 300 are recognized to have low Sm/Sc ratios like a mafic anorthosite (Korotev et al., 2008). It is among a small group of polymict breccias that have trace element compositional characteristics that fall outside of standard three component end members that can explain much of the compositional variation in the Apollo sample suites. This suggests that these meteorites sample an additional fourth (and mafic) component that is present in the lunar meteorite collection only (Korotev et al., 2009b).

Detailed trace element analysis indicates extensive overlap with SaU 300. Coupled with the textural similarities, these meteorites may be launch paired (Korotev et al., 2009a) (Fig. 3).

Radiogenic age dating

None yet reported.

Cosmogenic isotopes and exposure ages

None yet reported.



Figure 2: Sawn face of NWA 4932 with 1 cm cube (courtesy G. Hupe).

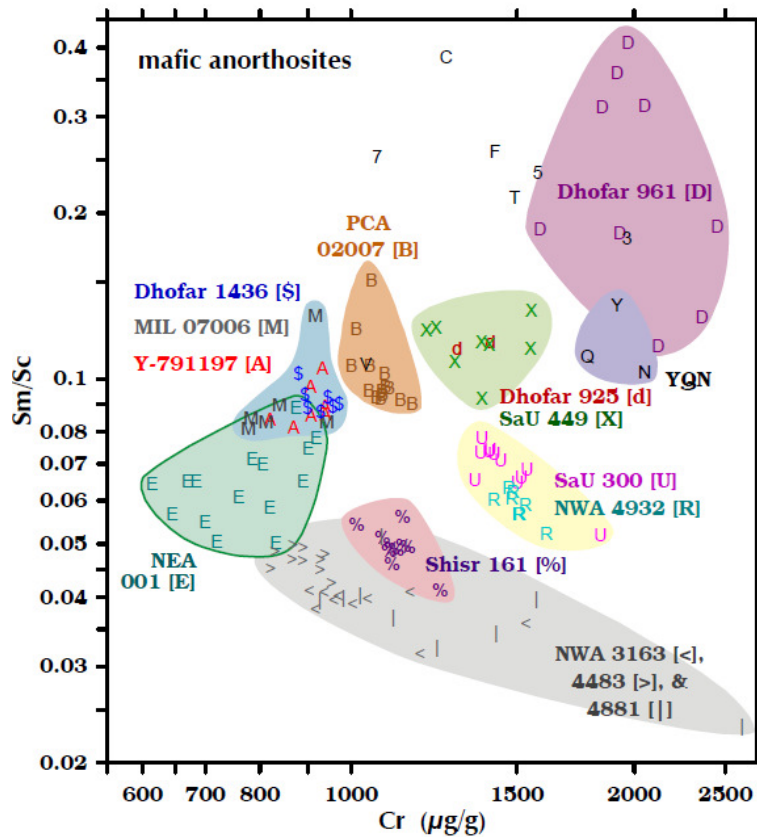


Figure 3: Sm/Sc versus Cr for mafic anorthosites in the lunar meteorite collection. Note the similarity of SaU 300 and NWA 4932, indicating (along with textural similarities) that they may be launch paired (Korotev et al., 2009a).

Table 1a. Chemical composition of NWA 4932

<i>reference</i>	1	1
<i>weight</i>	20-60	210
<i>technique</i>	d	e
SiO ₂ %	46	
TiO ₂	0.34	
Al ₂ O ₃	21.8	
FeO	8.55	
MnO	0.12	
MgO	9.15	
CaO	13	
Na ₂ O	0.32	
K ₂ O	0.12	
P ₂ O ₅	0.06	
S %		
<i>sum</i>	99.6	
Sc ppm		19.7
V		
Cr		1500
Co		44.3
Ni		602
Cu		
Zn		
Ga		
Ge		
As		0.5
Se		0.4
Rb		<5
Sr		254
Y		
Zr		35
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		<0.15
Ba		447
La		2.34
Ce		6.3

Pr	
Nd	3.5
Sm	1.16
Eu	0.64
Gd	
Tb	0.278
Dy	
Ho	
Er	
Tm	
Yb	1.26
Lu	0.181
Hf	0.89
Ta	0.14
W ppb	
Re ppb	
Os ppb	
Ir ppb	27.4
Pt ppb	
Au ppb	8
Th ppm	0.5
U ppm	0.16

technique (a) ICP-AES, (b) ICP-MS, (c) wet chemistry (d) FB-EMPA, (e) INAA, (f) RNAA, (g) XRF

Table 1b. Light and/or volatile elements for NWA 4932

Li ppm	
Be	
C	
S	
F ppm	
Cl	
Br	1.2
I	
Pb ppm	
Hg ppb	
Tl	
Bi	

1) Korotev et al. (2009b)