

NWA 5718 - 90.5 grams
Enriched Basaltic Shergottite



Figure 1: Photo of NWA5718 (photo by D. Pitt).



Figure 2: Sawn surface of NWA5718 (photo by D. Pitt).

Introduction

NWA 5718 is a fresh stone with a nice fusion crust purchased in Erfoud, Morocco by Daryl Pitt (figure 1). It is thought to have been found in the same strewn field in Algeria as NWA 2975 etc.

Petrography

A sawcut through NWA5718 shows that it is fine grained with a few melt pockets and glass veins (figure 2). Texture ranges from ophitic to subophitic and granular with some preferred orientation of pyroxene grains (figure 3). Accessory phases include ulvospinel, ilmenite, pyrrhotite, merrillite and small pockets of K-rich glass.

Mineralogy

Olivine: none

Pyroxene: Two pyroxenes are present. Pidgeonite is chemically zoned from $\text{Fs}_{39}\text{Wo}_{10}$ to $\text{Fs}_{42}\text{Wo}_{12}$ and sub-calcic augite is zoned from $\text{Fs}_{25}\text{Wo}_{28}$ to $\text{Fs}_{33}\text{Wo}_{31}$ (Wittke et al. 2010).

Plagioclase: Plagioclase is An_{57} and has been shocked to maskelynite.

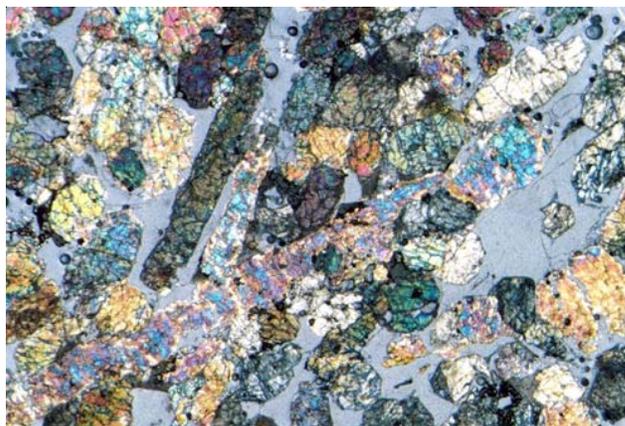


Figure 3: Thin section photomicrograph of NWA5718. 7 mm across Photo courtesy Ted Bunch

Mineralogical Mode

	Wittke et al. 2010
Pyroxene	70 %
Plagioclase	25
Other	5
Ilmenite	
Ulvospinel	
Merrillite	
Pyrrhotite	

Table 1. Chemical composition of NWA 5718. Chemistry

reference Herd2009
 weight MB 98
 SiO2 %
 TiO2
 Al2O3
 FeO
 MnO
 MgO
 CaO
 Na2O
 K2O
 P2O5
 S %
 sum

Sc ppm
 V
 Cr
 Co
 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	3.49	(a)
Ce	8.57	(a)
Pr		
Nd	5.92	(a)
Sm	2.27	(a)
Eu	0.83	(a)
Gd	3.63	(a)
Tb		
Dy	4.35	(a)
Ho		
Er	2.53	(a)
Tm		
Yb	2.23	(a)
Lu	0.32	(a)

Hf
 Ta
 W ppb
 Re ppb
 Os ppb
 Ir ppb
 Pt ppb
 Au ppb
 Th ppm
 U ppm
 technique (a) ICP-MS

A partial analysis by Cris Herd is found in the Meteorite Bulletin (table 1). The REE pattern is flat at about 11X chondrites. Wittke et al. report that NWA5718 is chemically different from NWA2975 (from same general area).

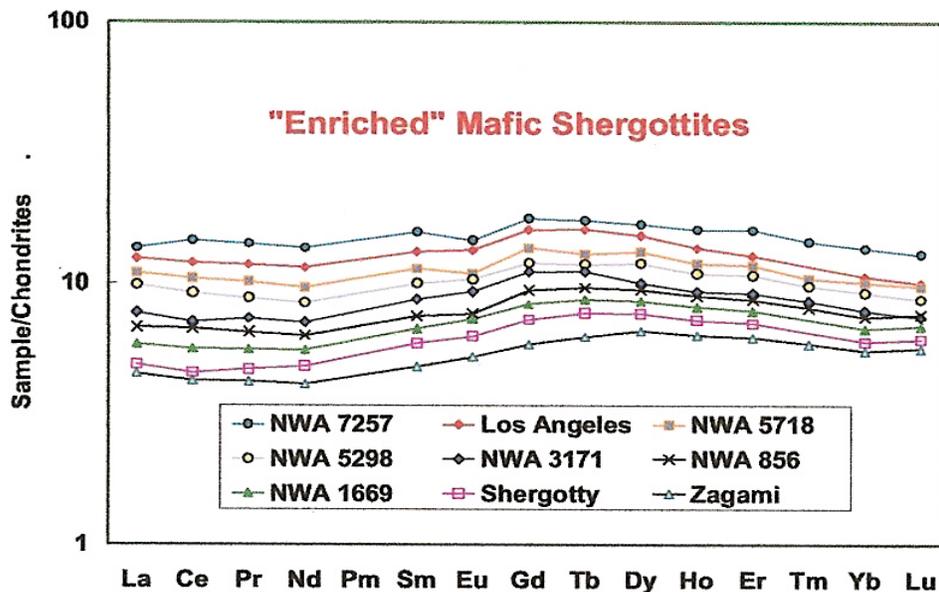


Figure 4: Normalized rare-earth-element diagram for “enriched” shergottites (Irving 2012).

Other Studies

Oxygen isotopes determined by Rumble give Delta ¹⁷O = 0.25, proving its Martian origin.

Sm-Nd isotope systematic confirm that NWA is from an enriched source region (Wittke et al. 2010).

Processing

It has been sawn.

References for NWA5718

Franz H.B., Farquhar J. and Irving A.J. (2010) Acid volatile sulfur isotopic composition of seven Shergottites from Northwest Africa (abs#2341). *Lunar Planet. Sci.* **XLI**. Lunar Planetary Institute, Houston.

Weisberg M.K. et al. (2010b) *Met. Bull* #98. *Meteorit. & Planet. Sci.* **45**, 1530-1551.

Wittke J.H., Bunch T.E., Herd C.D.K., Lapan T.J., Rumble D. Irving A.J. and Pitt D. (2010) Petrology and composition of “enriched” mafic Shergottite Northwest Africa 5718: Contrasts with Northwest Africa 2975/2986 (abs#5313). *Meteorit. & Planet. Sci.* **45**, A217.