

NWA 2626

Depleted Olivine-orthopyroxene-phyric Shergottite
31.1 grams



Figure 1: NWA 2626. Nice photo by Michael Farmer. About 3 cm across.

Introduction

NWA 2626 was purchased in Morocco in 2004 by Mike Farmer and Jim Strobe. It is a small shocked fragment of olivine-orthopyroxene shergottite (figure 1). According to Irving et al. (2005) it is not paired with other Martian meteorites found in North Africa. It has a thin (mm) weathering rind, but the interior is said to be unaltered. It has not been dated.

Petrography

NWA 2626 is a very phenocryst-rich rock with a basaltic-textured mesostasis made up of intergrown pyroxene and shocked plagioclase (maskelynite)(figure 2). Large olivine phenocrysts are zoned. Elongate, prismatic, phenocrysts of orthopyroxene are aligned, as in a flow pattern (Irving et al. 2005). Papike et al. (2009) compared NWA2626 with other shergottites and Shearer et al. (2008) studied the trace elements in olivine phenocrysts.

According to Irving et al. (2005), NWA 2626 has cross-cutting, black-glass, veinlets and glass pockets from shock (figure 5). The plagioclase has been converted to maskelynite by shock.

Mineralogical Mode for NWA 2626

	Papike et al. (2009)
Olivine	46 %
Pyroxene	44
Maskelynite	39
Ilmenite	tr.
Chromite	
Phosphate	
Pyrrhotite	



Figure 2: Photo of thin section of NWA2626 by Theodore Bunch 2005. 12 mm across.

Mineral Chemistry

Olivine: Large olivine phenocrysts in NWA 2626 are zoned Fo_{83-57} .

Pyroxenes: Phenocrysts of orthopyroxene ($Wo_{2.4}En_{79.7}Fs_{17.9}$) are surrounded by pigeonite ($Wo_{4.4}En_{70.2}Fs_{25.4}$), with interstitial pigeonite (about $Wo_{12.7}En_{50}Fs_{37}$) and minor augite ($Wo_{31}En_{45}Fs_{24}$).

Plagioclase or Maskelynite: Plagioclase analyses were An_{71-66} , before being shocked to maskelynite (Irving et al. 2005).

Glass: The glass veinlets appear abundant in slabs (figure 5).

Chromite: Irving et al. (2005) give the composition of chromite and ulvospinel.

Sulfide: Pyrrhotite.

Phosphate: Merrillite

Whole-rock Composition

None, yet

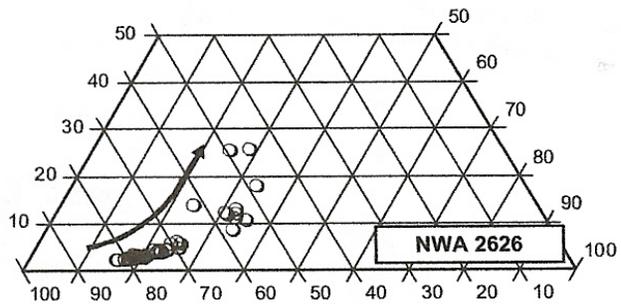


Figure 3: Pyroxene composition for NWA2626 (Papike et al. 2009).

Radiogenic Isotopes

None, yet

Cosmic Ray Induced Isotopes

Berezhnoy et al. (2010) reported ^{26}Al and Nishiizumi and Chaffee (2006) reported a cosmic ray exposure age of 1.1 m.y. as determined by ^{10}Be .

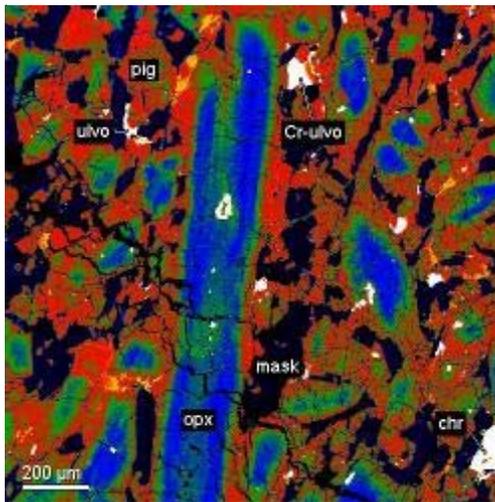


Figure 4: Back-scatter-electron image of polished thin section of NWA2626, showing elongate orthopyroxene (blue) mantled by pigeonite (green). Figure by Anthony Irving and Scott Kuehner.



Figure 5: NWA2626, showing glass veins. Bunch and Wittke 2012

References for NWA2626

- Berezhnoy A.A., Bunch T.E., Ma P., Herzog G.F., Knie K., Rugel G., Faestermann T. and Korschinek G. (2008) Al-26, Be-10 and Mn-53 in Martian meteorites (abs#5306). *Meteorit. & Planet. Sci.* **45**, A13.
- Irving A.J., Bunch T.E., Wittke J.H. and Kuehner S.M. (2005) Olivine-orthopyroxene-phyrlic Shergottites NWA 2626 and DaG 476: The Tharsis connection (abs#1229). *Lunar Planet. Sci.* **XXXVI**, Lunar Planet. Institute, Houston.
- Lindsay F., Turin B., Herzog G.F., Swisher C. and Emge T. (2012) Ar/Ar ages of single grains from Shergottite NWA 2626: Pushing the limits of laser step-heating (abs). *Lunar Planet. Sci. Conf.* Lunar Planetary Institute @ The Woodlands.
- Nishiizumi K. and Caffee M.W. (2006) Constraining the number of lunar and Martian meteorite falls (abs#5368). *Meteorit. & Planet. Sci.* **41**, A133.
- Papike J.J., Karner J.M., Spilde M.N., Shearer C.K. and Burger P.V. (2009b) Silicate mineralogy of Martian meteorites. *Geochim. Cosmochim. Acta* **73**, 7443-7485. (invited review with great pictures of textures)
- Rumble D. and Irving A.J. (2009) Dispersion of oxygen isotopic compositions among 42 Martian meteorites determined by laser fluorination: Evidence for assimilation of (ancient) altered crust (abs#2293). *Lunar Planet. Sci.* **XL**, Lunar Planetary Institute @ The Woodlands.
- Russell S.S., Zolensky M.E., Righter Kevin., Folco L., Jones R., Connolly H.C., Grady M.M. and Grossman J.N. (2005) The Meteoritical Bulletin No. **89**, 2005 September. *Meteorit. & Planet. Sci.* **40**, A201-263.
- Shearer C.K., Burger P.V., Papike J.J., Borg L.E., Irving A.J. and Herd C. (2008b) Petrogenetic linkages among Martian basalts: Implications based on trace element chemistry of olivine. *Meteorit. & Planet. Sci.* **43**, 1241-1258.