NWA 5790

145 grams
Nakhlite

Introduction

NWA 5790 was found in Mauritania; apparently as two pieces. There could be more! It apparently lacks fusion crust, and has many crevices filled with terrestrial contamination (figures 1 and 2). It has been dated at 1.38 b.y. with exposure to cosmic rays for ~ 7 m.y. Its terrestrial age has yet to be determined.

Petrography

Jambon et al. (2010) reported the texture (figure 5), along with mineral and mesostasis composition (table 1). Olivine phenocrysts are large and zoned. Euhedral augite phenocrysts have sector zoning with iron-rich rims. The mesostasis has numerous dendritic crystals of Ti-magnetite, trace Na-rich plagioclase, even K-spar. Cl-rich amphibole is trapped in melt inclusions.
Calichi is reported on the surface of this weathered meteorite (Tomkinson et al. 2012).

**Mineralogy**

**Olivine:** Olivine phenocrysts are zoned (Fa_{65-80}).

**Pyroxene:** Augite phenocrysts are highly zoned (figure 3).

**Plagioclase:** Minor Na-rich plagioclase is found as microlites in mesostasis.

**Phosphate:** Sanborn et al. (2011) determined the REE content of apatite.

**Chemistry**

The chemical composition of NWA5790 was reported by Janborn et al. (2010) and Sanborn et al. (2011). Terrestrial contamination was studied by Tomkinson et al. (2012). The rare-earth-element pattern is similar to that of nakhlites, but elevated (figure 6).

**Radiogenic age dating**

Shih et al. (2010) determined the crystallization age of NWA5790 as 1.38 b.y. by the Sm-Nd method (figure 4).

**Cosmogenic isotopes and exposure ages**

Huber et al. (2012) determined an exposure age of 7.3 m.y. by the \(^{38}\)Ar method.

**Other Studies**

The oxygen isotopic composition has been reported by Janbon et al. (2010).

**Processing**

Very nice sample.

**References for NWA5790**

### Table 1. Composition of mesostasis NWA 5790.

<table>
<thead>
<tr>
<th>reference</th>
<th>Janborn10</th>
</tr>
</thead>
<tbody>
<tr>
<td>weight</td>
<td>mesostasis</td>
</tr>
<tr>
<td>SiO2 %</td>
<td>54.6 (a)</td>
</tr>
<tr>
<td>TiO2</td>
<td>0.81 (a)</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>14.33 (a)</td>
</tr>
<tr>
<td>FeO</td>
<td>17.13 (a)</td>
</tr>
<tr>
<td>MnO</td>
<td>0.26 (a)</td>
</tr>
<tr>
<td>MgO</td>
<td>0.44 (a)</td>
</tr>
<tr>
<td>CaO</td>
<td>4.25 (a)</td>
</tr>
<tr>
<td>Na₂O</td>
<td>5.4 (a)</td>
</tr>
<tr>
<td>K₂O</td>
<td>1.1 (a)</td>
</tr>
<tr>
<td>P₂O₅</td>
<td>0.96 (a)</td>
</tr>
<tr>
<td>S %</td>
<td></td>
</tr>
</tbody>
</table>

**Technique:** (a) caution, not rock

![Normalized rare-earth-element patterns for Nakhlites including NWA5970(topmost)(Jambon et al. 2010).](image)

### Lunar Planet. Sci. LXI Lunar Planetary Institute, Houston.


Tomkinson T., Lee M.R., Mark D.F. and Stuart F.M. (2012a) Terrestrial organic and inorganic contamination of the NWA 5790 Nakhlite (abs#5248). *75th Meteoritical Soc. @ Cairns*