Barringerite \((\text{Fe, Ni})_2\text{P}\)

Crystal Data: Hexagonal. Point Group: \(\overline{6}m2\). As bands, 10–15 \(\mu\)m wide and several hundred \(\mu\)m long, consisting of individual grains less than 1 \(\mu\)m in diameter, along the contact between schreibersite and troilite.

Physical Properties: Hardness = 7 VHN = 1097 (20 g load). D(meas.) = n.d. D(calc.) = 6.92

Optical Properties: [Opaque.] Color: White, similar to kamacite; bluish compared to schreibersite, in reflected light.

Optical Class: Uniaxial. Anisotropism: Noticeable; white to blue.

R: (Slightly higher than that of schreibersite; lower than that of kamacite).

Cell Data: Space Group: \(\text{P}6\overline{2}m\). \(a = 5.87(7)\) \(c = 3.44(4)\) \(Z = 3\)

X-ray Powder Pattern: Synthetic Fe\(_2\)P.

2.237 (100), 1.28 (100), 1.21 (100), 1.10 (100), 2.048 (95), 1.920 (90), 1.694 (80)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
<td>44.3</td>
<td>75.1</td>
<td>76.22</td>
</tr>
<tr>
<td>Cr</td>
<td>0.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ni</td>
<td>33.9</td>
<td>0.04</td>
<td>2.85</td>
</tr>
<tr>
<td>Co</td>
<td>0.25</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>21.8</td>
<td>22.8</td>
<td>20.21</td>
</tr>
</tbody>
</table>

Total 100.25 98.15 100.01

(1) Ollague meteorite; average of several analyses by electron microprobe, corresponding to \((\text{Fe}_{1.16}\text{Ni}_{0.84}\text{Co}_{0.01})\text{P}_{2.01}\). (2) Y-793274 meteorite; by electron microprobe. (3) China; corresponding to \((\text{Fe}_{2.09}\text{Ni}_{0.07}\text{Cr}_{0.02})\text{P}_{2.18}\).

Occurrence: Along the contacts between schreibersite and troilite in a Fe–Ni meteorite (Ollague); as a single grain in a brecciated lunar meteorite of mixed mare and highland origin (Y-793274 meteorite); in the oxidation zone of a platinum-bearing Cu–Ni sulfide deposit (China).

Association: Kamacite, olivine, schreibersite, troilite (Ollague meteorite); plagioclase, glass (Y-793274 meteorite) schreibersite, wüstit, lawrencite (Canyon Diablo meteorite).

Distribution: In the Imilac (Ollague) pallasite meteorite [an extraterrestrial origin has been questioned]. In the Yamato-793274 meteorite, from the Moon. In the Canyon Diablo iron meteorite. Found in an unspecified mineral deposit in China.

Name: To honor Daniel Moreau Barringer (1860–1929), early proponent of the meteor impact origin of Meteor Crater, near Canyon Diablo, Arizona, USA.

Type Material: Nininger collection, Center for Meteorite Studies, Arizona State University, Tempe, Arizona, USA.


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