Preobrazhenskite

\( \text{Mg}_3\text{B}_{11}\text{O}_{15}(\text{OH})_9 \)

\( \text{(C)2001-2005 Mineral Data Publishing, version 1} \)

**Crystal Data:** Orthorhombic.  
**Point Group:** 2/m 2/m 2/m.  
As crystals, to 4 cm; in nodules and granular massive.

**Physical Properties:**  
Hardness = 4.5–5  
D(meas.) = n.d.  
D(calc.) = 2.45

**Optical Properties:**  
Semitransparent.  
*Color:* Colorless, lemon-yellow, dark gray.  
*Optical Class:* Biaxial (+), nearly uniaxial (+).  
\( \alpha = 1.570 \quad \beta = 1.570 \quad \gamma = 1.595 \)

2V(meas.) = n.d.

**Cell Data:**  
**Space Group:** Pbcm.  
\( a = 16.291(4) \quad b = 9.181(2) \quad c = 10.571(2) \quad Z = 4 \)

**X-ray Powder Pattern:**  
Inder deposit, Kazakhstan.  
5.28 (10), 3.79 (10), 3.230 (9), 3.187 (9), 2.821 (9), 2.769 (9), 2.641 (9)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO(_2)</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>B(_2)O(_3)</td>
<td>65.90</td>
<td>65.47</td>
</tr>
<tr>
<td>R(_2)O(_3)</td>
<td>0.17</td>
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</tr>
<tr>
<td>MgO</td>
<td>20.65</td>
<td>20.67</td>
</tr>
<tr>
<td>CaO</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>H(_2)O(^+)</td>
<td>13.39</td>
<td>13.86</td>
</tr>
<tr>
<td>H(_2)O(^-)</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.57</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

(1) Inder deposit, Kazakhstan; after washing to remove soluble halides.  
(2) \text{Mg}_3\text{B}_{11}\text{O}_{15}(\text{OH})_9.

**Occurrence:**  
In fine-grained halite–polyhalite rock.

**Association:**  
Inyoite, halite, polyhalite, kieserite, anhydrite, aksaite, boracite, ginoirite, halurgite, strontioborite, meteorite, kaliborite.

**Distribution:**  
In Kazakhstan, in and under the Inder borate deposit, and from the Chalkar salt dome, Ak-sa˘ı Valley, Uralsk district.

**Name:**  
To honor Pavel Ivanovich Preobrazhenskii (1874–1944), investigator of Russian salt deposits, Institute of Halurgy, St. Petersburg, and Institute of Mining and Chemical Stock, Moscow, Russia, a discoverer of the Inder deposit, Kazakhstan.

**Type Material:**  
Mining Institute, St. Petersburg, 1497/1–2.5; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 57015.

**References:**