Perrierite-(La)

\((\text{La},\text{Ce},\text{Ca})_4\text{Fe}^{2+} (\text{Ti,Fe}^{3+})_4(\text{Si}_2\text{O}_7)_2\text{O}_8\)

**Crystal Data:** Monoclinic. **Point Group:** 2/m. As simply terminated prismatic crystals to 1 mm, columnar along [010] or flattened on (001).


**Optical Properties:** Translucent to nearly opaque. Color: Black. Streak: Brown. Luster: Vitreous. Optical Class: Biaxial (-). \(\alpha = 1.94(1) \quad \beta = 2.020(15) \quad \gamma = 2.040(15) \quad 2\text{V(meas)} = 50(10)^\circ \)

Dispersion: Very strong, \(r < v\). Pleochroism: \(Z = \) dark brown; \(Y = \) brown; \(X = \) light yellow-brown. Absorption: \(Z > Y > X\).

**Cell Data:** Space Group: \(\text{P}2_1/\alpha\). \(a = 13.668(1) \quad b = 5.6601(6) \quad c = 11.743(1) \quad \beta = 113.64(1)^\circ \)

\(Z = 2\)

**X-ray Powder Pattern:** Dellen quarry, near Mendig, Eifel Mts., Rhineland-Palatinate, Germany. 2.96 (100), 2.80 (50), 2.14 (50), 1.947 (50), 5.19 (40), 3.53 (40), 1.657 (40)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CaO</td>
<td>3.26</td>
<td></td>
</tr>
<tr>
<td>La₂O₃</td>
<td>22.92</td>
<td></td>
</tr>
<tr>
<td>Ce₂O₃</td>
<td>19.64</td>
<td></td>
</tr>
<tr>
<td>Pr₂O₃</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>Nd₂O₃</td>
<td>2.09</td>
<td></td>
</tr>
<tr>
<td>MgO</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>MnO</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td>FeO</td>
<td>3.16</td>
<td></td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>5.28</td>
<td></td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>2.59</td>
<td></td>
</tr>
<tr>
<td>TiO₂</td>
<td>16.13</td>
<td></td>
</tr>
<tr>
<td>Nb₂O₃</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>SiO₂</td>
<td>20.06</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99.21</td>
<td></td>
</tr>
</tbody>
</table>

(1) Dellen quarry, near Mendig, Eifel Mts., Rhineland-Palatinate, Germany: average of 7 electron microprobe analyses, \(\text{Fe}^{2+}/\text{Fe}^{3+}\) ratio from structure analysis; corresponding to \((\text{La}_{1.70}\text{Ce}_{1.45}\text{Nd}_{0.15}\text{Pr}_{0.06}\text{Ca}_{0.70})_4\text{Fe}^{2+}\text{Mn}_{0.38}\text{Mg}_{0.08}\text{Al}_{0.02}\text{Ti}_{2.44}\text{Fe}^{3+}\text{Al}_{0.62}\text{Nb}_{0.07}\text{Si}_{2.93}\text{O}_{22}\).

**Mineral Group:** Chevkinite group.

**Occurrence:** In miarolitic cavities in sanidinite lava rock, probably pneumatolytic.

**Association:** Sanidine, phlogopite, pyrophanite, zirconoiite, jakobsite, magnetite, fluorcalciopyrochlore, zircon.

**Distribution:** In the Dellen quarry, near Mendig, Laacher See region, Eifel Mts., Rhineland-Palatinate (Rheinland-Pfalz), Germany.

**Name:** For the La-dominant member of the perrierite structure type.

**Type Material:** A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia; 4059/1.