Joaquinite-(Ce) NaBa$_2$Ce$_2$Fe$^{2+}$Ti$_2$Si$_8$O$_{26}$(OH)$_2$H$_2$O

Crystal Data: Monoclinic, pseudo-orthorhombic. Point Group: 2. As equant or tabular crystals, flattened $\perp$ [001], up to 1.2 cm; intimately intergrown with orthojoaquinite-(Ce).

Twinning: On {001}, polysynthetic, common.

Physical Properties: Cleavage: {001}, good. Hardness = 5.5 D(meas.) = 3.89–3.98 D(calc.) = 3.93


Luster: Vitreous.

Optical Class: Biaxial (+). Pleochroism: Weak; X = Y = colorless; Z = pale yellow.

Orientation: X = a; Y = b; Z = c. Dispersion: $r < v$, perceptible. Absorption: $Z > Y > X$.

Cell Data: Space Group: C2. $a = 10.516(3)$ $b = 9.686(3)$ $c = 11.833(4)$ $\beta = 109.67(3)^\circ$

X-ray Powder Pattern: San Benito Co., California, USA.

2.943 (100), 4.43 (95), 2.890 (85), 3.29 (60), 2.606 (60), 3.05 (40), 2.978 (40)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(1)</th>
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</thead>
<tbody>
<tr>
<td>SiO$_2$</td>
<td>34.97</td>
<td>MgO</td>
</tr>
<tr>
<td>TiO$_2$</td>
<td>11.83</td>
<td>CaO</td>
</tr>
<tr>
<td>ThO$_2$</td>
<td>0.27</td>
<td>SrO</td>
</tr>
<tr>
<td>Y$_2$O$_3$</td>
<td>0.70</td>
<td>BaO</td>
</tr>
<tr>
<td>RE$_2$O$_3$</td>
<td>18.46</td>
<td>Na$_2$O</td>
</tr>
<tr>
<td>FeO</td>
<td>4.09</td>
<td>K$_2$O</td>
</tr>
<tr>
<td>MnO</td>
<td>0.00</td>
<td>H$_2$O</td>
</tr>
</tbody>
</table>

Total [100.00]

(1) San Benito Co., California, USA; by electron microprobe, average of six points on five grains, intergrown with orthojoaquinite-(Ce) of presumably nearly identical composition; RE$_2$O$_3$ = La$_2$O$_3$ 21.14%, Ce$_2$O$_3$ 10.69%, Pr$_2$O$_3$ 1.25%, Nd$_2$O$_3$ 3.21%, Sm$_2$O$_3$ 0.70%, Gd$_2$O$_3$ 0.26%, Dy$_2$O$_3$ 0.21%, Er$_2$O$_3$ 0.00%, H$_2$O by difference; corresponds to Na$_{0.03}$K$_{0.01}$Ba$_{2.01}$Ca$_{0.05}$Mg$_{0.02}$ (Ce$_{0.98}$RE$_{0.02}$Sr$_{0.42}$)$_{2.94}$Fe$_{0.76}$Ti$_{2.04}$Th$_{0.03}$Si$_{18.06}$O$_{24.68}$(OH)$_{3.32}$.

Polymorphism & Series: Dimorphous with orthojoaquinite-(Ce).

Mineral Group: Joaquinite group.

Occurrence: In a natrolite vein cutting a glaucophane schist inclusion in a serpentinite body (San Benito Co., California, USA); in fenitized gneisses and alkaline syenites (Seal Lake, Canada).

Association: Orthojoaquinite-(Ce), benitoite, neptunite, natrolite (San Benito Co., California, USA); aegirine, barylite, eudidymite, neptunite (Seal Lake, Canada).

Distribution: At the Gem mine and to its north, on Santa Rita peak; at Mina Numero Uno and on the Victor claim, San Benito Co., California; from Granite Mountain, near Little Rock, Pulaski Co., Arkansas, USA. In Canada, at Seal Lake, Labrador, Newfoundland, and Mont Saint-Hilaire, Quebec. Along the Narssaq river, near Kvanefjeld, in the Ilmaussaq intrusion, southern Greenland.

Name: For Joaquin Ridge, near the original locality at the Gem mine, California, USA.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 90840.

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