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

**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).  
**Twining:**  On \{001\}, polycrystalline, common.

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

**Optical Properties:**  
- **Transparent to translucent.**  
- **Color:**  Honey-yellow to brown.  
- **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:**  \( \text{C}2 \).  
- \( a = 10.516(3) \)  
- \( b = 9.686(3) \)  
- \( c = 11.833(4) \)  
- \( \beta = 109.67(3)^\circ \)  
- \( Z = 2 \)

**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:**

|   | \( \text{SiO}_2 \) | 34.97 | \( \text{MgO} \) | 0.05 | \( \text{TiO}_2 \) | 11.83 | \( \text{CaO} \) | 0.21 | \( \text{ThO}_2 \) | 0.27 | \( \text{SrO} \) | 3.20 | \( \text{Y}_2\text{O}_3 \) | 0.70 | \( \text{BaO} \) | 22.44 | \( \text{RE}_2\text{O}_3 \) | 18.46 | \( \text{Na}_2\text{O} \) | 1.87 | \( \text{FeO} \) | 4.09 | \( \text{K}_2\text{O} \) | 0.03 | \( \text{MnO} \) | 0.00 | \( \text{H}_2\text{O} \) | [1.88] |
| \( 1 \) | \( 1 \) |

| 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; \( \text{RE}_2\text{O}_3 \) = \( \text{La}_2\text{O}_3 \) 2.14\%, \( \text{Ce}_2\text{O}_3 \) 10.69\%, \( \text{Pr}_2\text{O}_3 \) 1.25\%, \( \text{Nd}_2\text{O}_3 \) 3.21\%, \( \text{Sm}_2\text{O}_3 \) 0.70\%, \( \text{Gd}_2\text{O}_3 \) 0.26\%, \( \text{Dy}_2\text{O}_3 \) 0.21\%, \( \text{Er}_2\text{O}_3 \) 0.00\%, \( \text{H}_2\text{O} \) by difference; corresponds to \( \text{Na}_{0.83}\text{K}_{0.01}\text{Ba}_{2.01}\text{Ca}_{0.05}\text{Mg}_{0.02} \) \( \text{Ce}_{0.96}\text{RE}_{0.73}\text{Sr}_{0.42} \) \( \text{Fe}_{0.76}\text{Ti}_{2.94}\text{Th}_{0.02}\text{Si}_{8.06} \) \( \text{O}_{24.68} \) \( \text{OH}_{3.32} \).

**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 alkalic 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 Kvanejeld, in the Ilmaaussaq 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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