Arrojadite-(SrFe)  \[\text{SrFe}^{2+}(\text{CaNa}_{2})\text{Fe}^{2+13}\text{Al}(\text{PO}_{4})_{11}(\text{PO}_{3}\text{OH})(\text{OH})_{2}\]

Crystal Data: Monoclinic.  **Point Group:** m.  As slightly elongated crystals, to several hundred \(\mu\)m.


**Optical Properties:** Translucent.  **Color:** Yellow to yellowish red.  **Streak:** White.  
**Luster:** Vitreous.  
**Optical Class:** Biaxial (+).  \(\alpha = 1.654(1)\)  \(\beta = 1.657(2)\)  \(\gamma = 1.668(1)\)  2V(meas.) = 37(2)\(^{\circ}\)41(1)\(^{\circ}\)  2V(calc.) = 55\(^{\circ}\)  **Pleochroism:** Very weak, \(X = Y = \) colorless, \(Z = \) pale yellow.  **Absorption:** \(X \approx Y\).

**Cell Data:** **Space Group:** Cc.  \(a = 16.3992(7)\)  \(b = 9.9400(4)\)  \(c = 24.4434(11)\)  \(\beta = 105.489(1)\^{\circ}\)  \(Z = 4\)

**X-Ray Diffraction Pattern:** Calculated pattern.

<table>
<thead>
<tr>
<th>(a\times10^{-2})</th>
<th>(b\times10^{-2})</th>
<th>(c\times10^{-2})</th>
<th>(\beta\times10^{-2})</th>
<th>(\mu)</th>
<th>(R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.009 (100)</td>
<td>2.685 (70)</td>
<td>3.192 (41)</td>
<td>2.805 (28)</td>
<td>2.738 (28)</td>
<td>3.378 (26)</td>
</tr>
</tbody>
</table>

(1) Horrsjöberg, Värmland, Sweden; average electron microprobe analysis, \(H_2O\) and \(P_2O_5\) calculated; corresponds Sr\(_{0.01}Na_{1.20}(Ca_{0.59}Ba_{0.20}Pb_{0.03}K_{0.03})\{2\times 0.85(Fe^{2+}_{6.84}Mg_{3.61}Mn^{2+}_{3.33}Zn_{0.07}Li_{0.01})\times 1.00(Al_{1.00}Sc_{0.04})\{2\times 1.00[(OH)_{1.10}F_{0.90}]\{2\times 2.00[(P_{11.95}S_{0.02})\times 2\times 1.97O_{27}(OH)_{1.00}].

(2) \(SrFe^{2+}_{6}(CaNa_{2})Fe^{2+}_{13}Al(PO_{4})_{11}(PO_{3}OH)(OH)_{2}\).

**Polymorphism & Series:** Forms a series with dickinsonite.

**Mineral Group:** Arrojadite group.  \(A_2B_2CaNa_{2-3}M_{13}Al(PO_{4})_{11}(PO_{3}OH_{1.5})W_2\).

**Occurrence:** In metaquartzite formed under amphibolite facies conditions.

**Association:** Kyanite, muscovite, wagnerite, lazulite, rutile, quartz, fluorapatite.

**Distribution:** From Horrsjöberg, Värmland, Sweden [TL].

**Name:** Arrojadite indicates a member of the group with \(Fe^{2+}\) dominant at the \(M\) site; two suffixes indicate the dominant cation of the dominant valence state at the \(A\) and \(B\) sites. Honors Miguel Arrojado Ribeiro Lisbôa (1872-1932), Brazilian geologist.

**Type Material:** Mineral Museum, School of Mines, Paris, France (16926).

**References:**