Santafeite \( (\text{Na, Ca, Sr})_3(\text{Mn}^{2+}, \text{Fe}^{3+})_2\text{Mn}^{4+}_2(\text{VO}_4)_4(\text{OH, O})_5 \cdot 2\text{H}_2\text{O} \)  

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Crystal Data: Orthorhombic. Point Group: \( 2/m 2/m 2/m \). Acicular crystals, to 4 mm, in radial spherulitic aggregates.


Cell Data: Space Group: \( \text{B}22\text{2}_1 \). \( a = 9.25(2) \) \( b = 30.00(2) \) \( c = 6.33(2) \) \( Z = 4 \)

X-ray Powder Pattern: Grants district, New Mexico, USA. \( 14.88 \text{ (10)}, 7.47 \text{ (5)}, 2.702 \text{ (5)}, 2.788 \text{ (4)}, 1.667 \text{ (4)}, 3.66 \text{ (3)}, 3.39 \text{ (3)} \)

Chemistry:
\[
\begin{array}{ll}
\text{As}_2\text{O}_5 & 2.2 \quad 3.2 \\
\text{V}_2\text{O}_5 & 35.6 \quad 36.5 \\
\text{Al}_2\text{O}_3 & 1.1 \\
\text{Fe}_2\text{O}_3 & 0.9 \quad 1.1 \\
\text{Mn}_2\text{O}_4 & 16.6 \quad 16.5 \\
\text{MnO} & 13.7 \quad 13.3 \\
\text{MgO} & 0.9 \\
\text{CaO} & 6.2 \quad 5.2 \\
\text{SrO} & 6.0 \quad 8.5 \\
\text{Na}_2\text{O} & 4.1 \quad 5.0 \\
\text{H}_2\text{O} & 8.8 \quad [8.8] \\
\text{rem.} & 2.1
\end{array}
\]

Total \( 96.2 \quad [100.1] \)

(1) Grants district, New Mexico, USA; remnant includes CuO 0.5%, CoO 0.1%, NiO 0.1%, \( \text{UO}_3 \) 0.3%, \( \text{SiO}_2 \) + insoluble 0.8%, [cuprosklodowskite], \( \text{CO}_3 \) 0.3% [limestone]. (2) Do.; by electron microprobe, \( \text{Mn}^{2+} : \text{Mn}^{4+} \) from (1); corresponds to \( (\text{Na}_{1.44}\text{Ca}_{0.83}\text{Sr}_{0.74})\Sigma=3.00(\text{Mn}^{2+}_{1.37}\text{Mg}_{0.20}\text{Al}_{0.19}\text{Fe}_{0.12}^3)\Sigma=1.88(\text{Mn}^{2+}_{1.70}\text{Mn}^{2+}_{2.30})\Sigma=2.00\text{(VO}_4\text{)}_{3.59}(\text{AsO}_4\text{)}_{0.25}\Sigma=3.84\text{(OH)}_4\cdot 2.10\text{H}_2\text{O}. \)

Occurrence: Rarely incrusting fractures in limestone (Grants district, New Mexico, USA) and in sandstone (Monument No. 1 mine, Arizona, USA) in Colorado Plateau-type U–V deposits.

Association: Calcite, cuprosklodowskite (Grants district, New Mexico, USA); carnotite (Monument No. 1 mine, Arizona, USA).

Distribution: In the USA, from an unnamed uranium prospect about 20 km north of Grants, McKinley Co., New Mexico; at the Monument No. 1 mine, Monument Valley, Navajo Co., Arizona.

Name: For the Atchison, Topeka, and Santa Fe Railroad, on whose property the mineral was first found to occur, for their pioneering work in developing the uranium resources of the district.


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