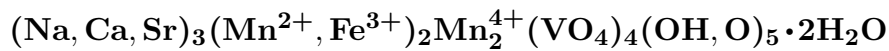


Santafeite

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

Physical Properties: *Cleavage:* {010}, perfect; {110}, distinct. *Tenacity:* Very brittle. Hardness = n.d. $D(\text{meas.}) = 3.379$ $D(\text{calc.}) = [3.39]$

Optical Properties: Opaque, translucent in thin fragments. *Color:* Black. *Streak:* Brown. *Luster:* Subadamantine.

Optical Class: Biaxial. *Pleochroism:* Pronounced; dark reddish brown to yellowish brown.

Orientation: $X = c$; parallel extinction. *Dispersion:* Distinct. *Absorption:* $X > Y > Z$.

$\alpha = 2.01$ $\beta = \text{n.d.}$ $\gamma = \text{n.d.}$ $2V(\text{meas.}) = \text{n.d.}$

Cell Data: *Space Group:* $B22_12$. $a = 9.25(2)$ $b = 30.00(2)$ $c = 6.33(2)$ $Z = 4$

X-ray Powder Pattern: Grants district, New Mexico, USA.

14.88 (10), 7.47 (5), 2.702 (5), 2.788 (4), 1.667 (4), 3.66 (3), 3.39 (3)

Chemistry:

| | (1) | (2) |
|--------------------------------|------|---------|
| As ₂ O ₅ | 2.2 | 3.2 |
| V ₂ O ₅ | 35.6 | 36.5 |
| Al ₂ O ₃ | | 1.1 |
| Fe ₂ O ₃ | 0.9 | 1.1 |
| MnO ₂ | 16.6 | 16.5 |
| MnO | 13.7 | 13.3 |
| MgO | | 0.9 |
| CaO | 6.2 | 5.2 |
| SrO | 6.0 | 8.5 |
| Na ₂ O | 4.1 | 5.0 |
| H ₂ O | 8.8 | [8.8] |
| rem. | 2.1 | |
| Total | 96.2 | [100.1] |

(1) Grants district, New Mexico, USA; remnant includes CuO 0.5%, CoO 0.1%, NiO 0.1%, UO₃ 0.3%, SiO₂ + insoluble 0.8%, [cuprosklodowskite], CO₃ 0.3% [limestone]. (2) Do.; by electron microprobe, Mn²⁺:Mn⁴⁺ from (1); corresponds to (Na_{1.44}Ca_{0.83}Sr_{0.73})_{Σ=3.00}(Mn_{1.37}²⁺Mg_{0.20}Al_{0.19}Fe_{0.12}³⁺)_{Σ=1.88}(Mn_{1.70}⁴⁺Mn_{0.30}²⁺)_{Σ=2.00}[(VO₄)_{3.59}(AsO₄)_{0.25}]_{Σ=3.84}[(OH), O]_{4.53}•2.10H₂O.

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.

Type Material: National Museum of Natural History, Washington, D.C., USA, 115882, 121957.

References: (1) Sun, M.-S. and R.H. Weber (1958) Santafeite, a new hydrated vanadate from New Mexico. *Amer. Mineral.*, 43, 677–687. (2) Dunn, P.J. and D.R. Peacor (1986) Santafeite, a re-examination and new empirical formula. *Mineral. Mag.*, 50, 299–300.

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