Saneroite $\mathbf{Na_2(Mn^{2+},Mn^{3+})_{10}(Si_{11},V^{5+})O_{34}(OH)_4}$

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. Tabular crystals, rarely prismatic to stocky, to 1 cm, in compact aggregates. *Twinning:* Present.

Physical Properties: *Cleavage:* Perfect in two perpendicular directions. Hardness = n.d. D(meas.) = 3.47 D(calc.) = 3.51

Optical Properties: Transparent to translucent. *Color:* Bright orange. *Luster:* Resinous to greasy.
Optical Class: Biaxial (–). *Pleochroism:* Strong; X = deep orange; Y = lemon-yellow; Z = yellow-orange. $\alpha = 1.715–1.725$ $\beta = 1.740–1.745$ $\gamma = 1.745–1.750$ 2V(meas.) = 40°–48°

Cell Data: *Space Group:* $P\bar{1}$. $a = 9.741(5)$ $b = 9.974(7)$ $c = 9.108(5)$ $\alpha = 92.70(4)°$ $\beta = 117.11(4)°$ $\gamma = 105.30(4)°$ Z = 1

X-ray Powder Pattern: Val Graveglia, Italy.
3.06 (s), 2.83 (s), 2.70 (s), 3.01 (m), 2.98 (m), 2.62 (m), 2.20 (m)

Chemistry:

	(1)
SiO_2	39.33
Fe_2O_3	0.36
As_2O_5	0.29
V_2O_5	6.60
MnO	40.13
CaO	0.25
Na_2O	4.53
H_2O^+	5.00
Total	96.49

(1) Val Graveglia, Italy; by electron microprobe, average of data collected on two zones of differing color, H_2O by TGA, valences from crystal structure analysis; corresponds to $Na_{2.40}(Mn^{2+}_{9.32}Fe^{3+}_{0.07}Ca_{0.07})_{\Sigma=9.46}(Si_{10.77}V^{5+}_{1.19}As^{5+}_{0.04})_{\Sigma=12.00}O_{35.30}\bullet 4.57H_2O$.

Occurrence: In veins in manganese ores associated with low-grade prehnite-pumpellyite facies metamorphic recrystallization of siliceous-hematitic sediments (Val Graveglia, Italy).

Association: Quartz, barite, caryopilite, ganophyllite (Val Graveglia, Italy); medaite, palenzonaite, pyrobelonite, fianelite, parsettensite, rhodochrosite, kutahorite, aegirine, quartz (Fianel mine, Switzerland).

Distribution: In Italy, at the Gambatesa and Molinello manganese mines, near Chiavari, Val Graveglia, Liguria, Italy. From the Fianel mine, Val Ferrera, Graubünden, Switzerland.

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Type Material: University of Genoa, Genoa; Municipal Museum of Natural History, Genoa, Italy.

References: (1) Lucchetti, G., A.M. Penco, and R. Rinaldi (1981) Saneroite, a new natural hydrated Mn-silicate. Neues Jahrb. Mineral., Monatsh., 4, 161–168. (2) Basso, R. and A. Della Guista (1980) The crystal structure of a new manganese silicate. Neues Jahrb. Mineral., Abh., 138, 333–342. (3) (1981) Amer. Mineral., 66, 1277–1278 (abs. refs. 1 and 2).