Sanmartinite $(Zn, Fe^{2+})WO_4$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Rare as crystals, to 60 μm, tabular on {001}, with {001}, {010}, {110}, {112}, {102}; typically in reticulated aggregates and fine-grained massive.

Physical Properties: *Cleavage:* On {010}, perfect. Hardness = n.d. D(meas.) = 6.70 D(calc.) = 7.87 (synthetic $ZnWO_4$).

Optical Properties: Translucent. *Color:* Reddish brown, with dark red internal reflections, dark brown to brownish black if massive. *Luster:* Resinous.
Optical Class: Biaxial. α = n.d. β = n.d. γ = n.d. 2V(meas.) = n.d.

Cell Data: *Space Group:* $P2_1/c$. $a = 4.702$ $b = 5.726$ $c = 4.948$ $\beta = 90°28'$ Z = 2

X-ray Powder Pattern: Synthetic $ZnWO_4$.
2.931 (100), 2.908 (90), 3.73 (40), 4.69 (35), 3.62 (35), 2.472 (35), 2.464 (35)

Chemistry:

	(1)	(2)	(3)
WO_3	72.62	73.41	74.02
FeO	7.24	4.67	
MnO	1.73	0.22	
ZnO	18.18	23.00	25.98
CaO	1.48		
insol.	0.24		
Total	[101.49]	101.30	100.00

(1) Los Cerrillos, Argentina; original total given as 101.25%; corresponds to $(Zn_{0.68}Fe_{0.31}Ca_{0.08}Mn_{0.07})_{\Sigma=1.14}(W_{0.95}O_4)$. (2) Do.; by electron microprobe, total Fe as FeO, total Mn as MnO; corresponds to $(Zn_{0.81}Fe_{0.18})_{\Sigma=0.99}WO_4$. (3) $ZnWO_4$.

Occurrence: A rare alteration product of scheelite in a quartz vein between granite and granite pegmatite intruding Precambrian crystalline schists.

Association: Willemite, scheelite, tourmaline, quartz.

Distribution: From Los Cerrillos, seven km southwest of San Martín, San Luis Province, Argentina.

Name: For its occurrence near San Martín, Argentina.

Type Material: The Natural History Museum, London, England, 1978,353; Academy of Natural Sciences, Philadelphia, 25575; Harvard University, Cambridge, Massachusetts, 134566; National Museum of Natural History, Washington, D.C., USA, 105681, 137479.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1072–1073. (2) Dunn, P.J. (1978) Sanmartinite: new data. Mineral. Mag., 42, 281. (3) Redfern, S.A.T., A.M.T. Bell, C.M.B. Henderson, and P.F. Schofield (1995) Rietveld study of the structural phase transition in the sanmartinite ($ZnWO_4$)–cuproscheelite ($CuWO_4$) solid solution. Eur. J. Mineral., 7, 1019–1028. (4) (1963) NBS Mono. 25, 2, 40.