Stefanweissite $(Ca, REE)_2Zr_2(Nb, Ti)(Ti, Nb)_2Fe^{2+}O_{14}$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As flattened prismatic crystals to 1.0 mm and acicular crystals to 2 mm, typically in radial aggregates. Dominant {001} with {011}, {010}, {111), and {100}.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = n.d. D(meas.) = n.d. D(calc.) = 5.254

Optical Properties: Translucent to transparent. *Color*: Brown, reddish brown to very dark brownish red, with red-brown internal reflections; thin needles are yellowish brown; in reflected light, pale gray with brown internal reflections. *Streak*: Light brown to yellow. *Luster*: Adamantine.
Optical Class: *n*(calc.) = 2.260
R_1-R_2: (470) 14.7-16.0, (546) 14.2-15.5, (589) 13.89-15.2, (650) 13.5-14.7

Cell Data: *Space Group*: *Cmca*. *a* = 7.2896(4) *b* = 14.1435(5) *c* = 10.1713(4) Z = 4

X-Ray Diffraction Pattern: In den Dellen pumice quarry, Laacher See volcano, Eifel region, Rhineland-Palatinate, Germany.
2.983 (100), 2.897 (71), 1.828 (38), 1.793 (25), 1.187 (19), 1.767 (16), 1.517 (10)

Chemistry:

	(1)		(1)
CaO	7.63	ThO_2	3.71
MnO	2.51	UO_2	1.09
FeO	7.86	TiO_2	17.32
Al_2O_3	0.25	ZrO_2	28.03
La_2O_3	2.28	HfO_2	0.91
Ce_2O_3	6.54	Nb_2O_5	19.96
Pr_2O_3	1.01	Total	99.69
Nd_2O_3	1.59		

(1) In den Dellen pumice quarry, Laacher See volcano, Eifel region, Rhineland-Palatinate, Germany; average electron microprobe and Raman spectroscopic analyses; corresponds to $Ca_{1.13}(Ce_{0.33}La_{0.12}Nd_{0.08}Pr_{0.05})_{\Sigma=0.58}Th_{0.12}U_{0.03}Mn_{0.29}Fe_{0.91}Al_{0.04}Zr_{1.89}Hf_{0.04}Ti_{1.80}Nb_{1.19}O_{14}$.

Occurrence: In cavities inside sanidinite volcanic ejecta.

Association: Sanidine, nosean, biotite, augite, titanite, ferriallanite- (La), magnetite, baddeleyite, a pyrochlore-group mineral.

Distribution From In den Dellen (Zieglowski) pumice quarry, 1.5 km northeast of Mendig, Laach Lake (Laacher See) volcano, Eifel region, Rhineland-Palatinate, Germany.

Name: Honors PhD *Stefan Weiss* (b. 1955), German geologist, mineralogist, petrologist, and editor of *LAPIS* magazine since May 1993, thereby effectively promoting mineralogy among collectors and amateurs.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (5191/1).

References: (1) Chukanov, N.V., N.V. Zubkova, I.V. Pekov, M.F. Vigasina, Y.S. Polekhovsky, B. Ternes, W. Schüller, S.N. Britvin, and D.Y. Pushcharovsky (2019) Stefanweissite, $(Ca,REE)_2Zr_2(Nb,Ti)(Ti,Nb)_2Fe^{2+}O_{14}$, a new zirconolite-related mineral from the Eifel paleovolcanic region, Germany. Mineral. Mag., 83, 607-614. (2) Haifler, J., R. Škoda, J. Filip, A.O. Larsen, and J. Rohlíček (2021) Zirconolite from Larvik Plutonic Complex, Norway, its relationship to stefanweissite and nöggerathite, and contribution to the improvement of zirconolite end-member systematics. Amer. Mineral., 106, 1255-1272.