# A new kristiansenite-like mineral from post-magmatic mineralization in the Szklarska Poręba granite?

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A mineral similar to kristiansenite, unusually highly enriched in scandium, was found in ore-mineralized granitic pegmatite at the Szklarska Poręba Huta quarry in Lower Silesia, SW Poland (latitude: 50.82778, longitude: 15.48944). Previously in the locality were discovered kristiansenite Ca4Sc2Sn2(Si2O7)2(Si2O6OH)2, silesiaite Ca4Fe3+2Sn2(Si2O7)2(Si2O6OH)2 and kozłowskiite Ca4Fe2+Sn3(Si2O7)2(Si2O6OH)2, forming the kristiansenite group [1-4].

It is a high-temperature mineral that crystallises from a Ca-bearing fluid phase, forming an inclusion in scheelite that is one of the mineral components of the polymetallic ore assemblage superimposed on this pegmatite. Cassiterite, Sc-bearing nioboixiolite-(Fe2+), Sc-bearing nioboixiolite-(Mn2+), scandiobabingtonite, kristiansenite, silesiaite, kozłowskiite and chamosite were recognized as the associated phases also occurring in the form of inclusions in scheelite.

The empirical formula calculated based on16 cations and 28 (O,OH) anions is (all Fe as Fe3+): (Ca3.878Mn0.121)Σ3.999 (Sc2.385Sn1.324Fe3+0.155Nb0.058Al0.051Ti0.016Zr0.008Ta0.005)Σ4.001 (Si7.982Al0.018)Σ8.000 O25.457(OH)2.543. The formula shown in terms of the cation and anion valences is: (2+)3.999(3+2.5914+1.3485+0.063) (4+7.9823+0.018) (2–25.4571–2.543).

This composition suggests the ideal formula Ca4Sc3Sn(Si2O6OH)3(Si2O7), which requires 20.59 calculated weight % CaO, 18.99 wt% Sc2O3, 13.83 wt% SnO2, 44.12 wt% SiO2, 2.48 wt% H2O; Total 100 wt.%.

The mineral is isostructural with kristiansenite, silesiaite, and kozłowskiite, with the space group symmetry assigned as *C*1 with α and γ angles very close to 90°. Thus, as in the case of the other three minerals of the kristiansenite group, the structure of this new mineral is metrically monoclinic but structurally triclinic.

Crystal system: triclinic Space group: *C*1

*a* = 10.0753(5) Å *b =* 8.4542(2) Å *c* = 13.3605(4) Å

*α* = 90.002(3)° *β* = 109.395(2)° *γ* = 89.995(2)°

*V* = 1073.45(5) Å3 *Z* = 2

The refinement of 278 structural parameters in *C*1 (positional and anisotropic displacement parameters for non-hydrogen atoms and positional parameters of hydrogen atoms) gave an *R*1 index of 3.08 % [*R*1(all) = 4.10 %], w*R*2 index of 7.07 % and goodness of fit parameter *S* = 1.069.

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