# Nybergite, kristiansenite-like mineral from post-magmatic mineralization in the Szklarska Poręba granite?

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Nybergite was found in an ore-mineralized granitic pegmatite in the Szklarska Poręba Huta quarry in Lower Silesia, SW Poland (latitude: 50.82778, longitude: 15.48944). Previously in the locality were discovered kristiansenite, silesiaite (2017-064) and kozłowskiite (2021-081) forming the kristiansenite group [1-4].

It is a high-temperature mineral crystallizing from a Ca-bearing fluid phase and it forms an inclusion in scheelite that is one of mineral components of polymetallic ore mineralization superimposed on a granitic pegmatite in the Szklarska Poręba Huta quarry. Cassiterite, Sc-bearing nioboixiolite-(Fe2+), Sc-bearing nioboixiolite-(Mn2+), scandiobabingtonite, kristiansenite, silesiaite, kozłowskiite and clinochlore were recognized as the associated phases also occurring in form of inclusions in scheelite.

The empirical formula calculated on the basis of16 cations and 28 (O,OH) anions is: (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).

The ideal formula is 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.%.

Nybergite, Ca4Sc3Sn(Si2O7)(Si2O6OH)3 (Z = 2), is isostructural with kristiansenite, silesiaite, and kozłowskiite, showing *C*1 structure with α and γ angles very close to 90°. Thus, similarly as in the case of the remaining three minerals of the kristiansenite group, the nybergite structure 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* = 1

The refinement of 276 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 2.91 % [*R*1(all) = 3.76 %], and goodness of fit parameter *S* = 1.091.

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