

Atypical kristiansenite-like mineral from post-magmatic mineralization in the Szklarska Poręba granite

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Karkonosze granite is the largest Variscan pluton in the Western Sudetes, located at the northeastern edge of the Bohemian Massif. It consists mainly of porphyritic to equigranular granite, with minor two-mica and granophyric granite, as well as lamprophyric and aplite dykes. The only active quarry in the Polish part of the massif is in Szklarska Poręba.

Coarse-crystalline granite hosts NYF-type granitic pegmatites, forming lenses and nests up to several tens of centimeters in size. These pegmatites, along with granophyric granite and quartz veins, contain W-Sn-Mo-Bi and Th-U-REE mineral associations. Identified scandium and Sc-rich minerals include thortveitite, scandiobabingtonite, kristiansenite, nioboixiolite-(Mn²⁺/Fe²⁺), kozłowskiite, silesiaite, and titanite [1 - 4].

In hydrothermal mineralization superimposed on pegmatite, kristiansenite occurs as oscillatory zoned crystals containing up to ~10 wt% Sc₂O₃, representing a solid solution with silesiaite Ca₄Fe³⁺₂Sn₂(Si₂O₇)₂(Si₂O₆OH)₂. However, in the scheelite accompanying disseminated wolframite, a mineral similar to kristiansenite, containing up to 15.15% wt% Sc₂O₃, was found, far exceeding the maximum Sc₂O₃ content in kristiansenite known to date (13.33 wt% Sc₂O₃ Heftetjern, Norway [5]; 13.58 wt% Sc₂O₃ Jordanów Śląski, Poland, *unpublished data*). Simultaneously, the mineral is noticeably deficient in tin, containing only 16.68 wt% SnO₂, which suggests a replacement of Sc by Sn. Consequently, due to the difference in sizes of ^{VI}Sc³⁺ and ^{VI}Sn⁴⁺ cation radii (0.745 Å versus 0.69 Å [6], the mineral has the largest unit-cell among the minerals of the kristiansenite group: *a* = 10.0756(4) Å, *b* = 8.4545(2) Å, *c* = 13.359(8) Å, *α* = 90.002(2)°, *β* = 109.389(4)°, *γ* = 89.995(2)°, and *V* = 1073.44(8) Å³, suggesting the evolution of this kristiansenite-like mineral towards an ideal composition of Ca₄Sc₃Sn(Si₂O₇)(Si₂O₆OH)₃.

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