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MINERALIZATION STYLES RELATED TO A HIDDEN LATE-VARISCAN GRANITE INTRUSION: THE DISTRICT OF OELSNITZ (VOGTLAND SYNCLINORIUM, GERMANY)

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The mining district of Oelsnitz covers an area of approximately 100 km² (**Fig 1**). Mining has taken place since the middle ages until 1991. The historic activities were directed towards Sn, Fe, Cu and Ag, whereas the last and most intense period comprised the exploitation of fluorspar around Schönbrunn.

Since the first comprehensive geological studies of the area, the mineralizations have been regarded to be spatially and genetically related to a granite intrusion (**Fig. 2**), which is not exposed at the surface. The existence of the granite is indicated by a ca. 5 km² large area of contact-metamorphosed shales (**Fig. 1**), was additionally supported by geophysical surveys and was eventually proved by several exploration drillings that intersected the rock body directly in depths of about 500 m. During the 1980s, the granite was dated by Rb/Sr yielding an age of 297±3 Ma as well as by U/Pb yielding an age of 300-310 Ma assigning the intrusion age to the late Variscan orogeny (cf. Kuschka and Hahn 1996). Geochemical analyses of granite drill cores (Kämpf et al. 1991) yielded elevated contents in F (3000 ppm, n=9), Li (30 ppm, n=9) and Rb (471 ppm, n=4).

Most types of mineralization are linked to NW-trending fault systems that are in parts readily traceable for several kilometers due to their locally developed mineralization (**Fig. 1**). The fault-related mineralizations chiefly comprise quartz±cassiterite±sulfide veins (**Figs. 4, 5**) up to several decimeters in thickness and fluorite-quartz-adularia veins (**Fig. 3**) up to 10 m or more in thickness (Kuschka and Hahn 1996). Apart from mineralized veins, the studied area shows occurrences of skarn-type sulfidic mineralization and metasomatites (**Figs. 6, 7, 8**) related to metamorphosed limestones and basalts of Devonian age and Ordovician shales, respectively. Investigations of sulfide ores of one particular occurrence revealed contents of indium in sphalerite up to 0.7 at% and the presence of discrete In-minerals (Doering et al. 1994). The examination of two additional metasomatite bodies confirmed considerable indium enrichments in bulk ores up to 140 ppm. The In-carrier minerals have not yet been identified though (Richter 2014).

While a metallogenetic relation between vein-style mineralizations and the hidden pluton is probable, the role of the intrusion within the formation of the skarns is not yet established sufficiently. The objective of the ongoing studies is to further constrain the genetic and age relations of the different types of mineralization by the latest geochemical and geochronological methods.

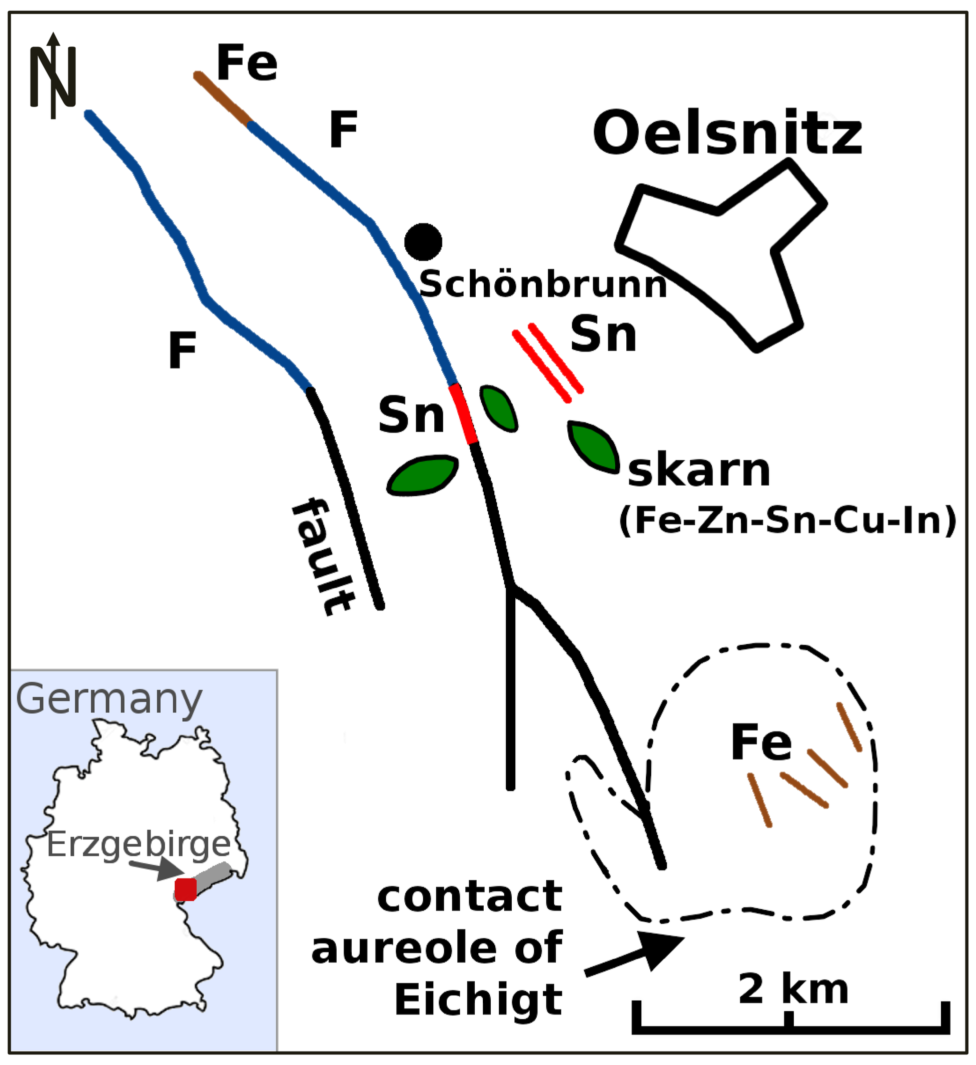

Fig. 1: Geological sketch map of the Oelsnitz district showing the distribution of commodities in the different fault related mineralizations and the skarns

Fig. 2: Representative drill core sample of the Eichigt granite showing medium grain size; quartz, K-feldspar, plagioclase, micas as major components; greenish color due to intense hydrothermal overprint; width of field: 12 cm

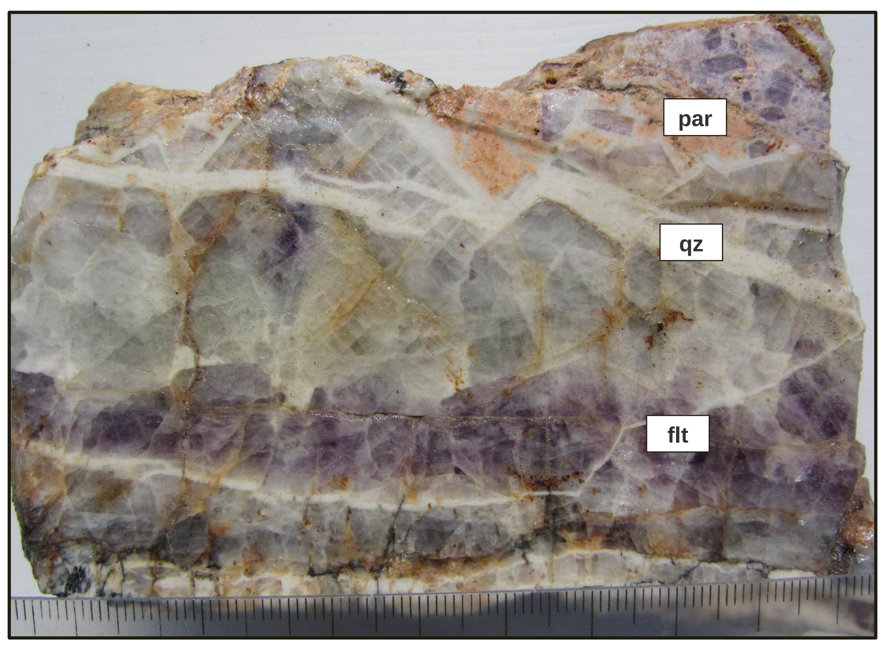

Fig. 3: Fluorite-quartz-paradoxite vein sample; width of field: 11 cm; Schönbrunn mine

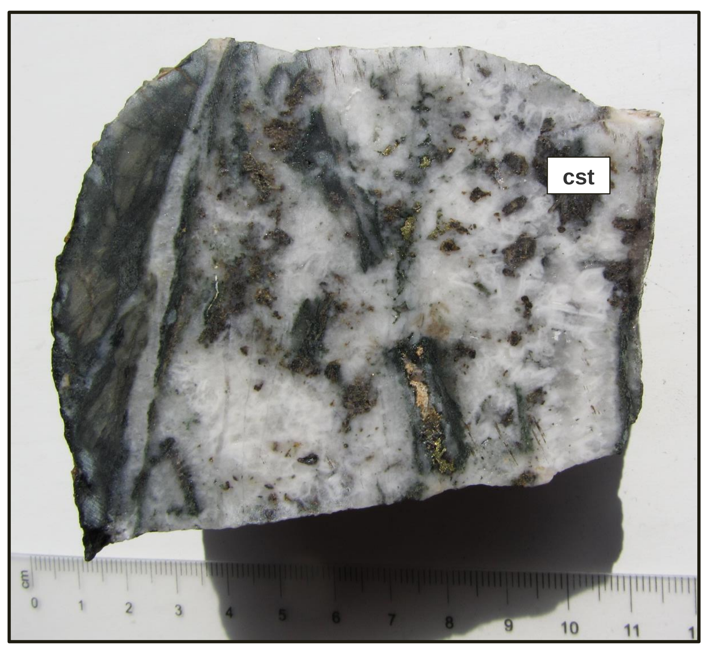

Fig. 4: Quartz-cassiterite vein sample; width of field: 12 cm; Oelsnitz-SW

Fig. 5: Quartz-sulfide vein sample containing arsenopyrite and minor pyrite; width of field: 11 cm; Oelsnitz-SW

Fig. 6: Garnet-rich chloritic skarn sample; width of field: 15 cm; eastern Oelsnitz skarn

Fig. 7: Magnetite-rich, layered skarn sample; width of field: 14 cm; eastern Oelsnitz skarn

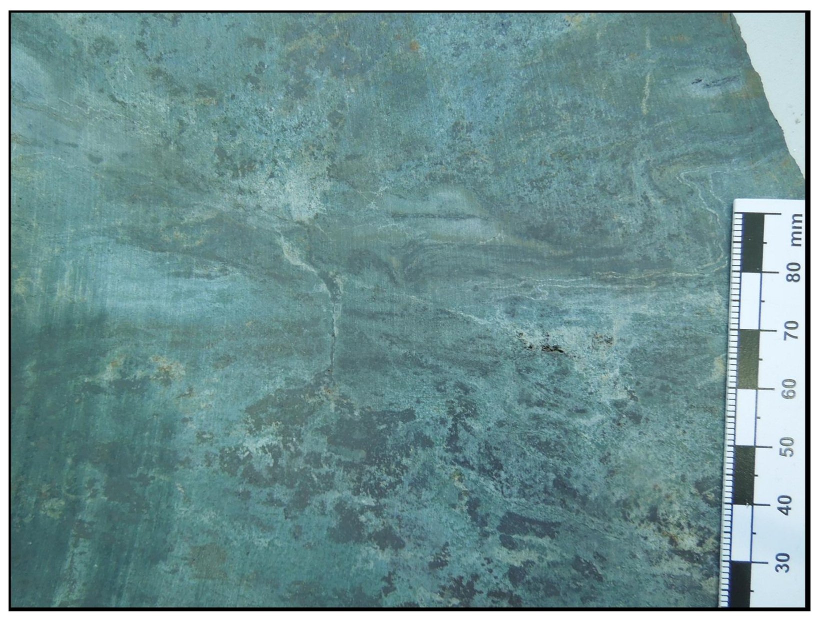

Fig. 8: Chlorite-magnetite metasomatite sample; width of field: 14 cm; western Oelsnitz skarn

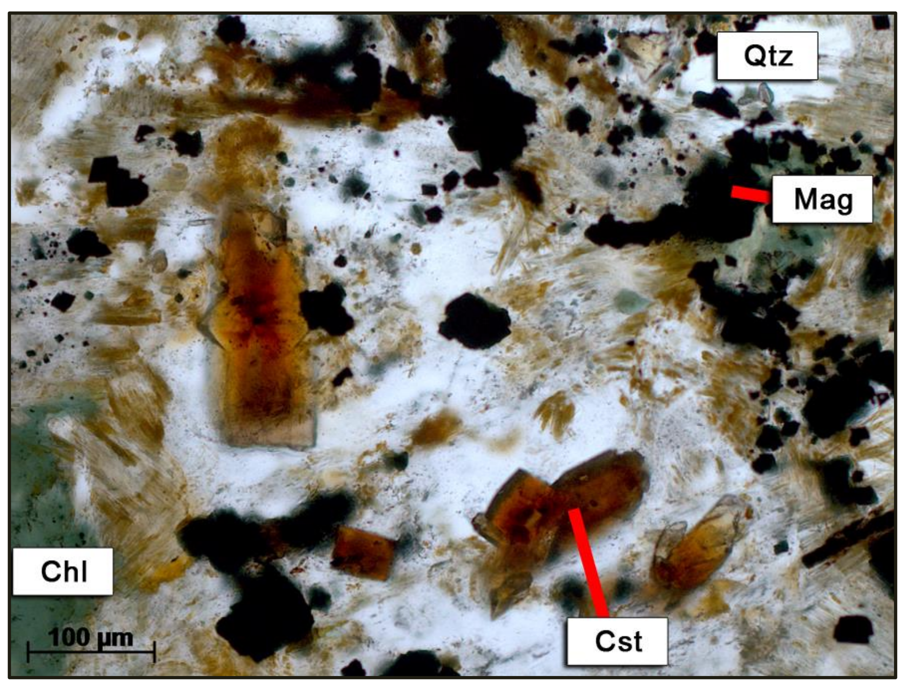

Fig. 9: Cassiterite bearing, magnetite-rich quartzeous skarn; thin section, transmitted light, parallel polarizers; eastern Oelsnitz skarn

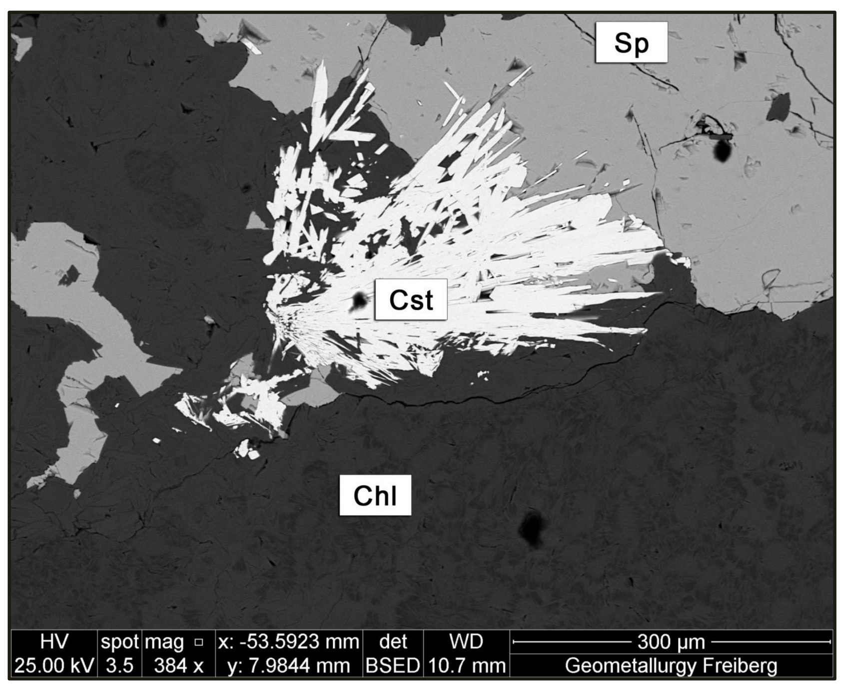

Fig. 10: Acicular cassiterite and sphalerite in chloritic matrix; thin section, BSE image; eastern Oelsnitz skarn

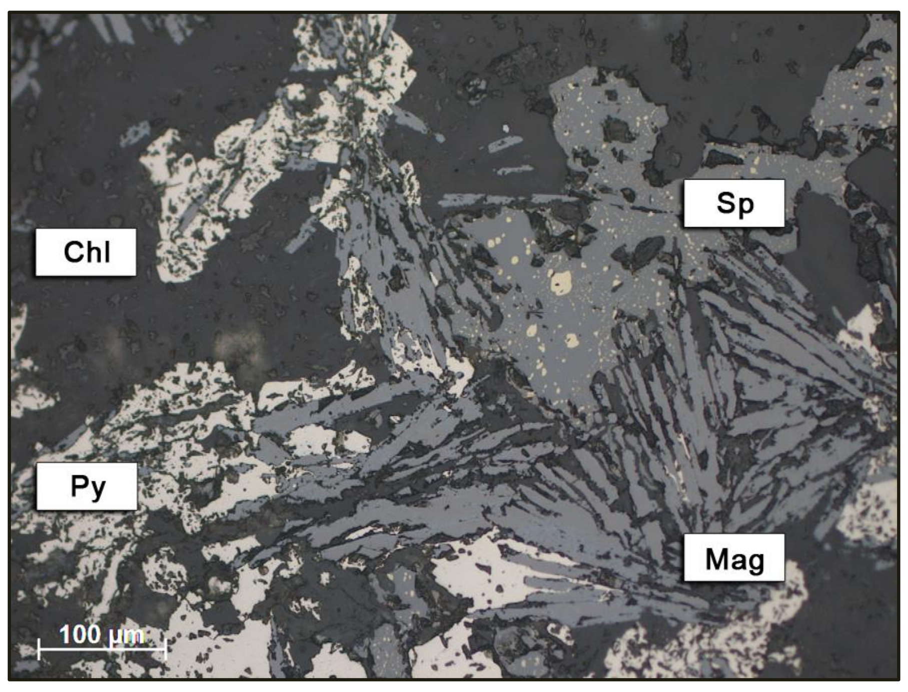

Fig. 11: Sphalerite and pyrite intergrown with chlorite and platy magnetite; thin section, incident light, parallel polarizers; eastern Oelsnitz skarn

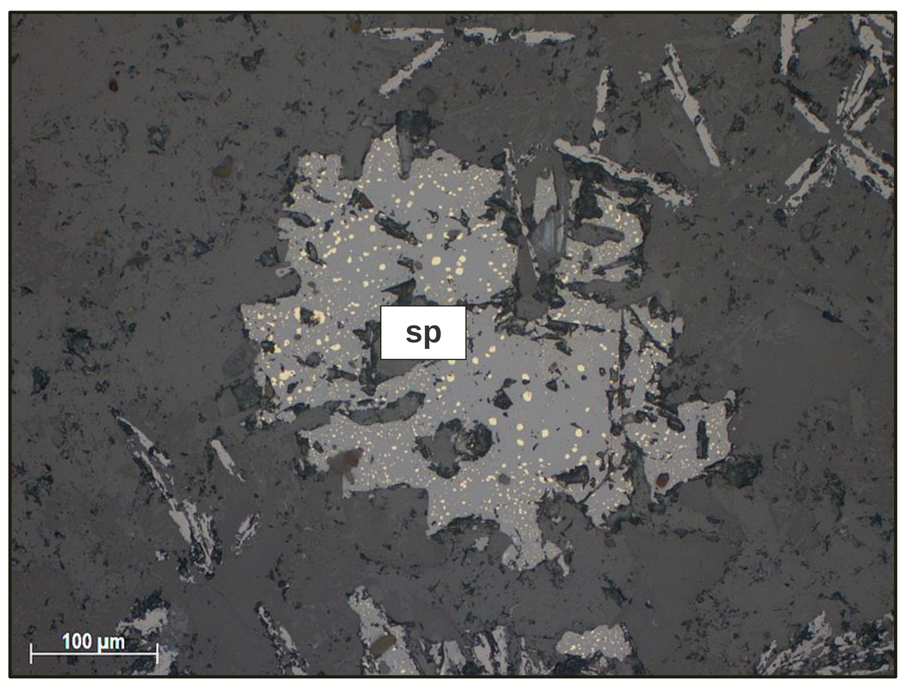

Fig. 12: Sphalerite featuring chalcopyrite diseases; thin section, incident light, parallel polarizers; western Oelsnitz skarn

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