TECHNISCHE UNIVERSITÄT BERGAKADEMIE FREIBERG
Die Ressourcenuniversität. Seit 1765.

GOLDSCHMIDT® PARIS 2017 | AUGUST 13-18

# RARE ELEMENT BEARING SKARNS IN THE DISTRICT OF OELSNITZ-SCHÖNBRUNN, VOGTLAND SYNCLINORIUM, GERMANY

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## INTRODUCTION

The mining district of Oelsnitz-Schönbrunn (**Fig. 1**) is situated in the Vogtland region on the southwestern margin of the Erzgebirge and has hosted different mining activities from the 15th century until 1991 when the mining for fluorite ceased. The mineral parageneses of the district are regarded to be related to the late-Variscan "Eichigt-Schönbrunn" granite intrusion, which is not exposed at the surface (e. g., Kuschka & Hahn 1996).

## SKARN OCCURRENCES

Apart from vein type mineralizations some minor skarn bodies occur that constitute an important objective of studies in the current research project WISTAMERZ. The skarn ores within the district contain different types of garnet, pyroxenes and epidote and they are known to host Zn and Sn mineralizations (up to 0,5 wt.-% Sn; Richter 2014). The most important skarn locality is the "Ludwig Fundgrube", an abandoned open pit mine exploited for magnetite ore (**Fig. 2**).

## PETROGRAPHY

In the course of recent investigations another skarn occurrence was discovered and material from this new locality shows significant metal contents (**Tab. 1; Fig. 3, 4, 5**) as well. The mineral assemblage is dominated by garnets, hedenbergite and epidote along with quartz and fluorite impregnations (**Fig. 7**). The garnet component of the skarns is characterized by intense chemical zoning, which is especially obvious in SEM analyses (**Fig. 6**). Different members of the grossular-andradite series with Fe or Al domination occur. Additionally, an OH-bearing garnet has been encountered that presumably represents an alteration product.

## ORE MINERALIZATION

The most abundant ore minerals are magnetite, sphalerite (**Fig. 8, 9**) and scheelite (**Fig. 10**). Pyrite, chalcopyrite, galena and bismuthiferous phases exist subordinately. The main Sn-bearing mineral is cassiterite as acicular aggregates (**Fig. 11**), while a significant proportion of the elemental Sn content also is incorporated in silicate minerals like titanite (up to 9 wt.% Sn, by EDS). Furthermore, members of the helvine-genthelvite series as Be-carrier were encountered (**Fig. 7**), which are known from other skarn occurrences in the Erzgebirge area as well (e. g., Schützel 1970).

| Element | Be (ppm) | In (ppm) | Sn (ppm) | W (ppm) | Zn (wt %) |
|---|---|---|---|---|---|
| "SK5" | 90 | 19 | 680 | 25 | 1.6 |
| "SK6" | n.d. | 14 | 960 | 35 | 0.5 |
| "SK22" | n.d. | 6 | 500 | 775 | 2.1 |

**Tab. 1:** Trace element contents of the bulk skarn samples SK5, SK6, SK22 (Fig. 3-5). Analyses: ALS Romania by ICP-AES (Zn) and ICP-MS (Be, In, Sn, W); n.d. - not determined.

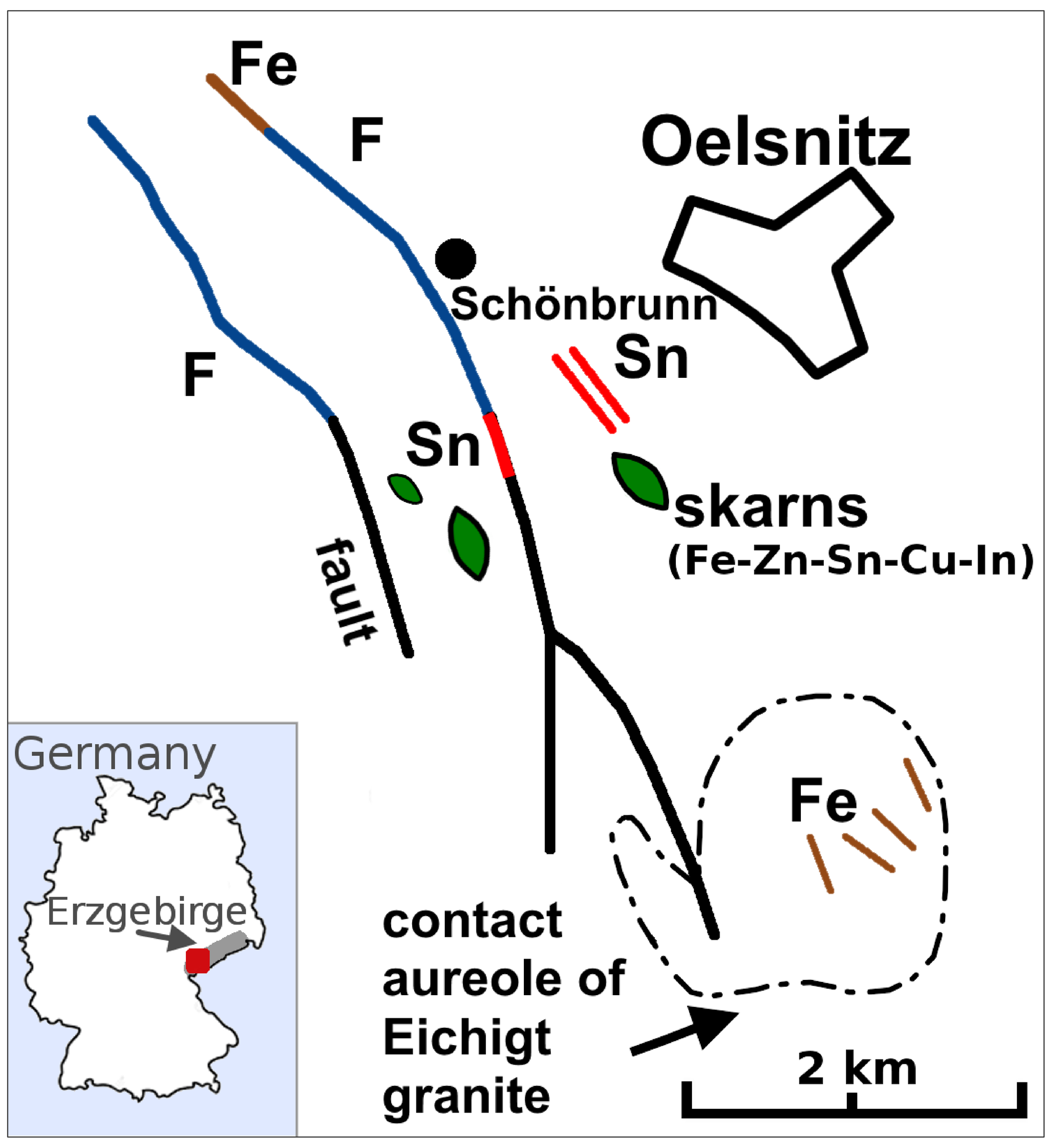


**Fig. 2:** Outcrop of former "Ludwig Fundgrube" magnetite open pit near Oelsnitz.

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


**Fig. 3:** Garnet-rich skarn rock, euhedral garnet crystals exhibit zoning; sample SK5.


**Fig. 4:** Epidote-rich skarn, sphalerite bearing; sample SK22.


**Fig. 5:** Magnetite-rich skarn with abundant chlorite; sample SK6.

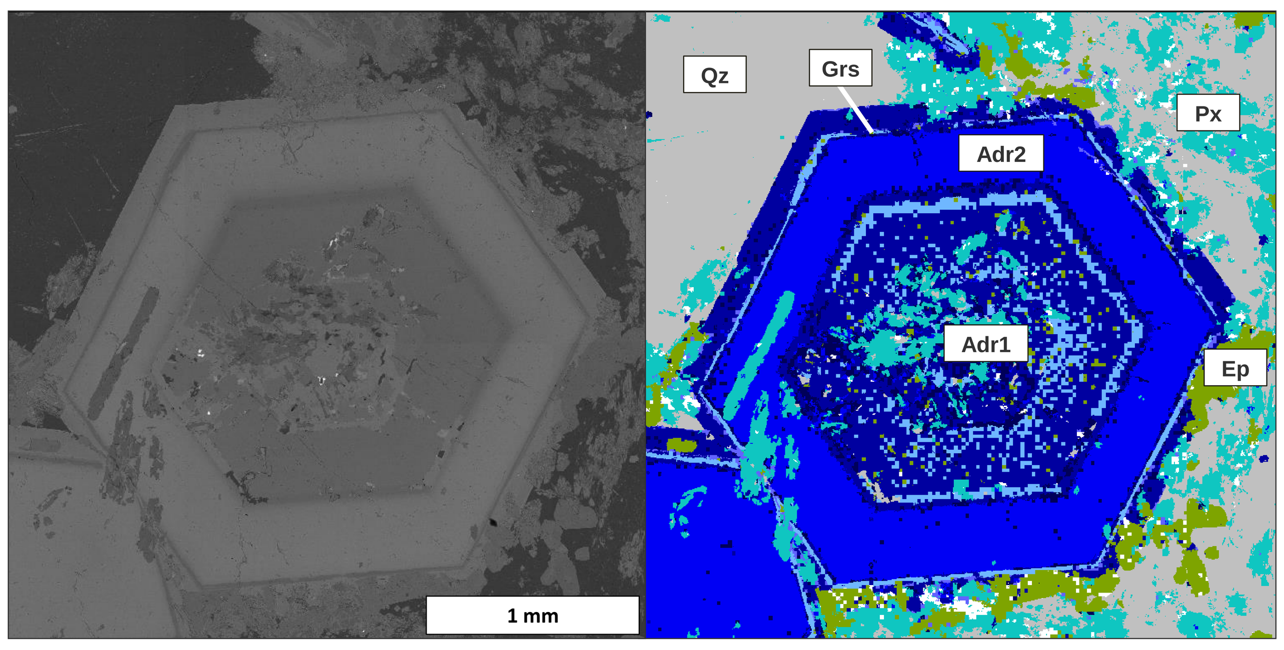


**Fig. 6:** BSE image and GXMAP of a zoned garnet with andraditic core and a grossular-andradite rim in quartz-pyroxene-epidote matrix; thin section; sample SK5.

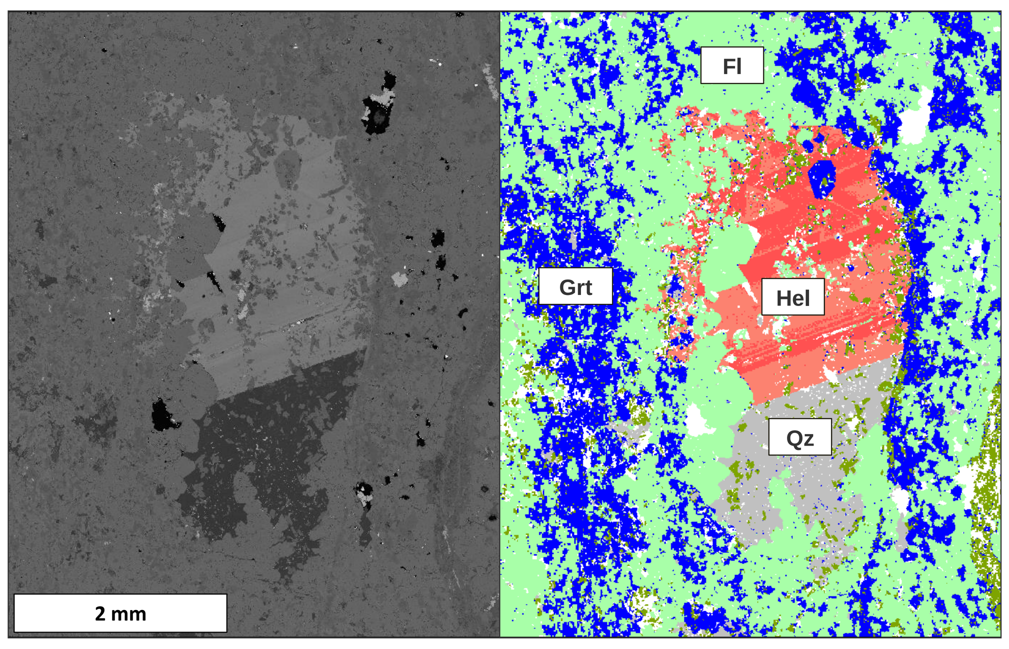


**Fig. 7:** BSE image and GXMAP of chemically zoned helvine-genthelvite ($Be_3(Mn^{2+},Zn)_4(SiO_4)_3S$) associated with quartz, garnet and fluorite; thin section; SK22.

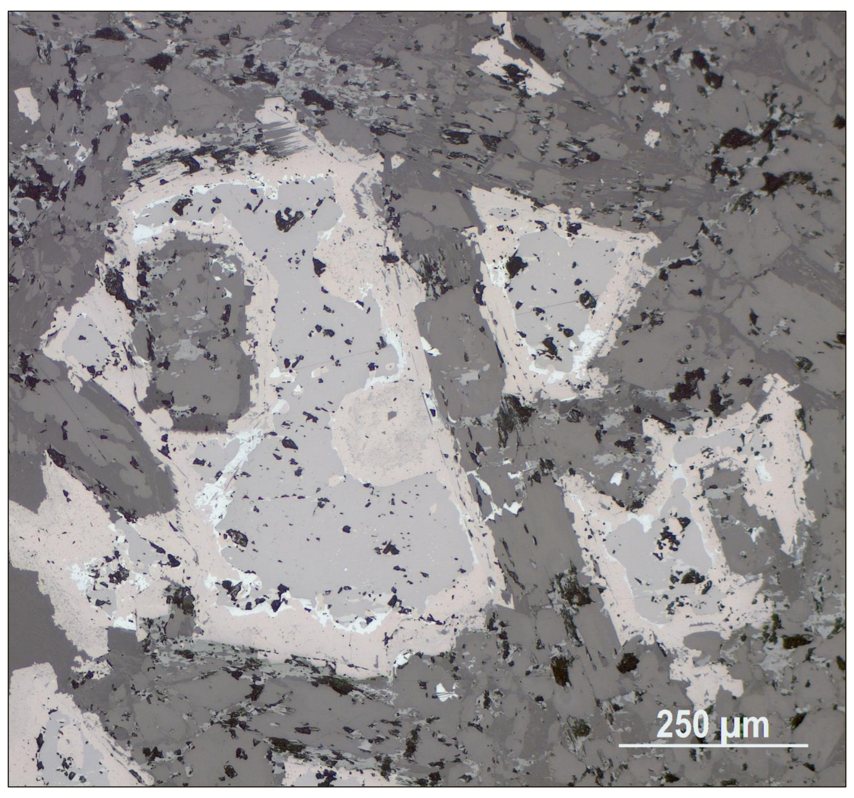


**Fig. 8:** Sphalerite (grey) corroded by magnetite (light brown) and hematite (light grey); thin section, reflected light, parallel polarizers; sample SK22.

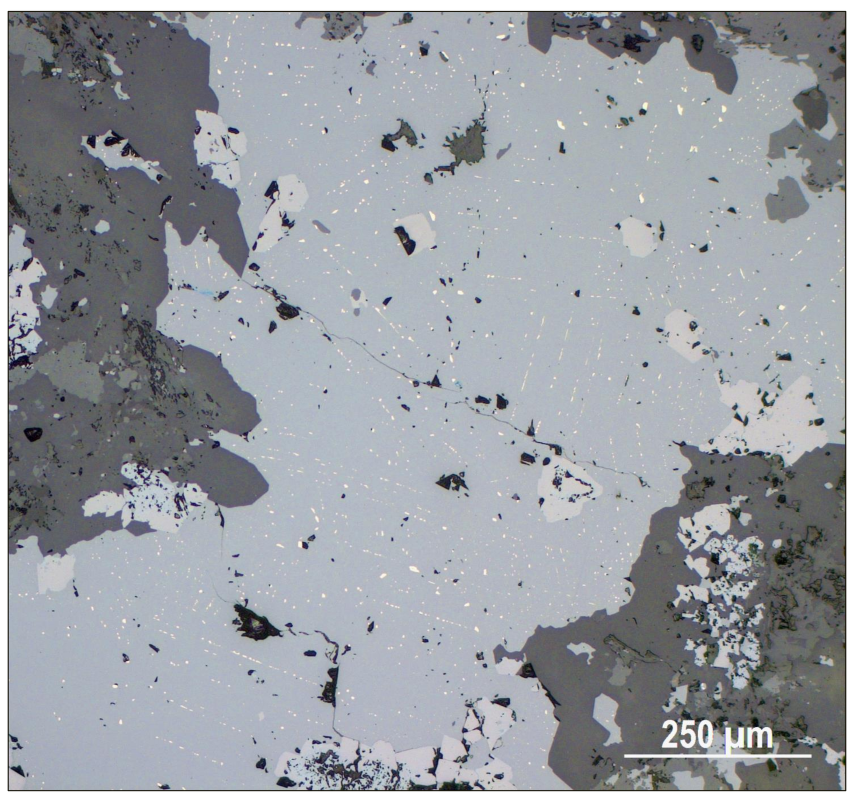


**Fig. 9:** Sphalerite (grey) containing oriented chalcopyrite diseases (yellow); thin section, reflected light, parallel polarizers; sample SK5.

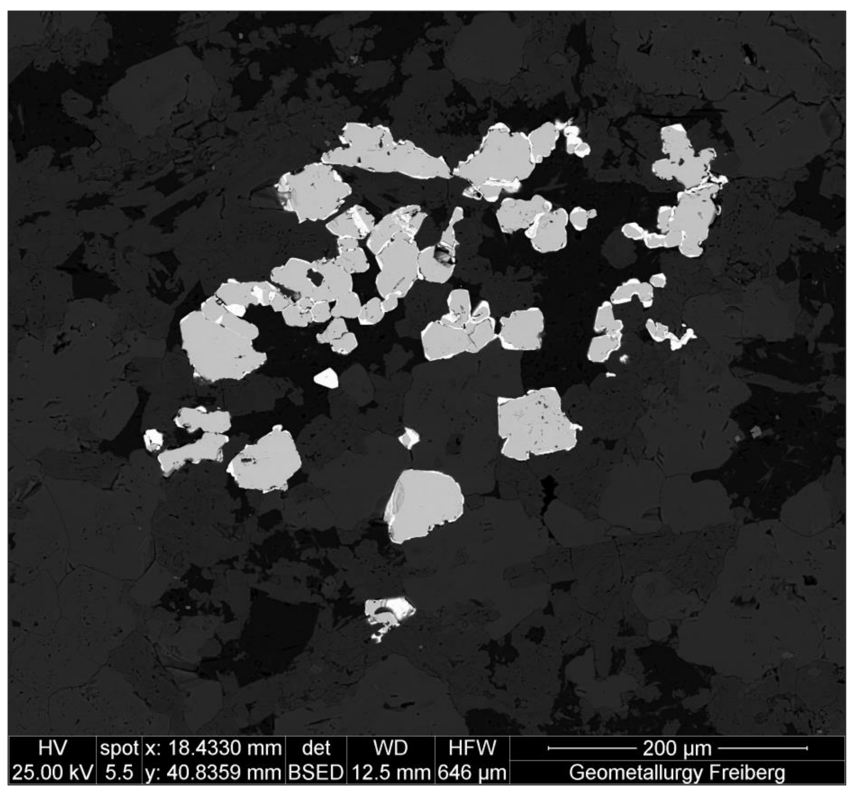


**Fig. 10:** Scheelite (grey), partly replaced by stolzite (white), thin section, BSE image; sample SK5.

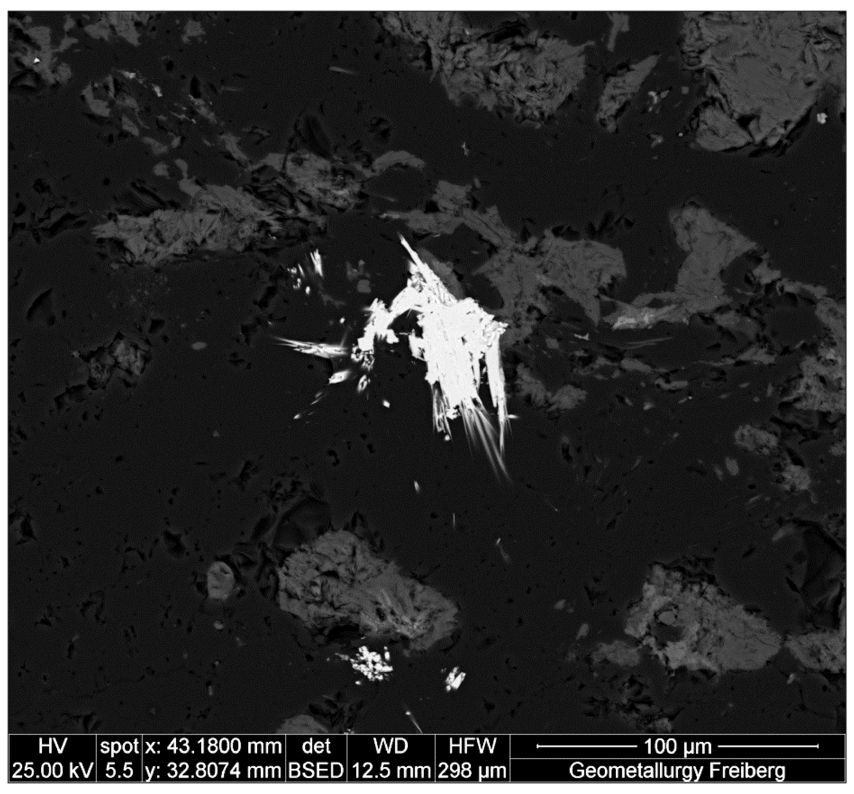


**Fig. 11:** Acicular cassiterite in chlorite-quartz matrix, thin section, BSE image; sample SK22.

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