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FLUID INCLUSIONS IN DETRITIC SCHEELITE FROM LOWER SILESIAN ALLUVIA

by

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The studied area is situated in the northern margin of the Bohemian Massif in Central Sudetes and represents the eastern part of the European Variscan Belt. A recent exploration program carried out by Polish Geological Survey showed that scheelite prospects occur in several areas of Sudetes (MIKULSKI, 1997a). For location of primary scheelite, in addition to the ultraviolet (UV) luminescence observations, the detailed heavy minerals sampling of gravel sediment and thermobarometric studies were also made.

The considered area is built of the Variscan Klodzko-Zloty Stok Massif (KZM) and its eastern metamorphic cover, which belongs to Orlicko-Snieznickie Crystallinicum (OSC). The OSC unit is composed of Proterozoic and Lower Paleozoic metasedimentary rocks intercalated with variable amounts of metavolcanites affected by Cadomian and Hercynian metamorphism. Typical profile includes: mica schists, plagioclase paragneisses with intercalations of marbles, amphibolites, quartzites, graphitic schists and migmatic gneisses with eclogite pods and orthogneisses as well. This metamorphic complex is intruded by small body of syntectonic Jawornik granitoids (JM) which is about 35 Ma older than KZM (using K-Ar dating - 298 Ma; DEPCIUCH, 1972). The KZM is built of metaluminous calc-alkaline rocks of cafemic association with common mafic enclaves (WIERZCHOLOWSKI, 1976). This intrusion, just recently is interpreted as „Andean-type" plutonism within European Hercynides (LORENC, 1994). The roof of the KZM is covered by patchy distributed relicts of sedimentary cover, now represented by hornfelses and amphibolites. Metallogenic processes are developed along eastern and southeastern border of KZM especially strong in the „Zloty Stok" As-Au deposit. In the vicinities of Droszków primary scheelite (+ gold) mineralization of contact-metasomatic and stockwork types were found (MIKULSKI, 1997b).

In the Klodzko region over 250 panned concentrates were collected from the tributary streams of the Biala Ladecka River (Fig. 1). In the field, a total of 20l samples of sand and gravel was collected, each from surface of about 1 m^2 and down to 0,5 m deep of the active channel. Sampling was systematically performed every 250 m along the courses and at the confluence sites. The sediment was sieved (2 mm sieve) and the undersize concentrated using a Siberian pan.

For the detailed mineralometric analysis heavy-minerals concentrate was split into six fractions: > 1, 1-0.8, 0.8-0.6, 0.6-0.4, 0.4-0.2, < 0.2 mm). The representative scheelite grains from each of 5 areas (Jaszkowa, Droszków, Orlowiec, Trzebieszowice and Lutynia) were used to determine the type of scheelite mineralization and compared with primary source mineralization.

Fluid inclusions were investigated in scheelite grains both from the *in situ* mineralization and in detritic samples. Inclusions were small, usually not exceeding 10 μm in length. In all samples only primary inclusions were consideded for this study. They were frequently euhedral (negative crystals), what, when inclusions were isometric, caused serious problems during the investigations, because they were almost completely opaque due to complete internall reflection of light. Thus the study is based mostly on the inclusions of tabular habit. The routine heating and freezing methods for inclusion studies were applied. Both from massive and from grain samples double-polished preparations were prepared.

The scheelite grains contained aqueous solution inclusions as well as apparently pure carbon dioxide and mixed carbon dioxide-aqueous inclusions. This allowed to determine not only homogenization temperatures of the inclusions (250-300°C), but also pressures (0.8-0.9 kbar) and crystallization temperatures (330-370°C) for the *in situ* samples. Similar data were obtained for the detritic scheelite: homogenization temperatures 260-350°C, pressures 0.8-1.1 kbar and crystallization temperatures 350-460°C. Total salt concentrations in inclusion solutions ranged from 2 to 7 wt. %. The fluid inclusion data from the detritic scheelite split in two groups: those similar to the *in situ* scheelite and other differing distinctly. This made possible to indicate the parent areas for some alluvial scheelite accumulations.

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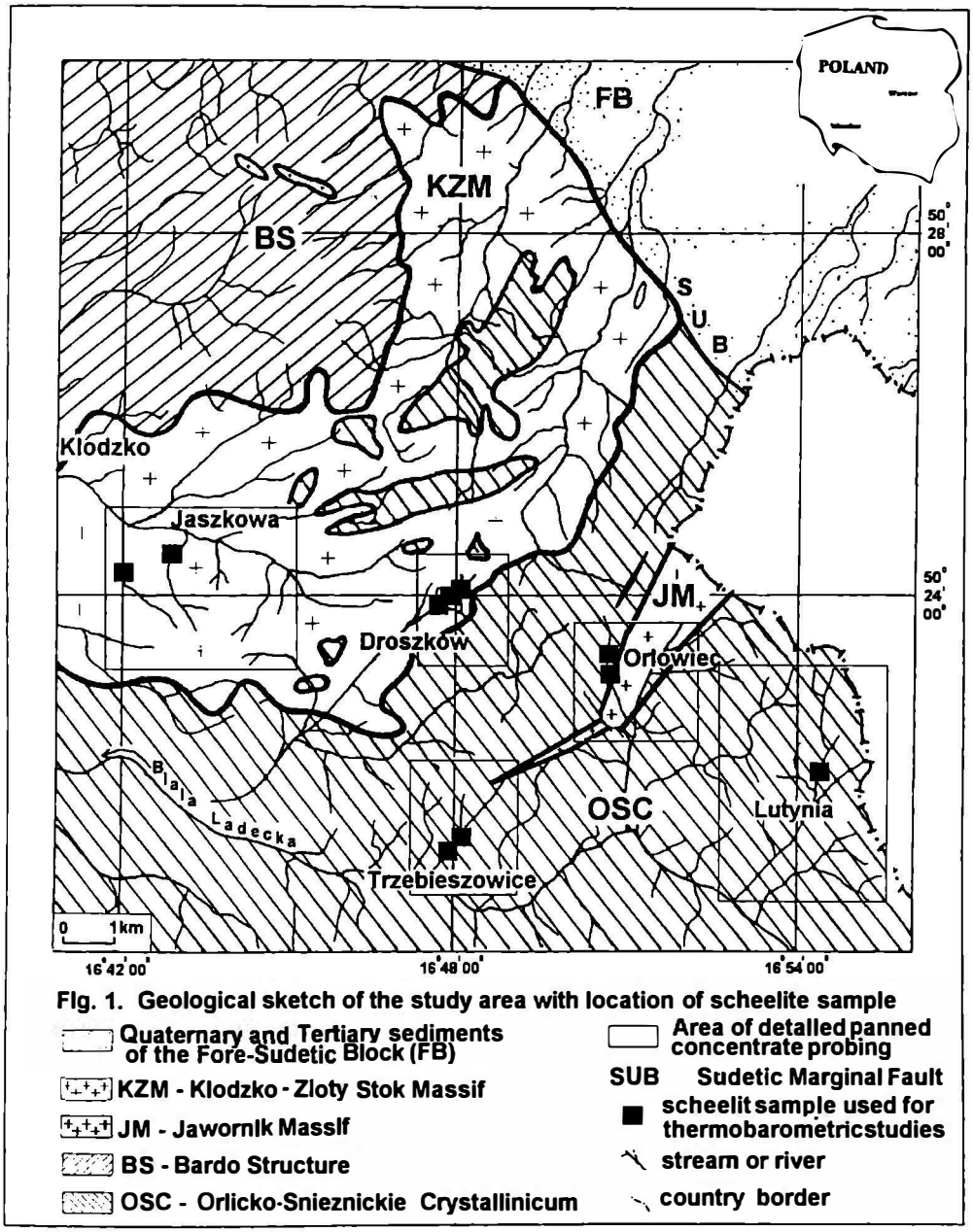

Fig. 1. Geological sketch of the study area with location of scheelite sample