Abstract

This study focuses on the analysis of scheelite from eight genetically distinct localities in the Bohemian Massif using cathodoluminescence (CL) with a cold – cathode, in order to practically assess whether any differences in luminescence spectra could be utilized in ore deposits prospecting or in studying the conditions of mineralization formation.

The samples were divided into three basic categories according to their origin: 1) magmatic – hydrothermal mineralization, which is divided into three subgroups: a) late Variscan Sn – W granites of Saxothuringian region (samples W3 and W6); b) rocks in the poličské krystalinikum with local development of pegmatites and skarns (W7); c) W – skarn mineralization that is spatially and likely genetically related to granites of the Central Bohemian Pluton (W4; W8); 2) vein hydrothermal mineralizations associated with fluids of metamorphic – magmatic or metamorphic origin (W5; W2); 3) stratiform mineralizations in the Moldanubian region affected by regional metamorphism (W1).

The absolute maximum intensity of the CL spectra of scheelite corresponds to the influence of the WO_4^{2-} group. The analysis revealed slight variability in the intensity of the CL spectra between individual samples. Sample W3 (Cínovec) showed the lowest CL intensity values, while sample W7 (Budislav) showed the highest.

Samples W1 (Kašperské Hory), W2 (Obří důl), W4 (Vrbík), W6 (Krupka), W7 (Budislav), and W8 (Chlumy) showed similar spectral characteristics with a dominant broad band in the range of 430 to 460 nm, corresponding to luminescence caused by the WO_4^{2-} group. In sample W1, some CL spectra showed a noticeable shift from the position of 435 nm to higher wavelenghts. Bands characteristic of rare earth elements were faint or completely absent. The exceptions are samples W3 (Cínovec) and W5 (Jílové u Prahy), where, in addition to the main band corresponding to luminescence caused by the WO_4^{2-} group, there were also distinct narrow bands of rare earth elements (Eu^{3+}, Dy^{3+}, Sm^{3+}, Er^{3+} and Nd^{3+}). The CL spectra of sample W3 also showed a noticeable shift of the main band from the position of 435 nm to higher wavelengths (up to 525 nm).