PŮVODNÍ PRÁCE/ORIGINAL PAPER

Mineralogická charakteristika dvou typů hydrotermálních žil s obsahem REE minerálů z lomu u Vrbčan (kutnohorské krystalinikum)

Mineralogy of two types of hydrothermal veins containing REE minerals from the quarry near Vrbčany (Kutná Hora Crystalline Complex)

Zdeněk Dolníček* a Jana Ulmanová

Mineralogicko-petrologické oddělení, Národní muzeum, Cirkusová 1740, 193 00 Praha 9;
**e-mail: zdenek_dolnicek@nm.cz*

Dolníček Z, Ulmanová J (2019) Mineralogická charakteristika dvou typů hydrotermálních žil s obsahem REE minerálů z lomu u Vrbčan (kutnohorské krystalinikum). Bull Mineral Petrolog 27(2): 331-345 ISSN 2570-7337

Abstract

Two types of hydrothermal veins containing REE minerals were found in an abandoned quarry at Vrbčany. Steeply dipping veins cut migmatitized gneisses of the Kutná Hora Crystalline Complex. The Alpine-type veins are formed by quartz, chlorite (thuringite-chamosite) and muscovite, whereas another type of vein is dominated by quartz and pyrite accompanied by accessory chalcopyrite and K-feldspar. Chlorite geothermometry indicates crystallization of paragenetically old chlorite between 380 and 330 °C. Grains of REE minerals (monazite, allanite and rarely also bastnäsite) disseminated in quartz gangue exhibit identical textural features and chemical composition in both vein types. All REE minerals are characterized by low extent of fractionation of REE (La_N/Sm_N = 2.04 - 4.98), suggesting low contents of strong REE-complexing ligands in the parent fluids. The evolution of Eu anomalies of REE minerals (always negative in older monazite and bastnäsite, both negative and positive in younger allanite) indicates a decrease of temperature to ~200 °C and/or an increase of Eh during crystallization of the vein. The nature of both studied mineralizations corresponds to the Alpine-type veins with low content of calcium. A main source of mineral-forming components can be suggested in the host rocks. However, chemical composition of allanite, chlorite and pyrite (containing "exotic" components including Ca, NH_4, Ni and Co) implies for regional circulation of parent fluids involving also other rock types of the Kutná Hora Crystalline Complex as well as its cover formations. Very suitable conditions for mobilization of REE and subsequent crystallization of REE minerals can be assumed during formation of the quartz-pyrite vein because of the increased quantity of REE minerals (especially monazite) in the vein fill, which exceeds common accessory occurrence. Younger activity of hydrothermal and probably also supergene fluids is evidenced by alteration of chemical composition and partial dissolution of part of grains of REE minerals.

Key words: *Alpine-type veins, chlorite, monazite, allanite, bastnäsite, chemical composition, chlorite geothermometry, Kutná Hora unit, Bohemian Massif*

Obdrženo 9. 9. 2019; přijato 8. 11. 2019