PŮVODNÍ PRÁCE/ORIGINAL PAPER

Těžba pokrývačských břidlic v oblasti Zálužné - Mokřinky (Slezsko, Česká republika) a s ní spojené supergenní minerály

Slate industry at Zálužné - Mokřinky area (Silesia, Czech Republic) and its associated supergene minerals

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Abstract

The development of the slate industry in North Moravia and Silesia is closely linked to the development of cities, industry and education, which required new types of cheap and non-flammable roofing material, durable tile material, slate writing tables and other products. Another factor was the intensive development of trade through rail transportation after 1840. This led to the fact that in the 1860s there were as many as one hundred active slate quarries between Opava and Olomouc towns, which employed up to 2000 workers and produced about 118 million pieces of slate roof- ing plates (scales) and about 140000 m^2 of paving each year. This boom ended at the beginning of 20th century, with the general expansion of the circular furnace (ceramic industry), cement-cladding tiles, and cheap sheet metal roofing. In the area Zálužné-Mokřinky first quarries are reported from the first half of the 19th century. The large modern open- ing of the Zálužné-Mokřinky slate deposit begun in 1866 with the newly established Slate Stock Company in Olomouc (Schieferbergbau AG Olmütz). Slate mining at the place reached yearly production 36000 m^2 of roofing at the turn of the 19th and 20th centuries. After the lower horizons were exhausted, the underground quarry was closed (1928) due to high operating costs. Local slates belong to the Early Carboniferous (Viséan) siliciclastic flysch sequence of the Varicsan foreland basin. Goniatite fauna proved its belonging to the Moravice Formation. In 2018, we sampled supergene minerals in the underground slate quarry (mine) of the Slate Stock Company. They are forming at the sides of open chamber, at the footwall, and on the backfill material. With a combination of the powder X-ray diffraction, EDS, and WDS scpectroscopy, we identified a number of supergene minerals, connected to the acid drainage of the pyrite from the slates. Most abundant is acicular gypsum with aggregates of aluminite. Common are thin coatings of jarosite. Botryoidal coatings of Si or Si-Al hydroxides belong to series between *alumogen* and allophane. Thin tabular crystals of lanthanite-(La) and lanthanite-(Ce) are locally bounded to their surface. Schwertmannite, goethite, and ferrihydrite-2L were identified from the straws of ferric minerals. There is an evidence of their microbially-supported precipitation. Oxidic manganese minerals accompany *alumogel* and ferrihydrite. Most common is buserite-Ca with an average formula $Ca_{1.75}Mg_{0.32}Na_{0.02}Ni_{0.07}Co_{0.02}Zn_{0.02}(Mn_{11.25}Si_{0.09}Al_{0.02}Fe_{0.01})_{\Sigma 11.37}F_{0.06}O_{25.00}\cdot nH_2O$ (recalculated for all Mn quadrivalent, 25 oxygens, and moisture-free base). Centres of the buserite aggregates are formed by birnessite with average formula $Ca_{0.41}Mg_{0.07}Ni_{0.01}Zn_{0.01}(Si_{0.02}Mn^{3.75+}_{1.82})_{\Sigma 1.84}F_{0.01}O_{4.00}\cdot 1.37H_2O$ (valency of Mn 3.75+, 4 oxygens, water calculated from the Mn/H_2O ratio). Recent calcite and aragonite mineralization was also noted.

Key words: *supergene minerals, biomineralization, aluminite, alumogel, allophane, lanthanite-(La), lanthanite-(Ce), schwertmannite, ferrihydrite-2L, buserite-Ca, birnessite, history of slate mining, roofing slate industry, Early Carboniferous, Silesia, Czech Republic*

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