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PŮVODNÍ PRÁCE/ORIGINAL PAPER

## Dachiardit-Ca, ferrierit-Mg a sprievodná zeolitová mineralizácia v dutinách chalcedónov na lokalitách Byšta, Brezina a Kuzmice (Slanské vrchy, Slovenská republika)

### Dachiardite-Ca, ferrierite-Mg and associated zeolite mineralization in chalcedony cavities from localities Byšta, Brezina and Kuzmice (Slanské vrchy Mts., Slovak Republic)

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#### Abstract

An interesting zeolite association has been identified at the localities Byšta, Brezina and Kuzmice, consisting of mordenite, clinoptilolite-Ca, dachiardite-Ca and ferrierite-Mg. Dachiardite-Ca (from Byšta and Brezina) and ferrierite-Mg (from Brezina) represent first recorded occurrences in the Slovak Republic. Zeolite mineralization occurs as white to gray crystalline fillings in small chalcedony cavities and crusts, developed in strongly altered Miocene rhyolites (Byšta and Brezina) or silicified andesites (Kuzmice). Crystals of dachiardite-Ca have acicular shapes, and are grouped into the radial, spherical and sheaf-like aggregates. Their average size ranges about 1 - 3 mm. Dachiardite-Ca from Byšta and Brezina is monoclinic, space group  $C2/m$  with following unit-cell parameters refined from X-ray powder diffraction data:  $a$  18.618(8),  $b$  7.498(3),  $c$  10.284(4) Å,  $\beta$  108.36(3)°,  $V$  1362.4(1.3) Å<sup>3</sup> and  $a$  18.616(12),  $b$  7.492(5),  $c$  10.271(6) Å,  $\beta$  108.27(5)°,  $V$  1360.2(2.0) Å<sup>3</sup>, respectively. Chemical analysis is corresponding to the average empirical formula  $(Ca_{1.12}K_{0.78}Na_{0.16})_{\Sigma 3.52}(Al_{3.52}Si_{20.56}O_{48}) \cdot 13H_2O$  for dachiardite-Ca from Byšta and  $(Ca_{1.37}Na_{0.48}K_{0.25}Ba_{0.02}Mg_{0.02})_{\Sigma 3.65}(Al_{3.65}Si_{20.37}O_{48}) \cdot 13H_2O$  for dachiardite-Ca from Brezina. Ferrierite-Mg from Brezina forms acicular crystals and spherical aggregates of average size up to 1 mm. It is orthorhombic, space group  $Immm$  with following unit-cell parameters refined from X-ray powder diffraction data:  $a$  19.084(4),  $b$  14.151(2),  $c$  7.4932(16) Å,  $V$  2023.7(1) Å<sup>3</sup>. Chemical analysis of ferrierite-Mg is corresponding to the following average empirical formula:  $(Mg_{1.14}Ca_{0.48}Ba_{0.40}K_{0.28}Na_{0.16}Fe_{0.01})_{\Sigma 2.47}(Al_{5.09}Si_{31.06}O_{72}) \cdot 20H_2O$ . PXRD as well as quantitative chemical data for clinoptilolite-Ca and mordenite are also provided in this paper. The formation of studied zeolites is associated with post-magmatic fluids significantly enriched in Si, which likely circulated during the younger stages of Miocene volcanic activity in the Slanské vrchy Mts. Hydrothermal fluids were probably generated from Si-rich rocks, represented predominantly by rhyolites under low temperature conditions (120 - 250 °C).

**Key words:** zeolite, dachiardite-Ca, clinoptilolite-Ca, ferrierite-Mg, mordenite, Byšta, Brezina, Kuzmice, Slanské vrchy Mts., Slovak Republic

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