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PŮVODNÍ PRÁCE/ORIGINAL PAPER

# Zeofylit, tobermorit, fluorapofylit-(K) a doprovodná zeolitová mineralizace z Křížového vrchu u Cvikova v Lužických horách (Česká republika)

Zeophyllite, tobermorite, fluorapophyllite-(K) and accompanying zeolite mineralization from Křížový vrch near Cvikov in Lužické hory Mts. (Czech Republic)

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## Abstract

Zeophyllite, tobermorite, kenotobermorite, fluorapophyllite-(K) and associated zeolites were found in cavities of Cenozoic basaltic rocks of small abandoned quarry at western slope of the Křížový vrch hill (443 m a.s.l.), 1.5 km NE from Cvikov, 13 km NNE from Česká Lípa, Lužické hory Mountains, Czech Republic. Zeophyllite forms colorless spherical aggregates with pearly lustre usually 3 - 4 mm in size, aggregates with diameter up to 1 cm were observed only rarely. It is trigonal, space group *R*-3, with unit-cell parameters refined from PXRD: *a* 9.362(2), *c* 36.470(12) Å and *V* = 2768.3(1.2) Å<sup>3</sup>. Chemical analyses of zeophyllite correspond to the empirical formula (Ca<sub>12.84</sub>Na<sub>0.07</sub>)<sub>Σ12.91</sub>(Si<sub>9.83</sub>Al<sub>0.26</sub>)<sub>Σ10.09</sub>O<sub>28</sub>(OH)<sub>1.43</sub>F<sub>8.42</sub>·6H<sub>2</sub>O. Tobermorite occurs as snow-white hemispherical to spherical aggregates up to 1 cm in size, it replaces earlier zeophyllite. It is monoclinic, space group *Bm*, with unit-cell parameters refined from PXRD: *a* 6.714(4), *b* 17.375(4), *c* 22.670(8) Å, *γ* 123.31(3)° and *V* 938.2(1.3) Å<sup>3</sup>. On the base of chemical analyses, tobermorite with empirical formula (Ca<sub>4.55</sub>Na<sub>0.03</sub>K<sub>0.02</sub>)<sub>Σ4.60</sub>(Si<sub>5.40</sub>Al<sub>0.60</sub>)<sub>Σ6.00</sub>O<sub>15.56</sub>(OH)<sub>1.44</sub>·5H<sub>2</sub>O is accompanied by more rare Ca-poor kenotobermorite with empirical formula (Ca<sub>3.99</sub>Na<sub>0.04</sub>)<sub>Σ4.03</sub>(Si<sub>5.60</sub>Al<sub>0.40</sub>)<sub>Σ6.00</sub>O<sub>14.62</sub>(OH)<sub>2.38</sub>·5H<sub>2</sub>O. Fluorapophyllite-(K) forms abundant prismatic crystals up to 0.5 - 2 cm in size. It is colorless to white with vitreous to greasy lustre. It is tetragonal, space group *P4/mnc*, with unit-cell parameters refined from PXRD: *a* 9.0157(13), *c* 15.7889(19) Å and *V* = 1283.4(3) Å<sup>3</sup>. Chemical analyses of fluorapophyllite-(K) correspond to the empirical formula (K<sub>0.81</sub>Na<sub>0.24</sub>)<sub>Σ1.05</sub>Ca<sub>4.06</sub>(Si<sub>7.25</sub>Al<sub>0.47</sub>)<sub>Σ8.00</sub>O<sub>20</sub>F<sub>1.05</sub>·8H<sub>2</sub>O. Other zeolites, thomsonite-Ca, chabazite-Ca, phillipsite-Ca and -K, were found in association; their PXRD data, unit-cell parameters and chemical compositions are given in the paper.

**Key words:** zeophyllite, tobermorite, kenotobermorite, fluorapophyllite-(K), chabazite-Ca, phillipsite-K, phillipsite-Ca, thomsonite-Ca, Cenozoic basaltic rocks, powder X-ray diffraction data, unit-cell parameters, chemical composition, Křížový vrch near Cvikov, Czech Republic

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