

Chabazite-Mg: A new natural zeolite of the chabazite series

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ABSTRACT

Chabazite-Mg, $(\text{Mg}_{0.67}\text{K}_{0.52}\text{Ca}_{0.48}\text{Na}_{0.08}\text{Sr}_{0.03})_{\Sigma 1.78}[(\text{Al}_{3.16}\text{Si}_{8.89})_{\Sigma 12.05}\text{O}_{24}] \cdot 9.68\text{H}_2\text{O}$, is a new zeolite species of the chabazite series, occurring in basalts of the Karikás-tető area of Prága Hill, Veszprém County, Balaton Highland, Transdanubia, West Hungary. It crystallizes as single, colorless rhombohedra up to 0.4 mm in size. The streak is white and the luster is strong vitreous. Mohs' hardness is about 4. The observed density is 1.98(1) g/cm³ and the calculated density is 1.964(7) g/cm³. Chabazite-Mg is anisotropic, uniaxial (+), $\omega = 1.465(5)$, $\epsilon = 1.469(5)$ (546 nm). In its chemical composition, a pre-dominance of Mg is observed among the extraframework cations. However, K and Ca are also very abundant, while Na and Sr levels are very low. The ratio Si/(Si+Al) is among the highest found in chabazite of hydrothermal genesis. Chabazite-Mg is rhombohedral, $R\bar{3}m$ space group, $a = 9.3433(5)$ Å, $\alpha = 94.894(4)^\circ$. The six strongest X-ray lines measured in the powder pattern [d in Å (hkl)] are: 9.306 (60) (100), 5.537 (37) ($1\bar{1}\bar{1}$), 4.958 (25) (111), 4.315 (100) ($20\bar{1}$), 2.924 (78) ($3\bar{1}\bar{1}$), 2.869 (41) (310). Single-crystal structure refinement of chabazite-Mg indicated that the extraframework occupation is distinct from other chabazite-series minerals. In particular, the Mg site (C3a) and one water site (W6a) are displaced from the threefold axis parallel to [111].

Keywords: Zeolite, chabazite, chemical composition, physical properties, structure refinement