

Slawsonite-celsian-hyalophane assemblage from a picrite sill (Prague Basin, Czech Republic)

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ABSTRACT

The first European occurrence of slawsonite is reported from a picrite sill within Upper Ordovician strata of the Prague Basin near the village of Rovina, Czech Republic. The rare slawsonite forms an interstitial phase in association with abundant celsian and hyalophane, replacing the original calcic plagioclase (bytownite). A study of this curious natural slawsonite-celsian-hyalophane assemblage provides a valuable insight into feldspar stability and petrogenesis. Whole-rock geochemical signatures of the picrite sill and underlying doleritic basalt intrusion show conspicuous enrichment in Sr and Ba superimposed on normal basaltic multielement patterns. These two elements were most likely introduced by intergranular fluids during diffusional seafloor metasomatism (rodingitization and serpentinitization) of the picrite. Strontian and barian feldspars precipitated directly from BaO-SrO-H₂O-bearing fluid, which caused decomposition of plagioclase to vuagnatite, aqueous SiO₂ and Al₂O₃ at $T \leq 350$ °C. Subsequently, vuagnatite decomposed to hydrogrossular and excess SiO₂ was consumed by serpentinitization of olivine. At the expense of aqueous Al₂O₃, serpentine reacted to chlorite closing the picrite alteration at 320–160 °C. Pressure did not exceed 0.5 GPa. The in situ EDS analyses indicate that the chemical composition of the slawsonite is Sl₉₁Cn₃An₃Ab₃ (core) to Sl₈₂Cn₃An₄Ab₉Or₂ (rim), the celsians range from Cn_{96.9}An_{0.3}Ab_{0.2}Or₂Sl_{0.6} to Cn_{76.3}An_{4.7}Ab₃Or_{15.7}Sl_{0.3}, and the hyalophanes vary from Cn_{72.2}An_{1.4}Ab_{5.1}Or_{21.1}Sl_{0.2} to Cn_{57.3}An_{0.8}Ab_{3.1}Or_{38.5}Sl_{0.3}.

Keywords: Slawsonite, celsian, hyalophane, strontium and barium feldspars, vuagnatite, hydrogrossular, rodingitization, serpentinitization, Prague Basin