English abstract

The late-Variscan magnesium-rich potassic to ultrapotassic igneous rocks create numerous dykes, dyke swarms and several plutonic bodies at the boundary between the Moldanubian Zone and the Teplá-Barrandian Block of the Bohemian Massif. They represent a volumetrically smaller group of igneous rock but they are the key to understand generation of melt and processes of mantle metasomatism and shallow-level magma differentiation. In addition, they are considered as an indicator of the tectonic evolution of this part of the Bohemian Massif during the final stages of the Variscan orogenesis. Currently, they are the subject of discussion by several authors in terms of their genesis, emplacement time and geodynamic significance.

The presented thesis is a compilation of four scientific publications that are aimed at the petrological study of selected (ultra)-potassic dyke rocks from several localities at the western border of the Moldanubian Zone. The study of mineral textures, mineral chemistry and whole-rock geochemistry together with magnetic fabrics, structural field relations and age determinations allowed us to describe the crystallization history of these rocks, discuss their evolution from melt generation to magma ascent and emplacement, and form the model of sequence of Variscan orogenic processes in the Moldanubian part of the Bohemian Massif.

The objects of interest are calc-alkaline lamprophyres (*minettes*, *spessartites*, *kersantites*) and related rock-types (*vaugnerite*, *syenite porphyries*). These rock-types all have similar mineral assemblages with slightly different modal amounts of individual minerals in relation to the rock-type. They contain olivine and/or talc pseudomorphs after olivine, biotite, clinopyroxene, orthopyroxene, amphibole and/or its pseudomorphs, and calcite. The felsic phases are represented by K-feldspar, plagioclase and quartz. Apatite, Cr-spinel, titanite, zircon and opaque phases (Fe-Ti oxides and sulphides of Fe, Cu, Ni) are common accessory minerals. Late-stage secondary minerals are talc, serpentine, carbonate, biotite, clinopyroxene, amphibole, chlorite and quartz. Moreover, various types of ocelli were observed in the studied samples. These are (*i*) quartz with reaction rims of clinopyroxene and minor K-feldspar, (*ii*) calcite ocelli, and (*iii*) multiphase ocelli formed by plagioclase and biotite, minor amphibole and K-feldspar, and occasionally by carbonate and quartz.

The studied dyke rocks preserve the evidence of multistage crystallization. The observed mineral textures together with the major element concentrations in analyzed minerals and their compositional zoning are the expression of variations in composition of melt and fluid and temperature-pressure changes during formation of dykes. The main elements and components that affect the formation and stability of mineral phases are CO_2, H_2O, F, Si and Na. The stages of mineral crystallization, distinguished in this work, demonstrate they started their crystallization from parental melt in the upper mantle. Then the residual melt was affected by both fractionation and contamination

by crustal material during the magma ascent. Finally, the mineral reactions in subsolidus conditions and escape of volatiles affected the growth of minerals during the last crystallization stage.

The bulk rock chemistry of all analyzed samples show common geochemical features that were observed in similar rock-types around the Variscan orogeny. These features are especially high contents of K, volatiles (mainly H_2O and CO_2) and incompatible elements (notably high LILE/HFSE ratios and REE contents with enrichment of LREE relative to HREE). The samples show mantle-derived signatures such as high contents of Mg, Cr and Ni. Despite of these basic geochemical similarities, it is possible to see variations in element concentrations in the analyzed samples, mainly the oscillations in ratios of some incompatible elements such as Ce, Sr, Nb and Zr. The whole-rock geochemistry of studied dykes indicates that the source magma was formed by a low-degree of partial melting of metasomatic volatile-rich peridotite in the upper mantle (probably in the spinel stability field or even at the boundary between the spinel and garnet stability field), and subsequently affected by the fractionation and crustal contamination which is consistent with observed mineral textures and mineral chemistry.

The new U-Pb dating of vaugnerite and syenite porphyry yielded similar ages (338.59 ± 0.68 Ma and 337.87 ± 0.21 Ma). The determined ages of both dykes are close to the age of potassium-rich syenite plutons in the Moldanubian Zone.

The magnetic fabrics of the selected dykes assume their formation by magma flow within the dyke. But in one case a lamprophyre dyke showed the combination of both magma free flow and forcefully driven magma movement. The individual dykes have parallel orientation in W-E to NW-SE direction. They are almost perpendicular to the Central Bohemian Plutonic Complex (CBPC) trending as well as to the magmatic fabrics in the individual plutons of CBPC and to the regional metamorphic fabrics observed in the metamorphic rocks of the Moldanubian Zone. The magma ascent and emplacement in the dykes were attributed to the regional stress field of WNW-ESE convergence during the formation of Variscan Orogeny.