

Summary

The objective of this thesis is to determine the mineralogy and petrography of 13 'opuka' stone samples taken out from different construction phases of the Church of the Beheading of St. John the Baptist in Dolní Chabry. The analysis of a mineralogical composition and structural properties of the extracted samples alongside with a comparison of their physical characteristics provided a basis for estimation of the samples' origin within the construction phase. Methodology used for the samples analysis has been inspired by the methods described in project NAKI (no. DF13P01OVV008) also known as „Materiálový rozbor přírodního kamene – opuky – exaktními laboratorními metodami jako nástroj ke stanovení zdrojové oblasti“. These methods includes besides macro and microscopic analysis also X-ray powder diffraction and high pressure mercury porosimetry which together provided a complete set of data about the samples. For the purpose of obtaining the general characteristic of the rock and the initial estimate of the content of mineral phases within it the optical microscopy was used. The results made it possible to classify the samples into four groups depending on content of a silica matrix. This in turn allowed to link some of the samples conclusively with some of the older construction phases of the site. The electron microscopy (SEM/EDS) allowed more detailed microanalysis of mineral phases, porous silica matrix and elemental mapping. Using the electron microscopy analysis proved to be very useful in revealing numerous alternations and neomorphisms. The X-ray powder diffraction analysis of the insoluble residue revealed the presence of mixed-layered illite/smectite (I/S) structure and poorly crystallized illite (PCI). It has been shown that the samples characterized by the presence of PCI indicate a higher content of kaolinite and micas as compared to I/S rich samples. The study of a pore space using mercury porosimetry have proven that the I/S structures have pores structure demonstratively closer to the average values of the entire set of samples which is in contrast with the remaining samples. The samples with the highest carbonate content represent an exception as they exhibited utterly different characteristic. The objective of this thesis was achieved only partly as the mineralogical composition and the internal structure of the rocks proved not to provide conclusive interconnection between our samples and a construction phase. Although satisfactory allocation has been possible for limited number of the samples the analysis failed at an adequate classification of the entire sample set.