

A petrographic investigation of historic building sandstones in the Konin area (Central Poland)

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Petrographic studies of rocks used for construction of ancient buildings are the first step in their protection from further weathering and play a key role in future restoration works. They provide information on nature of the rock material, its provenance, and enable to recommend alternative material as a replacement, when stone from the original quarry is unavailable.

The main goal of our study was 1) to provide a detailed mineralogical characterization of the different architectural details erected in the Central Poland, 2) to identify rock-types utilized in this area within the space of centuries.

We studied the material sampled from historical objects of the Konin area in Central Poland: 1) milestone erected in 1151 in the half-way between Kruszwica and Kalisz, currently located at the St Bartholomew Church in Konin, 2) portal of St Peter & Paul Church in Nowe Miasto, dated back to 13th century, 3) portal of Saint Andrew Church in Gosławice, built in the first half of the 15th century, and 4) epitaph of Eleonora z Gieców Gibasiewiczówna, founded in 1843. Microscopic examination showed that all of them are mature, monotonous quartz arenites. They are dominated by quartz (up to 99 vol. %). Feldspars are scarce (less than 0.5%) and detected within a few samples. Accessories are rutile, zircon, tourmaline, sphene and opaques. All arenites are fine- to medium grained, moderately sorted to moderately well sorted. The grain size ranges from 63 μm up to 630 μm , with the dominant 250-630 μm class. Grain shape is mostly subangular to subrounded. Porosity is estimated at typically 15–20%, and generally open. The arenites do not contain pore-filling cement, there are only well-developed authigenic quartz overgrowths detected in all studied samples.

As suggested by various authors, material from historical source quarry, placed in the Brzeźno (the current district of Konin) should be considered as potential source rocks. According to historical data, the exploitation of the Brzeźno sandstone began in the 12th century. The quarry was abandoned in the beginning of the 20th century. Therefore, the sandstone from the quarry was studied in order to verify the suggestions based on non-petrological arguments. The Brzeźno sandstones are fine-grained quartz arenites. Their mineral composition, grain morphology, grain-size distribution, type of cement, are all almost identical with that of the sandstones sampled from examined historical objects. Hence, earlier assumptions concerning the provenance of historical sandstone material in the Konin region could be confirmed. Moreover, our data suggests that the Brzeźno sandstone was the most popular dimension-stone used in the Konin area. However this hypothesis needs to be verified by more samples, since the present conclusion is based on a study of limited historical objects.