



Carbonate sinters – genetic aspects, material characteristics and historical applications of a highly decorative stone material

G. Lehrberger (1) and J. Kadlčáková (2)

(1) Lehrstuhl für Ingenieurgeologie, Technische Universität München, Arcisstraße 21, 80333 München, Germany (lehrberger@tum.de)

(2) Eichleite 28, 82031 Grünwald, Germany (jit.ka@web.de)

Carbonate sinters were used as decorative stones for buildings, monuments and for the manufacture of art objects since Antique times. These rocks attracted the attention of man because of their interesting banding with white, yellowish or brownish layers.

Numerous different names were and are in use for carbonate sinters. Egypt is the region, where the name “alabaster” derives from, which means the “stone from alabastrites”. Till nowadays the carbonate sinters, in particular those from Asiut are used and called “oriental” or “calcite-alabaster”. On the international stone market sinter rocks are traded as “onyx” (ital. onice) or “marble onyx”. All these names refer to optical properties or those, who are relevant for the stonemanson (e.g. polishing), but are not accepted by the scientific petrographers. Recent literature tries to summarize such rocks together with bright, porous and layered precipitates as “travertine”, which is not very satisfying, too.

The carbonate sinters consist of calcite, aragonite and to a little extent of vaterite, all three modifications of calcium carbonate with the formula CaCO_3 . Carbonate sinters form either at the surface as sinter terraces or in rather shallow vein type deposits. Generally massif carbonate sinters form from thermal water systems, thus representing low temperature hydrothermal systems. The deposits have often rather limited size, often only a hundred meters long and a few decimeters to meters wide. The carbonate precipitating systems are frequently connected with young or recent volcanic activity, which supplies the heat and the carbon dioxide gas, which is dissolved in water.

An exception is the formation of carbonate sinter in the water channels of antique Roman Aqueducts in the Eifel area of Germany, where in later times the sinter crusts were “quarried” and used in many sites in Germany, the Netherlands and even in Denmark.

The application of carbonate sinters is mainly in the form of thin cut and ground slabs or as massive bodies, but always with polished surface to enhance the visibility of the decorative banding. This banding makes the sinters similar to agate, but much easier to be worked. Massive parts of buildings were made of “calcite alabaster” in Prehistoric times in Egypt, but also in 19th century’s churches, such as in San Paolo fuori le Mura cathedral in Rome. Slabs for incrustations, which are often arranged in symmetric patterns, can be found already in the excavations of the antique city of Ostia antica in Italy, but also in many churches in Rome and in the Baroque New Castle in Stuttgart in Germany.

A highly decorative effect is achieved if thin carbonate sinter slabs are used like giant thin sections as church windows like in the cathedral of Orvieto and San Paolo fuori le Mura in Rome, both in Italy.

Carbonate sinters comprise a widespread and very decorative historical stone material, which was neglected over a long time, but can be also attractive for modern applications.