

## **HISTORICAL CLAY AND CERAMIC SAMPLES FROM THE COLLECTION OF THE VIENNA TECHNICAL MUSEUM**

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The Vienna Technical Museum has a large collection of merchandise, including clays and ceramic products, from the 19<sup>th</sup> and early 20<sup>th</sup> century. The origin and composition of the material is not well known. Different raw materials, mixtures for the production of porcelain, stone ware and glaze, and ceramic products (clay pipes and Seger cones) were analysed. The mineral content of the samples determines the material properties and can give information about provenance, processing and firing temperature.

The bulk and clay mineral content of the raw materials was determined by X-ray diffraction and Simultaneous Thermoanalysis (STA). Grain size analyses were made by a combination of wet sieving and sedimentation. The clay fraction of all samples consists mainly of both well and poorly ordered kaolinite, in some samples traces of illite and vermiculite were found. The clay content of the raw materials ranges from 45 mass% to 85 mass%.

Mixtures for hard-paste porcelain contain usually 50 % kaolinite, 25 % quartz and 25 % plagioclase and potassium feldspar. Traces of mica are found in all samples. The presence of mullite in the mixtures for stone ware verifies the use of fired material as grog.

Different clay pipes from England, France and Austria were probably exhibited 1873 at the World's Fair in Vienna. Pipes were made from high-quality clay to get a fine pored product. The mineral composition was determined nondestructive by X-ray diffraction. Main component of all pipes is quartz, only in the English pipes mullite was found, which indicates a higher firing temperature or an admixture of that mineral. Small amounts of mica were present in most of the specimens. Two black pipes from Austria, made by the same manufacturer, showed remarkable differences in the composition of the glaze.

Seger cones are small ceramic bodies which deform at specified temperatures. They have been used since 1886 to check the "heat work", i.e. the combined effect of temperature and time, in a kiln. They are made of mixtures of clay and alkali- or earth-alkali oxides.