VITRIFICATION AND OPTICAL ISOTROPY/ANISOTROPY OF MATRIX IN RELATION TO FIRING TEMPERATURE ON THE EXAMPLE OF THE SO CALLED "POLISHED YELLOW CERAMICS" OF THE CAROLINGIAN PERIOD (9^{TH} C. AD)

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In the first phase of a series of investigations SEM pictures were taken of broken surfaces of archaeological samples of the so called "polished yellow ceramics" of the Carolingian Period (9^{th} c. AD) in order to describe the grade of their vitrification. It has been shown that there are differences in the grade of vitrification within the main petrographic groups. This was interpreted as a difference in the firing temperature. This interpretation was supported by the results of XRD measurements and polarizing microscopy (isotropy/anisotropy of matrix).

In order to be able to connect certain vitrification patterns and matrix isotropy/anisotropy with certain firing temperatures, in the second phase of the investigations pieces of weakly vitrified archaeological samples from each petrographic group were refired at 800, 900 and 1000°C in an electric oven. Broken surfaces of the refired samples were then studied in the SEM and thin sections of them were analyzed by polarizing microscopy.

It could be shown that the refired samples (originally low fired archaeological samples) developed similar vitrification patterns (SEM) and matrix isotropy/anisotropy at higher temperatures as the originally higher fired archaeological samples had shown. In this way the firing temperature of all original archaeological samples could be estimated with a high precision.

As a second result of these investigations it was also possible to establish a reference collection of SEM vitrification images and matrix isotropy/anisotropy patterns from the polarising microscope connected to known firing temperatures. Parts of this reference collection are going to be presented at the EMAC 07 and their similarities and differences to the SEM investigations of M. Tite and Y. Maniatis are going to be discussed.