

Investigation of the incrustation on Bükk pottery by means of micro-analysis techniques

Judith Mihály¹ & Cristoph Berthold²

¹Chemical Research Center of Hungarian Academy of Sciences (CRC), Budapest

²Institute for Geoscience, Eberhard Karls Universitaet Tübingen (IFG), Tübingen

mihaly@chemres.hu

In the frame of the German-Hungarian DAAD-MÖB project (2009-2010 'Long distance trade in Neolithic pottery') elemental and phase analysis of incrustation material on selected Bükk pottery samples were performed. To investigate these small, thin parts of pottery (museum art objects) non-destructive, high-resolution methods like micro-XRF, micro-XRD, micro-Raman (IFG-Tübingen) and the quasi-destructive micro-ATR-FTIR using cca. 50 µg samples for measurement (CRC-Budapest) were applied.

Based on micro-XRF and micro-XRD results, the incrustation material proved to be disordered, probably heat treated (X-ray amorphous) kaolinite together with quartz and feldspar. The use of white clay paste was established also by micro-AR-FTIR measurements. The –OH stretching bands of interlayer and inner -OH group at 3700 and 3620 cm⁻¹, respectively and the shoulder at 915 cm⁻¹ (due to Al-OH bending) reveal that the type of clay is disordered kaolinite. The absence of a well-structured layered alumino-silicate is reinforced also by Raman studies (only amorphous carbon was detected both with micro-Raman and FT-Raman measurements). These results indicate that most of the incrustated pottery was (re)fired between 550 - 800°C. No bone grit was detected. Calcite was identified only on one sample as an additional white decoration.

In the yellow and pink-yellow incrustated decorations, beside kaolinite and quartz, goethite was identified, while the red coloration proved to be due of hematite. In the micro-ATR-FTIR spectra of red incrustation traces of gypsum were also detected.

The combined use of micro-XRD, micro-XRF, micro-Raman and micro-ATR-FTIR techniques provided an effective methodology for composition and phase investigation on incrustations and the obtained results can contribute in creating the 'fingerprint' of the Bükk pottery.