9th International Conference on NDT of Art, Jerusalem Israel, 25-30 May 2008
For more papers of this publication click: www.ndt.net/search/docs.php3?MainSource=65

AUTHENTICATION OF 18TH CENTURY CREAMWARE

Dr. Mateja Kos, National Museum of Slovenia
Presernova 20, SI-1000 Ljubljana, Slovenia;
Mateja.kos@nms.si; Fax +386 1 24 14 422

Cream colored earthenware (creamware) was invented in Staffordshire, England in mid-18th Century. The term refers to ceramics made of special white clay with small amount of kaolin and with translucent lead glaze. Its great success in Europe was connected with the use of the creamware as a substitute for the porcelain which was very expensive and thus status symbol. It namely united some of the qualities of porcelain (whiteness, translucency) with a much lower price. It also proved to be more suitable for mass production than other ceramics materials, which further lowered the price of products.
One of the design sources for creamware was baroque and classicist silver tableware, the other Chinese and Japanese porcelain. The European factories copied English products which were renowned for their quality and decoration.
There were many creamware factories in mid- and south Europe. Their products were more or less similar, with small variations in the color of the body. Because of that it is almost impossible to distinguish the products of the different manufacturers by art-historical methods.
In the vicinity of todays' Slovenia, the most renowned factories were in Vienna and Graz (Austria), and in Trieste (Italiy). In Ljubljana, three creamware factories were established in late 18th and early 19th century. Their products were well designed and even highly elaborate. They were exported in nearby countries as Germany, Austria, and Italy. The most important Ljubljana factories were Sigismund Zois's ceramics factory and Brothers Wassser's creamware factory. Both had their marks but only a part of objects were in fact signed. As for forms and decoration, all the producers in Ljubljana, Graz, Vienna, and Trieste used very similar schemes, based on English patterns. They all also tried to produce the same creamy white material with as little yellow hues as possible.

The curator's role is to establish whether creamware artifacts were produced in Ljubljana or maybe imported from Trieste, Graz, Vienna, or even from England. Since art historical methods (grouping the objects on the basis of color, pattern, form, comparisons, and stylistic analysis) proved not to be effective enough, we searched for another, more exact solution. In order to corroborate the results and establish the provenance database, we decided to determine chemical composition of the ceramics. We supposed that the objects could be classified according to the composition of the clay. Firstly, we made several attempts to analyze some of the objects by XRF, which proved unsuccessful. After that we decided to use in-air PIXE, since our scientific team has a great deal of experiences on X-rays analysis of glass.
The method, developed, performed, and evaluated by Ziga Smit from Jozef Stefan Institute in Ljubljana, proved useful for analyzing all kinds of glazed ceramics. The following is a short summary of the analysis procedures and results.

As in glass, the measurements consisted of two parts: first we took the PIXE spectra, using protons of 2 MeV impact energy. Argon signal from the air was used for the normalization, so the geometry was controlled by spacers. No external absorber was used, except a 5.5 cm air

gap between target and detector. With PIXE we found out that the clay was reasonably pure, so iron was the heaviest impurity we detected. Probe measurements were also made with thicker absorbers (0.3 mm aluminum), but elements heavier than iron were again not detected with satisfactory statistics and accuracy. We then decided to distinguish our objects according to the relative composition of light elements, which are basic constituents of clays and plagioclase.

With PIGE we determined the gamma yields of Na, Mg, Al and Si. Silicon was only used for normalization: the ratios Na/Si, Mg/Si, Al/Si were combined with our PIXE data to calculate the total composition. The accuracy of our method was about ±5% was major elements and 10-20% for minor and trace elements. With this procedure we determined the composition of Na, Mg, Al, K, Ca, Ti, and Fe.

We were able to distinguish several groups, most likely depending on different clay sources. We also managed to distinguish between the structures of the glaze and of the body itself which at first seemed to be a major problem. The results we observed after grouping are promising.