Phase Analytical Study of Ancient Albanian Ceramics

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Pottery is one of the most common remains of ancient civilisations all over the world. Because iron is generally present in unpurified clays as raw materials and therefore also in the archaeological ceramics ^{57}Fe Mössbauer spectroscopy is a very effective tool for studying the firing process. During firing the iron-bearing minerals undergo characteristic changes determined by process parameters like the kiln atmosphere and the firing temperature. Aim is the reconstruction of the original production process by combining the results of an extensive phase analysis of the ancient pottery by Mössbauer spectroscopy and additional techniques with those of laboratory and field firing experiments.

In the present study specimens of ceramic finds from three different archaeological Albanian sites (Apolonia, Durres, and Belsh; 4th to 2th century B.C.) were examined by ^{57}Fe Mössbauer spectroscopy in transmission geometry at room temperature; spectra of selected samples also were measured after extraction of iron oxides by dithionite treatment or at low temperature. X-ray powder diffractometry and magnetic measurements were used as complementary methods. Additionally, an appropriate ancient sherd sample was refired in air at different temperatures and the corresponding Mössbauer spectrum measured at room temperature.

The room temperature Mössbauer spectra of all samples were dominated by ferric quadrupole doublet(s). These doublet(s) are caused by (i) structural Fe^{3+} in the silicate lattice of the clay minerals and/or (ii) small particles of iron oxides or oxyhydroxides which exhibit superparamagnetism.

Finally, the data obtained by different methods have to be combined and used for a possible reconstruction of the production techniques of the ancient Albanian ceramics.