Contribution ID: **7** Type: **Oral**

The evolution of mineralogical phases during firing of ancient Greek ceramic pots

Wednesday, 11 September 2013 14:40 (20 minutes)

The preset work is part of a systematic study, using polychromatic and monochromatic neutrons, to characterize pottery, from the ancient Greek provinces of Phillipi, Topiros and Abdera. The aim of this project is to supply data on the constituent minerals, firing and weathering conditions, to both archaeologist and scientists in the field. The experiment was performed in two steps. First, a single piece of very low fired archaic pottery was fired in a furnace. In-situ TOF -ND patterns were collected from room temperature to 950 ˚C in steps of 25 ˚C. During the second stage seven ceramic pieces of approximate dimensions 3 - 15 cm2 and 0.7 –1.5 cm thick, were illuminated with a wide monochromatic beam for several hours each at RT and the patterns were collected.The initial TOF experiments were carried out at ISIS, followed by sets of measurements with monochromatic neutrons using the E6 and E2 instruments at the BER II reactor site in Berlin, Germany.
Diffraction pattern Rietveld type analysis showed that the dominant phases are quartz (54%) and feldspars (20%). Diopside, orthoclase, calcite and iron oxide phases were also identifiable. The diopside content is found to decrease with increasing quartz - feldspar compositions. Furthermore the plagioclase content is increased almost linearly with the temperature. The hematite content in the sample remains almost constant above 700 ˚C and is in excess of 7%. Based upon the data collected in the second step, the firing temperatures of the pottery samples were determined to be within 850 ˚C to 950 ˚C.

Primary authors: Dr SIOURIS, IOANNIS (Democritus University Thrace); Dr KATSAVOUNIS, Stefanos. (Democritus Univ. Thrace)

Co-authors: Dr HOSER, ANDREAS (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH); Ms CHARITOU, SOULTANA (DEMOCRITUS UNIVERSITY OF THRACE); Dr KOCKELMANN, WINFRIED (Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire OX11 0QX, UK.)

Presenters: Dr SIOURIS, IOANNIS (Democritus University Thrace); Dr KATSAVOUNIS, Stefanos. (Democritus Univ. Thrace)

Session Classification: Scattering Methods II

Track Classification: NINMACH