THE "BLACK CERAMICS OF MARGINEA" (ROMANIA): A MODERN ANALOGUE OF ANCIENT CERAMICS?

IONESCU, C.[1]*, HOECK, V.[2] & SIMON, V.[3]
[1] Dept. of Geology, Babeş-Bolyai University, 1, Kogălniceanu Str., RO-400084 Cluj-Napoca, Romania
[2] Dept. of Geography and Geology, Salzburg University, 34 Hellbrunner Str., A-5020 Salzburg, Austria
[3] Faculty of Physics & Institute for Interdisciplinary Research in Nano-sciences, Babeş-Bolyai University, Cluj-Napoca, Romania
* E-mail: corina.ionescu@ubbcluj.ro

The so-called "Marginea ceramics" is one of the most famous modern black ceramics in Romania. The raw material is a Miocene illite-rich clay, no temper is additionally used. The clay consists of illite, muscovite, feldspar, quartz, chlorite/kaolinite, Fe oxi-hydroxides and carbonate. Recalculated on a dry basis, the clay has ~59 wt% SiO_2, ~8.4 wt% CaO, ~17 wt% Al_2O_3, and ~3 wt% MgO. This chemistry fits very well to that of the black ceramics, given below. The firing takes place in quite primitive ovens, using wood fuel, with no temperature control.

The study focused on the changes occurring in the fired ceramics, compared with the raw material. It involved polarized light optical microscopy, X-ray powder diffraction (XRPD), electron microprobe analysis (EMPA), scanning electron microscopy (SEM) and ICP-MS.

The ceramics show magnetic properties strong enough to keep a small magnet on the pot walls. On broken surfaces the wall of the black pots consist of light to dark grey fine layered core covered by thin black layers on both sides. The SEM and the backscattered electron (BSE) images revealed a ceramic body composed of a very fine network of glassy material connecting relics of untransformed primary minerals and newly-formed phases (Figs. 1a,b). Scarce quartz, K-feldspar and plagioclase grains, some muscovite, biotite flakes and Fe-rich grains are embedded in a matrix of glass, illite, muscovite ± chlorite/kaolinite. Pyroxene and a part of feldspar together with magnetite are obviously firing phases. The black outer layer is more compact and shows a higher content of Ca-rich plagioclase and Fe-rich phase. X-ray powder diffraction indicates the presence of magnetite and possibly maghemite in the fired ceramics body, and in particular in the outer layer. These two minerals are responsible for the black colour (IONESCU *et al.,* 2011).

Recalculated on LOI-free basis, the ceramic chemistry shows only little variation and no distinct trends: SiO_2 ranges from 58 to 60 wt%, CaO from 8.1 to 8.8 wt% and MgO is around 3 wt%. A precise comparison of the ceramics with the clayey raw material is feasible and can solve some problems regarding mineral changes during firing. The results can be applied for compositional and technological studies on ancient black ceramics.

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Reference

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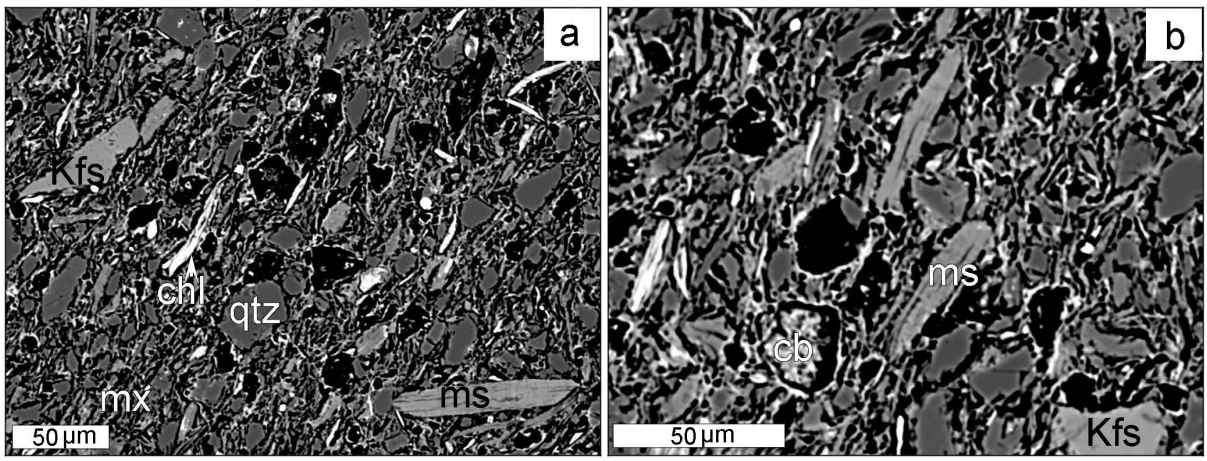

Fig. 1. *BSE images of the ceramic body, with a fine network of partially melted clayey matrix (mx) embedding quartz (qtz), muscovite (ms), K-feldspar (Kfs), chlorite (chl) and carbonate (cb). The black parts are pores.*