ELECTRON MICROPROBE ANALYSIS FOR ARCHAEOCERAMICS

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The use of the Electron Microprobe for studying the archaeological ceramics is not widely applied, even it enables the identification of the mineral compounds of the matrix, the temper grains, the firing minerals or the post-depositional alteration products. In turn, the detailed knowledge of the mineral phase composition allows inferences of the classification of shards, the identification of raw materials and the technological conditions of firing.

Apart from the obvious advantage, several problems are inherent to the method. Among these, the most obvious is the low total sum of the quantitative analyses. This can be due to various factors, such as: the fine porosity of samples, the incomplete dehydroxylation during the firing, or the rehydration and/or rehydroxylation during the burial.

Another problem is related to the identification of mineral components of the clayish matrix, as it represents a more or less homogeneous mixture of extremely-fine grained minerals, usually smaller than the beam diameter (3-5μm). The presence of an amorphous or vitreous phase complicates the situation.

The distinction among the primary and the secondary (firing) phases can be also relatively difficult, as the same mineral may occur as both. And the last but not the least, the firing minerals represent basically metastable phases, with non-stoichiometric composition, difficult to be characterized from mineralogical point of view. Additionally, they are “contaminated” with elements such as e.g. Fe, K or P trapped inside the new lattice.

The above discussed situations are illustrated by case studies of archaeological ceramics from Transylvania (Romania).