

# ARCHAEOLOGICAL INVESTIGATION OF CELTIC GRAPHITIC POTTERY FROM DIFFERENT ARCHAEOLOGICAL SITES IN HUNGARY

**Isabella Havancsák<sup>1</sup>, Bernadett Bajnóczi<sup>1</sup>, Mária Tóth<sup>1</sup>, Attila Kreiter<sup>2</sup>, Szilvia Szöllősi<sup>3</sup>**

<sup>1</sup>Institute for Geochemical Research, Hungarian Academy of Sciences, Budapest, Hungary, [havancsaki@geochem.hu](mailto:havancsaki@geochem.hu)

<sup>2</sup>Field Service for Cultural Heritage, Budapest, Hungary

<sup>3</sup>Institute of Archaeological Sciences, Eötvös Loránd University, Budapest, Hungary

The use of graphite in pottery making has already started in Neolithic times, but the importance of graphite has grown considerably from the early La Tène period. Production of ceramics containing graphite as non-plastic inclusion reached its peak between the end of the 4<sup>th</sup> century BC and the middle of the 1<sup>st</sup> century AD in the form of the classical Celtic “graphitic ware”, which became a substantial part of the Central European Celtic pottery. The term “graphitic ware” is commonly used for a special typological group of ceramics, the most characteristic form of which is the situla-like pot.

Extended (long-distance) trade in Celtic times is evidenced by the widespread occurrence of graphite-bearing ceramics, far away from restricted graphite sources. The reason behind preparing graphite-bearing vessels, as well as the determination of the exact provenance (i.e. mine or mining district) of graphite and its dominant form of transportation (i.e. raw graphite, clay mixed with graphite or finished graphite-bearing vessels) constitute significant topics in the Celtic research.

Graphite-bearing and non-graphitic ceramics were investigated from two Celtic archaeological sites, Dunaszentgyörgy (LT B2-C1) and Bátaszék (LT D) in South Hungary. The sites are situated along the Danube about 40 kms from each other. The aim of the research was to compare the characteristics of the graphitic raw material as well as their host vessels found at the two sites and to provide a preliminary outline about the possible provenance of graphite. The ceramics were analysed by optical microscopy, X-ray diffraction, X-ray fluorescence spectrometry and electron microprobe analysis.

Graphitic ceramics from Dunaszentgyörgy contain graphite fragments and clasts of graphitic (para)gneiss consisting of quartz, K-feldspar, muscovite, sillimanite, kyanite and graphite, rarely amphibole and tourmaline. The chemical and mineralogical comparison of non-graphitic and graphite-bearing wares from Dunaszentgyörgy indicates that local clays were used to produce both types. Graphitic vessels from the Bátaszék show graphite, granitic clasts and graphitic rock fragments containing quartz, mica, graphite and sometimes amphibole. The granitic rock fragments originate from the granitic intrusion of Carboniferous age outcropping near Bátaszék and confirm that graphite-bearing wares (as well as non-graphitic pottery) were produced from local clays. The firing temperature of graphitic wares is similar at both sites: absence of Ca-silicates indicates firing below 800°C, sometimes below 650°C.

Graphitic rocks with the above-mentioned mineralogical composition can not be found in outcrops in the territory of Hungary. Their possible provenance is the Bohemian Massif. According to the mineralogical composition, the potential source for graphitic (para)gneiss found in the Dunaszentgyörgy ceramics can be restricted to the Variegated unit of the Moldanubicum zone. Our results support recent archaeological assumptions according to which the trade of raw graphite (with the host rock) is predominant in the La Tène period.