

Interdisciplinary research of iron casting technologies in the town of juketaw during the golden horde period

Shaykhutdinova E., Khramchenkova R., Nail N., Alexander B., Ruslan Y., Situdikov A.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The work features the results of interdisciplinary research of cast iron dishware fragments discovered in the territory of one of the largest towns of the Volga Kama region in the Golden Horde period. The microstructure of cast iron samples and surface mapping have been studied using scanning electron microscopy (SEM), and the micro elemental composition was determined by emission spectral analysis (ESA). The characteristic features of the manufacturing technology have been revealed as a result of research of the elemental and phase composition across the area of the transverse fracture and longitudinal polished section. The results of SEM allowed to carry out a comparative analysis with archaeological material from the territory of Bolgar settlement - capital of the Bolgar Ulus of the Golden Horde. According to the results of micro elemental analysis, two groups of cast iron were determined with differences attributed to various sources of raw material.

Keywords

Bolgar, Chemical composition, ESA, Golden Horde, Juketaw, Metallurgy, SEM, Structure, Volga Bulgaria

References

- [1] N. Nabiullin, "Juketaw-bulgar town on the Kama", Tatar.kn. izd-vo, Kazan, Russian Federation, 2011.
- [2] G. Asylgarayeva, V. Bakhmatova, I. Gazimzyanov, L. Melnikov, J. Mukhametshin, N. Nabiullin, U. Semykin, R. Khramchenkova. "Results and prospects of research Juketaw". Proceedings of the IV (XX) archaeological congress, October 20-25, 2014, T. III, Kazan, pp. 444-446.
- [3] V. Bakhmatova, About raw materials sources of ceramics "Dzhuketaw", Proceedings of the IV (XX) archaeological congress, October 20-25, 2014, T. IV, Kazan, pp. 119-121.
- [4] V. Bakhmatova, N. Nabiullin, Possible origins of the unglazed traditional pottery (exemplified by Juketaw ceramic site of the 10th-14th centuries), Philology and culture, 2013, no3 (33), pp. 232-235.
- [5] I. Gazimzyanov, N. Nabiullin, "Anthropology of the population Juketaw (by materials of Donaurskiy cemetery)", Scientific notes of the Kazan University, A series of humanities, 2011, Vol. 153, Book 3, pp. 21-28.
- [6] N. Nabiullin, R. Khramchenkova, "Glass jewellery of the Juketaw: morphology and chemical composition", Philology and culture, 2013, no3 (33), pp. 240-244.
- [7] A. Petrenko, G. Asylgarayeva, N. Nabiullin, "Economic activity of Juketaw population according to archaeozoological materials", Philology and culture, 2012, no2 (28), pp. 278-281.
- [8] K. Rudenko, Metal dishes of the Volga and the Kama region in the 8th-14th centuries, Izdatelstvo Reper, Kazan, Russian Federation, 2000.
- [9] S. Ryazanov, Iron foundry in the European part of the Golden Horde (second half of the XII-XIV centuries), Dissertation of the candidate of historical sciences, Izhevsk, 2010.

- [10] G. Sayfutdinova. Cartographic representation of archaeological monuments on the territory of the Republic of Tatarstan and selected regions of Russia, All-Russian scientific conference. International Year of Maps in Russia: combining space and time, ?oscow. 2016, p. 257.
- [11] E. Shaykhutdinova, A. Belyaev, R. Yanbaev, A. Sitedikov, A. Zinnatullin, "Iron casting in Volga Bulgaria in 14-15 cc.", Proc. of the 1st International Conference on Metrology for Archaeology, 2015, pp. 203-207.
- [12] E. Shaykhutdinova, R. Yanbaev, R. Khramchenkova, A. Sitedikov, A. Belyaev, "The study of the cross fracture samples for the reconstruction process and performance characteristics of products iron foundry Volga Bulgaria", The casting processes: interregional collection of proceedings, Izd-vo Magnitjorsk. gos.Techn. un-Ta im. G.I. Nosova, Magnitogorsk, Russian Federation, 2015, pp. 176-188.
- [13] E. Shaykhutdinova, A. Belyaev, A. Sitedikov, R. Yanbaev, Archaeometric analysis of cast iron dishware from the towns of Volga Bulgaria: Bolgar and Juketaw, Proceedings of IMEKO International Conference on Metrology for Archaeology and Cultural Heritage (MetroArchaeo 2016). October 19-21, 2016. Torino, Italy. Pp. 270-273.
- [14] Khramchenkova R., Degryse P., Sitedikov A., Kaisin A. Analytical studies of post medieval glass bottle marks from excavations at Kazan Kremlin (Russia). Journal of Archaeological Science: Reports. V.12, pp. 25-27.