

**МИСТЕЦТВОЗНАВСТВО**

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DOI <https://doi.org/10.24919/2308-4863/55-1-7>**Oleksandra BARBALAT,***orcid.org/0000-0001-8682-9247**Senior Lecturer at the Department of Decorative Arts and Restoration**Borys Grinchenko Kyiv University**(Kyiv, Ukraine) alexandrabarbalats@gmail.com***PECULIARITIES OF HOT ENAMEL TECHNIQUE APPLICATION  
IN THE ARTISTIC-IMAGES SYSTEM OF KYIVAN RUS GOLDSMITHING  
XI – FIRST HALF OF XIII CENTURY**

*The study is devoted to the art historical analysis of the basic principles that formed the basis for the development and application of the hot enamel technique in the Kyivan Rus goldsmithing of XI – first half of the XIII century. The article reflects the specifics of the application of this art technology, in particular in the manufacture of works of sacred purpose in the jewellery workshops of princely Kyiv. The peculiarities of the use of this technique for the effective disclosure of the symbolism of artistic images are revealed.*

*The article examines the artistic and figurative features of Kyivan Rus goldsmithing. The history of the formation of the traditions of their use as a decor of jewellery, executed in the technique of hot enamel, is highlighted. The symbolism of the colours inherent in this technique as a part of the integral semantic-semiotic system of the Kyivan Rus iconography is explained. A comparative analysis of the composition of Byzantine and Kyivan Rus hot enamel is carried out.*

*The scientific novelty of the study consists in the illumination of artistic and technological aspects of the hot enamel technique, which historically came from Byzantium and is one of the factors of form making in the goldsmithing of Kyivan Rus.*

*It is established that the experiments of the Kyivan princely goldsmiths with the hot enamel technique have led them to a new qualitative stage of development and became one of the factors forming the general concept of Kyivan Rus goldsmithing development in the late XI – early XIII centuries.*

*Materials of this research are offered to apply in the process of creating new exclusive collections of jewellery with hot enamel. The results of the presentation of such conceptual collections will contribute to the promotion of the cultural and artistic heritage of Ukraine in the world.*

*The study uses historical-cultural and artistic-project approaches in combination with comparative and presentation methods.*

**Key words:** *cloisonne enamel, minakari, minankari, Byzantium, Kyivan Rus goldsmithing of XI – first half of XIII centuries.*

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У ХУДОЖНЬО-ОБРАЗНІЙ СИСТЕМІ КИЄВОРУСЬКОГО ЗОЛОТАРСТВА  
XI – ПЕРШОЇ ПОЛОВИНИ XIII СТ.**

*Дослідження присвячене мистецтвознавчому аналізу основних засад, що сформували підґрунтя для розвитку та застосування техніки художньої гарячої емалі у києворуському золотарстві XI – першої половини XIII ст. У статті висвітлено специфіку застосування даної мистецької технології, зокрема у виготовленні творів сакрального призначення в ювелірних майстернях княжого Києва. Розкрито особливості використання даної техніки для ефективного розкриття символізму художніх образів.*

*У статті розглянуто художньо-образні особливості києворуського золотарства. Висвітлено історію формування традицій їхнього застосування в якості декору ювелірних прикрас, виконаних у техніці гарячої емалі. Розтлумачено символіку кольорів притаманних для даної техніки, як частину цілісної семантико-семіотичної системи побудови києворуської іконографії. Виконано порівняльний аналіз складу візантійської та києворуської гарячої емалі.*

*Наукова новизна дослідження полягає у висвітленні художньо-технологічних аспектів техніки гарячої емалі котра історично вийшла із Візантії та була одним із чинників формотворення у золотарстві Київської Русі.*

*Встановлено, що власні експерименти ювелірів княжого Києва із технікою гарячої емалі вивели їх на новий якісний етап розвитку та стали одним із чинників формування загальної концепції розвитку золотарства Київської Русі кінця XI – початку XIII століть.*

*Матеріали даного дослідження запропоновано застосовувати в процесі створення нових ексклюзивних колекцій ювелірних прикрас з гарячою емаллю. Результати презентації подібних концептуальних колекцій сприятимуть популяризації культурної та мистецької спадщини України в світі.*

*У дослідженні використано історико-культурний та художньо-проектний підходи у поєднанні з порівняльним та презентаційним методами.*

**Ключові слова:** перетинчаста емаль, мінакарі, мінанкарі, Візантія, києворуське золотарство XI – першої половини XIII ст.

**Statement of the problem.** In medieval times, the hot enamel technique was one of the most effective means of expressing form and content in works of jewellery of sacred significance. In contrast to other principles of shaping, this technique is characterised by colour expression and a clear graphic perfection of the decoration. The technique of hot enamelling of non-ferrous metals, gold, in particular, was a boundless field for creative experimentation in the works of Byzantine and Kyivan Rus enamellers.

A wide range of techniques in the technique of hot enamel formed a powerful arsenal of expressive means of shaping, still used by artists-jewellers in many countries around the world, in particular Ukraine. The tradition of hot enamelling of non-ferrous metals has been known since the times of ancient Egypt, Iran, Byzantium and Kyivan Rus. Accordingly; they identify enamelling as the ancient cultural-artistic heritage of our nation in the world context.

The course of recent important historical events, taking place in Ukraine on the way to the revival of its cultural traditions, provokes a process of rethinking the artistic heritage. Given that interpretations of individual achievements of culture and art of princely Kyiv, which were proposed in the twentieth century, today have lost their relevance, attention should be focused on the need for their re-examination, in-depth study and art historical rethinking.

In contemporary science and art history discussion, it is suggested to consider the Kyivan goldsmith's heritage as a self-sufficient component of decorative and applied art, as artistic artefacts, in particular the preserved items of goldsmith's art, enable us to understand better the points of intersection of the artistic culture of separate cells. Creative prerogatives and facts of a certain unity.

The peculiarities of using the technique of artistic hot enamel in decorating jewellery items created under the influence of Byzantine civilization by masters of princely Kyiv still arouse great interest among domestic guilds makers. Nowadays this tendency of turning to the sources of one's own cultural and artistic heritage requires additional

research dedicated to the peculiarities of applying jewellery techniques, in the art and image system of the Kyivan Rus goldsmith's of the XI – the first half of the XIII century, in particular, hot enamel.

**Analysis of research and publications.** The basis of this study is the biblical characteristics of the Heavenly Jerusalem from the fifth prophetic book from the New Testament, The Revelation of St. John the Evangelist (Bible, 1990: 279).

Also significant for this study is the work of the British philosopher M. Stewart, «The Surprising Meaning of Numbers and Colours in the Texts of Holy Scripture».

In which he clarifies in detail the sacred significance of colours in Christianity (Stewart, 1984: 4).

Since the artistic images, applied in the decoration of the princely Kyivan jewellery, were created mainly in the hot enamel technique, one should pay attention to the research of the local art critics: M. Stolyar, I. Solomko, A. Opanasiuk

«Mythological Beings of the Works of Kyivan Rus Goldsmith in the Modern Decorative and Applied and Fine Arts of Ukraine» (M. Stolyar, I. Solomko, A. Opanasiuk, 2022: 112). This work reflects the sacral significance of mythological creatures that appeared in the decoration of the Kyivan Rus jewellery. The origin of the characters and the peculiarities of their application is considered.

The study by Ukrainian researcher L. Pekarskaya «Jewellery of princely Kyiv» allowed acquainting a wide range of connoisseurs with unique authentic works of Kyivan Rus gilding, containing images of mythological creatures and made in the technique of hot dint enamel (Pekarska, 2011: 168).

Of particular interest in the context of the topic are peculiarities of application of hot enamel technique in the artistic and figurative system of the Kyivan Rus gilding of the XI – first half of the XIII century as a dominant decoration technique of the princely Kyiv jewellery, found on the territory of modern Ukraine, significant for this study is a collective work of domestic art historians A. Shkolnaya, A. Sosik, A. Barbalat, A. Sytnik, I. Kashshai. In the work «Kyivan Rus Kolts with enamels and Niello: genesis,

sources of inspiration, iconography, attribution issues» by the abovementioned authors, among other things, are considered the features of the hot enamel technique (Shkolna, O., Sosik, O., Barbalat, O., Sytnyk, I., Kashshay, O., 2021: P. 648).

In general, the technique of hot enamelling of precious metals was widely applied for high-quality solutions to artistic images in the works of Byzantine and Kyivan goldsmithing. It is still of interest to modern jewellers and researchers, and its place in the semantic-semiotic system of medieval Kyiv needs additional research and clarification, as it remains insufficiently disclosed in the domestic art history space.

**The purpose of the article** - is to analyse the driving force of the art of artistic hot enamel, which was a means of effective disclosure of the artistic image in the works of the artists-jewellers of princely Kyiv in the XI – first half of the XIII century. Determining the place and purpose of the art technology in the semantic-semiotic system of the Kyivan Rus iconography.

**Outlining the basic material.**

The hot enamel technique is a long-standing method of combining coloured glass and metal. The technique gained wide popularity in the jewellery art of the Middle Ages, including Kyivan Rus, as it was directly related to the biblical character of the Heavenly Jerusalem. The apostle John the Theologian in his revelation constantly underlined the metallic («<...> – and the city was pure gold – <...>») and crystalline nature of the city («<...> – like pure glass – <...>») (Bible. 1990: 295).

A complex analysis of the interrelation between the ancient Egyptian, Iranian and Iberian enamel traditions allows us to clarify the influence of their centuries-old skills on the formation of Byzantine goldsmith's art, which in its turn was reflected in the development of enamel art in the goldsmithing of Kyivan Rus. Simultaneously with the introduction of Christianity in Kyivan Rus, as a state religion, by Prince Vladimir the Great (958–1015) at the end of the X century, some changes took place in the symbolic purpose of jewellery.

Rus with the centre in Kyiv has accepted Christianity from Byzantium – the millennial civilization, whose cultural and artistic reflection today is considered an imperishable heritage. To create its distinctive style, Kyivan Rus adapted pagan artistic traditions in the field of sacred and liturgical objects of Christian art (Barbalat O. 2022: 79).

The transformation of Rus into the Christian world required masters of goldsmith work to create liturgical and other sacred objects. The Greeks, simultaneously with new techniques and methods

of work, delivered the system of ornamentation of Christian-themed jewellery from Byzantium. One of the centres of goldsmithing was medieval Kyiv, where the main emphasis in the manufacture of jewellery was placed on the symbolic attributes of Christianity, the language of which became a sacral reflection of stylized plant elements in the semantic ornamental motifs (Barbalat O. 2022: 80).

These are enamel icons, gold and silver settings, diadems, barmas, kolts, abundant, body and altar crosses, and medallions depicting saints, made in the techniques of filigree, grain, niello and hot enamel, complemented with minerals to symbolic phytomorphic, onitomorphic, anthropomorphic and anthropomorphic ornaments (Barbalat O. 2022: P. 80).

It should be noted that the special rise of hot enamel in the historical territories of Ukraine was in the period of Kyivan Rus. Gold ware: diadems, necklaces, grivni, kolts, and gospel settings, decorated with enamel, were found all over the territory of present-day Ukraine. Kyivan Rus hot-enamelled jewellery mainly dates back to the XII – first half of the XIII century.

They were created following Byzantine ideological concepts. For example, the images of Semurves (Semargles-Perepluts – mythological beings of Iranian origin) (Il. 1). Eagle-headed gryphons symbolise the idea of strong power, indicating their "princely" version of origin (Il. 2) Popular in Byzantine and Kyivan Rus jewellery decorated with cloisonné hot enamel was the scene «The Presentation of Alexander the Great» (Il. 3). with the cult of the emperor. Consequently, it is important to note that the gold jewellery of Kyivan Rus with cloisonné hot enamel belonged mainly to the prince and his inner circle.

Summing up, it should be noted that the jewellery of Kyivan Rus inherited elements of Eastern cultures (features of hot enamel techniques of Achaemenid Iran, Iberia). The jewellery of the above period can be regarded as a benchmark in the context of the «pure» refined stylistics of Kyivan Rus, one of the most powerful and culturally developed medieval states on the map of Europe (Barbalat O. 2021: 95).

The then «brand» of Ukrainian jewellers, known as kolts (Il. 4) is an embodiment of the highest achievements of the artistic opinion of the masters of that time, behind which one can sense a huge inner spiritual culture and their professional flawless knowledge of materials and techniques. (Shkolna, O., Sosik, O., Barbalat, O., Sytnyk, I., Kaszczaj, O., 2021: P. 646).

Medieval Christians understood every element of the world as a manifestation of God, paying special attention to the religious significance of plants.

The active process of the conversion of Byzantine phytomorphic ornaments to sacred significance can be traced to the artistic monuments of Byzantium and Kyivan Rus in the XI and early XIII centuries (Barbalat O. 2022: 80).

Among other things, for Ancient Greece and Rome, whose pagan components were absorbed by Byzantium, an important component was gold, symbolizing divine light, i.e. it could be called an absolute metaphor for the energy of the Creator. (Garczarska, 2020: 88).

It is historically known that in the world context, the Egyptians used techniques of hot enamelling of non-ferrous metals since the New Kingdom (1550–1295 BC). Later, from Persian-occupied Egypt, this technique spread actively in Iran and developed strongly during the reign of the Achaemenids (VI–IV centuries BC). In Persian, enamel sounds like *minakari* (Persian: مین‌کاری – enamel).

Influenced by the artistic images of Iran, the Scythian animal style was formed, which was synthesized with Hellenic art in the Black Sea region. Later, the technology of enamelling non-ferrous metals became an integral part of Greco-Roman goldsmithing. A significant number of ornaments date from the IV–III centuries. BC, made in the so-called technique of cloisonne hot enamel (Барбалат О. В., Школьна О. В. 2020: 16).

An important role in the development of medieval enamel work was played by the state of Iberia, whose masters were highly valued in Byzantium throughout the Middle Ages. In Georgian, enamel sounds like *minankari* (Georgian: მინანკარი – enamel). Thus, the works of enamel art of Byzantium, in particular, made in Constantinople (VIII–XII centuries) by masters from Iberia later significantly influenced the development of this technique in the goldsmith's Kyivan Rus (Барбалат О. В., Школьна О. В. 2020: 19).

Under the significant influence of Byzantine art in the early XII century. in Europe, there are schools of artistic enamel: Maas in Lorraine, Rhine (Cologne), Limoges (Limoges) (Барбалат О. В., Школьна О. В. 2020: 18).

In the historical territories of Ukraine, membranous enamel gained a special rise in the days of Kyivan Rus. It should be noted that gold products: tiaras, necklaces, hryvnias, colts, book frames, decorated with enamel, were found throughout the territory of present-day Ukraine.

Analyzing, in fact, the technological aspects of hot enamel, it should be noted that enamel (from the French email – melt) is a low-melting transparent or opaque lead-silicate glass, painted in various colours

with metal oxides. After application to the product, after the firing process, it turns into a solid, shiny mass with bright and stable colours. Enamelling belongs to a special technology of jewellery production, closely related to the main jewellery processes. In addition to decorative qualities, the enamel is endowed with durable protective properties. Enamelling as a kind of jewellery art has several technological features.

The longer the process of firing the glass mass, the colder the shades of paint. Repeated firings are allowed, but there is a limit to corrections. The firing process is not always completely controlled, so the master never knows exactly what the result will be. Each work becomes a kind of test of the artist's talent, captures with its unpredictability and requires a combination of maximum effort of creative ideas, aspirations and objective scientific knowledge.

For example, conducting a comparative analysis of the composition of enamel masses, we see that the special attention of ancient masters was focused on the symbolic meaning of enamel colours in jewellery, which was formed by adding oxides and salts of metals in a special flux based on quartz sand combined with potassium oxide, boric acid, soda and lead red lead.

By types of enamel, mixtures are deaf, opaque, so-called opaque, whose decorative properties are expressed in the brightness of colours, lustre, contrast with the colour of the metal. Transparent or translucent – transparent, which is characterized by the permeability of colours and their amazing play at different angles depending on the incident light. But opal enamels, which combine the qualities of the first two and look transparent or deaf depending on the angle of the incident light, resemble opal – a precious mineral of the silicate class (Хардаєв В. 2011: 196).

In particular, the masters of Byzantium and ancient Georgia widely used translucent and opaque enamels to work, with which they made a base of high-grade gold from 800°C to 911°C. Jewellers of princely Kyiv mainly used opaque enamel mixtures, for which from 58% to 66% of the Au content in the base is enough. This fact is evidenced by the analysis of the alloy of metals and enamel mixtures used in Kyivan Rus, Byzantine and Georgian jewellery from the collection of MICU, performed by the laboratory of KNTEU in 2010 (Хардаєв В. 2011: 195).

Referring to the above analysis of Byzantine and Kyivan Rus enamels in the jewellery of the MICU collection, it is worth noting the general similarity of their composition and some of its differences. Unlike the enamel mixtures used by the jewellers of princely Kyiv, which according to the above analysis contain from 20% to 60% of lead, the oxide of which gives the enamel red colour, and from 15% to 20%



of tin oxide, which creates opacity of the material, the works of Byzantine masters contain from 89% to 96% of chromic acid lead and only 2% of tin, which in combination with potassium look translucent and closer to purple shades.

Analysing the differences in the composition of enamel mixtures, it should be noted that the masters of princely Kyiv found their excellent way to obtain bright red colours of enamel through the use of selenium, which is absent in the coating materials of



П. 1. Image of Semargl with a diadem. X century Byzantium, Constantinople? Gold, membranous hot enamel. Archaeological Museum «Veliky Preslav». Preslav, Bulgaria.  
Рис. 1. Зображення Семмурва з діадеми. X ст. Візантія, Константинополь? Золото, перетинчаста гаряча емаль. Археологічний музей «Великий Преслав». м. Преслав, Болгарія.



П. 2. Image of a griffin with a diadem. 12<sup>th</sup> – first half of the 13<sup>th</sup> century. Princely Kyiv. Gold, hot cloisonne enamel. Treasury of the National Museum of the History of Ukraine. Kyiv. Ukraine.  
Рис. 2. Зображення грифона з діадеми. XII – перша половина XIII ст. Княжий Київ. Золото, гаряча перетинчаста емаль. Скарбниця Національного музею історії України. м. Київ. Україна



П. 3. Detail depicting the scene «Ascension of Alexander the Great». The first half of the 13<sup>th</sup> century. Gold, hot cloisonne enamel. Private collection.  
Рис. 3. Деталь із зображенням сцени «Вознесіння Олександра Македонського». Перша половина XIII ст. Золото, гаряча перетинчаста гаряча емаль. Приватна колекція.



П. 4. Kolt with Dove 11<sup>th</sup> – first half of the 13<sup>th</sup> century. Princely Kyiv. Gold, hot cloisonne enamel. Treasury of the National Museum of the History of Ukraine. Kyiv. Ukraine.  
Рис. 4. Колт із голубом. XI – перша половина XIII ст. Княжий Київ. Золото, перетинчаста гаряча емаль. Скарбниця національного музею історії України. м. Київ. Україна.

Byzantine products. Instead, cadmium selenide, which is used to obtain ruby shades of enamel, is present in Byzantine and Kyivan Rus products in an amount of 1% to 3%. The crimson shades of colour symbolized the blood of Christ shed for the salvation of mankind, which was widely used by Byzantine masters and was considered a valuable material, because, among other things, it contained oxides of gold.

Shades of yellow, which in Christianity symbolize the presence of the Holy Spirit, were obtained with the help of antimony oxide, which is also in the amount of 1% to 3% contained in the enamels of Byzantium and Kyivan Rus. But, in contrast to the Kyivan material, the Byzantine material contains up to 1% sulphur, which allowed to obtain amber colours. Iron oxide in combination with other compounds gave the enamel different shades of brown, grey, black. While tin oxide, creating the opacity of the material, gave rise to white – an inviolable symbol of holiness, purity and spirituality in Christianity.

At the same time, manganese oxide and cobalt oxide are the basis of the range of purple, blue and cyan colours associated in Christianity with the eternity and infinity of all things. Copper and chromium oxide in the enamels of Byzantium and Kyivan Rus create a range of blue-green and turquoise-azure colours, symbolizing earthly life, spring, the flowering of nature, youth.

**Conclusions.** Therefore, the technique of hot enamel was popular in decorating the jewellery of

princely Kyiv and mainly in the decoration of kolts, bracelets, diadems and other works of Kyivan Rus goldsmithing of XI – first half of XIII centuries.

Cruciform decorative rosettes with phytomorphic ornaments, acquired great sacral significance as they were directly related to the biblical characteristics of the structure of Heavenly Jerusalem. Pagan conceptions of the world formations were in harmony with biblical subjects.

In general, it should be noted that the development of Kyivan Rus goldsmith traditions in the period of the XI – the first half of the XIII century is distinguished by a powerful cultural interrelationship with the whole continent. This resulted in the adoption of borrowed artistic images in its artistic traditions.

The religious reform of Prince Vladimir the Great in 988 could not fully oust the paganism that had settled on the territory of Kyivan Rus. At the same time, the process of superimposition of the newly accepted religion on the pagan traditions took place. As a result, the artistic images of Kyivan Rus art gained new meanings.

The Tree of Life, Griffins, Virgin Birds, Semargles, Doves, etc. were the main elements in the semantic-semiotic system of building the Kyivan Rus iconography in the XI first half of the XIII centuries. Executed in the technique of hot enamel on gold, whose colours strengthened the symbolic meaning of these images, they are still a strong source of inspiration for the works of modern jewellers.

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