



RAW MATERIAL SOURCES OF SOGDIAN SILVER CRAFTSMANSHIP: BASED ON FINDS FROM SAMARKAND AND PANJIKENT

Samarkand State University named after Sharof Rashidov,
2nd-year doctoral student of the Department of Archaeology

Ziyayev Husan Niyoz ugli

E-mail: ziyayevhusen@gmail.com

Tel.: +99899 221-21-43

ORCID: <https://orcid.org/0009-0003-9135-388X>

Annotation. *The article analyzes the raw material sources of Sogdian silver craftsmanship on the basis of materials from Samarkand/Afrasiab and Panjikent. Silver vessels, coins, decorative systems, iconographic motifs, chasing and hammering techniques, as well as international trade relations are studied in connection with the issue of raw material supply. Particular attention is paid to silver-bearing regions such as Chach-Ilaq, Chatkal, Lashkerek, the Talas Valley, and possible Pamir–Hindu Kush routes. The study interprets Sogdian silverworking not merely as an artistic phenomenon, but as a complex economic and technological system connected with mining, monetary circulation, aristocratic consumption, and urban craftsmanship.*

Keywords: Sogdian silver, Samarkand, Afrasiab, Panjikent, silver craftsmanship, raw material sources, Chach-Ilaq, Lashkerek, dirham, lead isotopes.

Annotatsiya. *Maqolada Sug‘d kumush buyumsozligining xomashyo manbalari Samarqand/Afrosiyob va Panjikent materiallari misolida tahlil qilinadi. Kumush idishlar, tangalar, bezak tizimi, ikonografik motivlar, zarb va bolg‘alash texnikasi hamda xalqaro savdo aloqalari xomashyo ta‘minoti masalasi bilan bog‘lab o‘rganiladi. Asosiy e‘tibor Choch-Iloq, Chatqol, Lashkerek, Talas vodiysi va ehtimoliy Pomir–Hindukush yo‘nalishlari kabi kumush resursli hududlarga qaratiladi. Tadqiqotda Sug‘d kumushsozligi faqat san‘at hodisasi emas, balki konchilik, monetar muomala, aristokratik iste‘mol va shahar hunarmandchiligi bilan bog‘liq murakkab iqtisodiy-texnologik tizim sifatida talqin qilinadi.*

Kalit so‘zlar: Sug‘d kumushi, Samarqand, Afrosiyob, Panjikent, kumush buyumsozligi, xomashyo manbalari, Choch-Iloq, Lashkerek, dirham, qo‘rg‘oshin izotoplari.

Abstract. *This article examines the raw material sources of Sogdian silver craftsmanship through the evidence of Samarkand/Afrasiab and Panjikent. Silver vessels, coinage, decorative systems, iconographic motifs, hammering and chasing techniques are analysed in relation to silver supply. Particular attention is paid to Chach-Ilaq, Chatkal, Lashkerek, the Talas Valley, and possible Pamir–Hindu Kush supply routes. The article argues that Sogdian silverworking should not be interpreted only as an artistic phenomenon. It was also a complex economic and technological system connected with mining, monetary circulation, urban craft production, elite consumption, and long-distance exchange networks.*

Keywords: *Sogdian silver, Samarkand, Afrasiab, Panjikent, silver vessels, raw material sources, Chach-Ilaq, Lashkerek, dirham, lead isotopes.*

INTRODUCTION. Sogdian silver craftsmanship occupies a special place in the art history of early medieval Central Asia. Metal objects formed within the cultural environment of Samarkand/Afrasiab and Panjikent reflect not only aesthetic taste, but also urban craftsmanship, mining, raw material exchange, and the system of social patronage. The form of silver vessels, their hammered body, chased ornamentation, zoomorphic or mythological motifs, and sometimes their connection with coin silver as raw material require the study of Sogdian metalworking within a broader economic context.

At the center of the problem lies one question: if silver objects of high artistic quality were produced in Samarkand and Panjikent, where did the silver that supplied them come from? The available evidence shows that silver raw material was formed not from a single local source, but from a complex system of sources coming through Chach-Ilaq, Chatkal, the Talas Valley, Lashkerek, possibly the Pamirs, the Hindu Kush, and remelted coins. Chach-Ilaq, Chatkal, and the Talas Valley are mentioned as the main regions of silver mining in the Middle Ages; it is

recorded that there were 15 mines in Chach-Ilaq and 30 mines in Chatkal [Sala, 2011, p. 425].

The problem of raw materials in Sogdian silver craftsmanship requires not only an art-historical approach, but also an archaeometallurgical one. This is because, in order to understand the ornamentation on the surface of a vessel, it is necessary to determine its metal composition, alloy quality, suitability for hammering, and whether it was made from remelted or primary silver. For example, the isotope ratios of slags obtained from Tunkat and Lashkerek correspond to Shash coins, demonstrating the importance of lead isotope analysis in determining the provenance of silver [Merkel et al., 2013, p. 64]. The isotopic indicators of Samarkand coins, however, differ from Tian Shan ores; therefore, it is assumed that Samarkand may have obtained its silver from various directions such as the Pamirs, the Hindu Kush, and Ilaq [Merkel et al., 2013, p. 64].

RESEARCH METHODS. The article applies historical-analytical, archaeological-comparative, art-historical, iconographic, and archaeometallurgical approaches. The historical-analytical method serves to explain Sogdian silver craftsmanship in connection with early medieval urban economy, coinage, trade routes, and mining networks. This approach is especially important in analyzing Samarkand's position as a mint and its connection with the mines of Chach-Ilaq. Ibn Hawqal's statement that silver dirhams in Transoxiana were minted only in two places – in Tunkat, the capital of Ilaq, and in Samarkand – strengthens the written-source basis of this line of analysis [Sala, 2011, section 3].

The archaeological-comparative method makes it possible to compare the materials of Samarkand/Afrasiab and Panjikent within the common Sogdian cultural space. The materials of Panjikent are especially important in connection with Sogdian aristocratic culture, banquet scenes, wall paintings, and the object consumption of the urban elite. Samarkand, in turn, was a major node of silver flow as a mint, trade center, and political center. Therefore, the two centers are considered

not separately from one another, but as different functional aspects of one cultural-economic system.

Art-historical and iconographic analysis was directed toward interpreting the zoomorphic, floral, geometric, and mythological motifs on silver vessels. It is noted that Sogdian craftsmen achieved high results in working gold, silver, and bronze, and that zoomorphic ornaments occupied an important place in their objects [Asatullayeva, 2026, p. 94]. Based on B. I. Marshak's typology, the division of Sogdian metallurgy into schools A, B, and C, as well as the idea that school C is close to Tang-period Chinese silver, shows the territorial differentiation of craft styles [Asatullayeva, 2026, p. 95].

The archaeometallurgical method, however, requires caution in identifying the source of raw materials. Lead isotopes, bismuth, copper, sulfur, or other trace elements in slag, ore, coins, and objects help determine the region of origin of silver. However, the remelting of silver, the use of old coins, or the mixing of different sources complicates provenance. For this reason, the article uses the firm conclusion "clearly proves" only in cases confirmed by isotopic or written evidence.

RESULTS. 1. Sogdian Silver Craftsmanship and Urban Demand. Sogdian silver craftsmanship was a complex field of production connected with urban craftsmanship, aristocratic consumption, and international trade. Silver vessels were not ordinary household objects, but also functioned as signs of social status, ceremonial environment, and gift exchange. A seventh-century silver cup with elephant heads on its ring-shaped handle, preserved in the Freer Gallery of Art in Washington, is mentioned among the examples that demonstrate the high level of Sogdian artistic metalworking [Asatullayeva, 2026, p. 95].

The production of such objects required a stable supply of raw material. Large goblets hammered from a single metal sheet required high-quality silver with good plasticity [Pritzker, n.d., p. 106]. Therefore, silver craftsmanship was directly connected not only with the skill of the jeweler, but also with the quality of ore, smelting and refining technology, and the suitability of the metal for hammering.

The central position of Samarkand in the Sogdian political-economic system is important for explaining silver raw material and mint activity. According to A. Ungalov, in the early Middle Ages the Sogdian confederation was formed as a state organization, and it possessed coinage, a central city, state symbols, and an administrative structure; in later political processes, the center of the confederation was concentrated around Samarkand [Ungalov, 2020, P. 8–9.]. In this respect, Samarkand should be interpreted as a center that received and redistributed silver flows not only in connection with craftsmanship, but also in relation to the political-administrative system.

2. Chach-Ilaq, Chatkal, and the Talas Valley: Main Raw Material Basins.

The available evidence shows that Chach-Ilaq and Chatkal were among the most important raw material bases for Sogdian silverworking. The information that there were 15 silver mines in Chach-Ilaq and 30 in Chatkal determines the importance of these regions in the medieval metal economy [Sala, 2011, p. 425]. The Lashkerek mine is one of the best-studied examples of this system. It is recorded that it was mined to a depth of 300 meters in 460–930, and that 9–14 thousand tons of slag remains containing 20 percent lead indicate the production of approximately 400 tons of silver [Sala, 2011, note 2].

The polymetallic nature of the Lashkerek mine is also important. It is noted that natural silver veins in this area occur in association with galena, sphalerite, bornite, and other minerals [Merkel et al., 2013, p. 63]. Such mineral composition complicated the process of silver extraction, but at the same time increased the economic value of the mine. The information that mining operations in the Lashkerek gorge in the southern part of Tashkent Region extended for 4–5 km along a fracture zone in the seventh–ninth centuries shows that the mine was exploited on a large scale [Tashkent Region, n.d., Lashkerek forest section].

3. The Samarkand Mint and Silver Flow. Samarkand was an important center of silver raw material not only for artistic objects, but also for the monetary system. It is noted that in the Samanid period coins were minted mainly at the Chach

and Samarkand mints, and partly in Balkh and Bukhara [Sala, 2011, section 2.1]. According to the analysis of Northern European hoards, 54 percent of Samanid dirhams belonged to the Shash mint and 38 percent to the Samarkand mint, showing how centralized the silver flow was [Merkel et al., 2013, p. 63].

This fact strengthens Samarkand's position as a consumer of raw material. If the Samarkand mint produced dirhams on a large scale, it must have been supplied continuously with silver raw material. The fact that a large part of the coins found in Northern European, Baltic, and Scandinavian hoards are Samanid dirhams minted in Chach and Samarkand shows that silver from Sogdiana and Transoxiana entered international exchange networks [Sala, 2011, section 2.2, note 12].

4. Lead Isotopes and the Problem of Provenance. Lead isotope analysis is of special importance in determining the source of silver raw material. The correspondence of the isotope ratios of Tunkat and Lashkerek slags with Shash coins shows that Chach-Ilaq silver entered mint products [Merkel et al., 2013, p. 64]. However, the situation is more complicated in the case of Samarkand coins: the isotopic slope obtained from Tian Shan ores differs from that of Samarkand coins, and therefore Samarkand silver may have come from various directions such as the Pamirs, the Hindu Kush, and Ilaq [Merkel et al., 2013, p. 64].

This situation shows that it is not correct to connect Samarkand with only one mine. The Samarkand mint and silver craftsmanship may have relied on a multi-source raw material system. Remelted coins, old objects, and silver mixtures from different regions may also have entered the process. The fact that silver remelting makes provenance difficult to determine is considered an important methodological problem in archaeometallurgy [Merkel & Kershaw, 2021, p. 116–133].

5. Samarkand and Panjikent: A Common Sogdian Cultural Space. Samarkand and Panjikent were two important urban centers of Sogdian culture, and in understanding silver craftsmanship they complement each other. While Samarkand, as a mint, political center, and major trade node, stood close to the management of silver flow, Panjikent reveals the environment of aristocratic urban

culture, banquets, wall paintings, and elite object consumption. In this sense, the Panjikent materials illuminate the social function of silver objects, while Samarkand illuminates the economic mechanism of raw material and monetary flow.

The decorative repertoire of Sogdian silver vessels was not limited only to local taste. It is noted that during the Tang period, a transformation and synthesis of Sogdian and Chinese artistic techniques occurred and was embodied in bowls of a new form [Asatullayeva, 2026, p. 95]. Chinese craftsmen continued Sogdian prototypes by making the vessels more compact in size and chasing images of wild animals and vineyards on their surfaces [Asatullayeva, 2026, p. 95]. This indicates that the artistic metalworking traditions formed in Samarkand and Panjikent influenced the international craft environment.

6. Technique, Iconography, and Raw Material Quality. The technical quality of Sogdian silver objects is directly connected with the issue of raw material. Vessels hammered from a single sheet, repoussé and chasing techniques, geometric faceting, medallions, and zoomorphic compositions required silver with high plasticity. In the western Central Asian gold ewer analyzed by Pritzker, the composite predator Senmurv is combined with a floral ornament in the central medallion, showing an iconographic environment connected with Sasanian and Sogdian silk patterns [Pritzker, n.d., p. 107]. The fact that the three-leaf flower motif was widespread in sixth–ninth-century silk, stone, metal, and wall painting also shows the common cultural basis of the floral system in metal objects [Pritzker, n.d., p. 113].

Animal imagery was also not merely a decorative element. Pritzker notes that animal images are presented in states of dance, hunting, play, or dramatic movement and carried ancient allegorical and emotional meanings [Pritzker, n.d., p. 114]. This situation required from the master of silver objects not only technical skill, but also knowledge of complex cultural codes. Thus, the issue of raw material sources is connected with style and iconography: without high-quality silver, such a complex artistic program would have been difficult to realize.

DISCUSSION. It is not sufficient to explain the raw material sources of Sogdian silver craftsmanship only through a geological map. Mining, minting, trade routes, aristocratic patronage, and artistic style functioned as an integrated system. Although the Chach-Ilaq and Chatkal mines are viewed as the main sources of silver, the isotopic composition of Samarkand coins complicates this picture. The mismatch with Tian Shan ores indicates that Samarkand silver may have come from various regions, including the Pamirs, the Hindu Kush, and Ilaq directions [Merkel et al., 2013, p. 64].

The difference between the materials of Samarkand and Panjikent is also visible precisely at this point. In Samarkand, silver flow was connected with the mint and a major trade center, while in Panjikent the cultural function of silver objects – banquets, elite consumption, ceremonial appearance, and the world of objects depicted in wall paintings – appears more prominently. This difference does not place the two cities in opposition; on the contrary, it shows functional specialization within Sogdiana. While Samarkand was a center that accumulated raw material and monetary flows, Panjikent vividly reflects the social and spiritual consumption environment of these objects.

The influence of Sogdian silver objects on Chinese and Tang-period metalworking brings the issue of raw materials into an international context. If Sogdian vessels were exported, if their forms were adopted and reinterpreted by Chinese craftsmen, this means that production was not accidental or small-scale. Melikian-Chirvani notes that Sogdiana and possibly northeastern Bactrian regions played a leading role in the geometric style, and that the division of vessel volume into polygonal facets was characteristic of this environment [Melikian-Chirvani, 1974, p. 147]. It is also emphasized that certain forms in Tang silver were not Sasanian, but were connected with a group of vessels of Sogdian origin dating to the seventh–eighth centuries [Melikian-Chirvani, 1974, p. 135].

At the same time, caution is necessary regarding raw material provenance. The fact that the style of a silver vessel is characteristic of Sogdiana does not mean that

its silver was also obtained specifically from a Sogdian mine. On the contrary, the craftsman may have worked in one region, the raw material may have come from another region, and the object may have been exported to a third region. The remelting of precious metals, the use of coin silver, and the transformation of old objects into new forms further complicate provenance [Merkel & Kershaw, 2021, p. 116–133].

The example of Lashkerek is important in interpreting Sogdian silver craftsmanship economically. The calculations concerning a mine excavated to a depth of 300 meters, thousands of tons of slag, and hundreds of tons of silver production show that precious metal mining in medieval Central Asia had a fairly large scale [Sala, 2011, note 2]. Such a volume may have supplied not only local needs, but also coin minting, international trade, elite commissions, and long-distance exchange.

CONCLUSION. Sogdian silver craftsmanship was a complex field of craftsmanship that required a stable supply of raw material. The materials of Samarkand/Afrasiab and Panjikent show two sides of this process: Samarkand illuminates the monetary, commercial, and political centralization of silver, while Panjikent reveals artistic consumption, the aristocratic environment, and the iconographic world.

Regions such as Chach-Ilaq, Chatkal, the Talas Valley, and Lashkerek occupied an important place as the main sources of silver raw material. However, the isotopic indicators of Samarkand coins show that the flow of raw material was not unidirectional and that there was a possibility of connection with the Pamirs, the Hindu Kush, and other regions. Therefore, explaining Sogdian silver through one mine or one trade route would be a scientifically narrow approach.

The Samarkand mint, the Shash-Tunkat mining and metallurgical center, and the international circulation of dirhams show that Sogdian silver entered a broad economic system. The occurrence of Chach and Samarkand dirhams in large

proportions in Northern European hoards indicates that this silver also influenced the trade world beyond Central Asia.

The iconography of Sogdian silver objects – Senmurv, zoomorphic scenes, the three-leaf flower, geometric faceting, and chased ornaments – is inseparable from the quality of raw material. Vessels with complex ornamentation required high-quality silver, technical skill, and a stable patronage environment. In this respect, silver craftsmanship stood at the intersection of art, economy, and technology.

In the future, it is necessary to compare silver objects, coins, slags, and ore samples related to Samarkand and Panjikent through lead isotopes, trace elements, metallography, and production traces. Only such an approach will make it possible to distinguish more precisely the raw material sources of Sogdian silver craftsmanship and to evaluate scientifically the ratio between local production, import, remelting, and export.

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