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ЦАР ИВАН ШИШМАН (1371-1375):
СТРУКТУРНО ИЗСЛЕДВАНЕ

ВЛАДИМИР ОВЧАРОВ

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Billon (?) Coinage of King Ivan Shishman (1371–1375): A Structural Investigation

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Билонови (?) монети на цар Иван Шишман (1371-1375): Структурно изследване

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Abstract: In the numismatics of the Second Bulgarian Empire, there is an interesting group of coins which have an additional plating of white metal over the coin cores. These coins are an interesting phenomenon that has not yet been the subject of extensive research. There is also ambiguity about the plating metal. Researchers suggest that the plating metal is silver and, according to the current statement, they attribute them as a billon coinage. So far, all scientific publications on the topic are based only on visual observations. The aim of this study is to analyse these coins with advanced elemental analysis (SEM/XRF/EDX). In this work, attention is focused on the “billon coinage” of the reign of King Ivan Shishman (1371–1395). The analysis of the coin cores characterises them as made of copper. In the preparation of the first and second “billon” coinages, medieval metallurgists used tin (Sn) plating. In conclusion, these coinages are not billon since silver is not used for additional metallic plating and is not present in the alloy composition of the coin core.

Keywords: “Billon” coinage, King Ivan Shishman, Second Bulgarian Empire, Metallographic analysis



Introduction

The reign of King Ivan Shishman is characterised by the issuance of abundant silver and copper coinage (Дочев 2009, 206–221). So far, four silver (Ag 95%), two “billon”, and three copper issues with flat and concave cores are known, which are issued mainly by the Tarnovo mint. The “billon” coinage of the ruler is subdivided into two main types, which were minted almost in parallel. According to K. Dochev, the first “billon” coinage dates to the period of 1371–1390, and the second “billon” coinage to 1375–1385. Both emissions are products of the Tarnovo mint (**Fig. 1**). The name “billon” is used in the scientific literature when silver is a component in the coin alloy and can reach up to 20%, or when the coins are silver-plated (Morrisson 2002, 926; 933-934). The researcher of the coinage of the Second Bulgarian Empire, K. Dochev, quite rightly notes that “these editions are the result of a shortage of silver in the Tarnovo Mint and are an

official speculative measure aimed at replacing silver coins with those whose value is artificially inflated” (Дочев 1992, 40). In 2007, St. Avdev notes that King Ivan Shishman’s “billon coins” have “visibly silvered surfaces”, but the composition of the additional metal plating and the cores are unknown (Авдев 2007, 197).



Fig. 1. Tin plated coinages of King Ivan Shishman (Private collections; Photo credits: V. Ovcharov): **1.** Type IA – the coins are tinned and subsequently hammered; **2-3.** Type IB – the coins are hammered and subsequently tinned; **4.** Type II – the coins are hammered and subsequently tinned.

Aim of Study

The aim of this study is to analyse these coins with advanced elemental analysis (SEM/XRF/EDX) in order to prove or reject the statement about the so-called silver-plating (billon).

Materials and Methods

For this purpose, the results of the archaeometric analyses of the Bulgarian mediaeval coinage conducted between 2011–2013 using SEM/XRF were used (Овчаров, 2011). The results that were supplemented with new data for coin surfaces, obtained via energy-scattering X-ray analysis (EDX) performed with a “Socius Dual Beam” microscope equipped with an EDX detector (Octane Elite EDS Silicon Drift Detector) are included. The Octane Elite EDS System uses state of the art electronics, which yield high-speed X-ray data processing within a smaller and fully vacuum-encapsulated detector device. An ultra-high-resolution analytical focused ion beam microscopy system provides elemental and 3D surface characterisation.

Twenty coins of the first and second “billon” type are included for analysis.¹ The coins have different degrees of preservation of the “silver” plating.

Results

Coin cores

The results obtained by SEM/XRF show the chemical composition of the alloy composition of the coin core:

¹ All analysed coins are from private collections.

1. First billon type: Cu 89%, Pb 7%; Sn 3.8; Sb 0.2%.
2. Second billon type: Cu 88, 2%; Pb 6.3; Sn 5.1%; Sb 0.2%; Fe 0.1%; Ag 0.1%.

The data for coin cores characterise them as made of copper. The find of 0.1% silver in the second “billon” type is an impurity that is a natural component of the ore used. The addition of silver was an unconscious act and went unnoticed by medieval metallurgists (Овчаров, 2011).

Coin Plating

The results obtained by EDX analysis show that in the preparation of the first and second “billon” coinage, mediaeval metallurgists used tin (Sn) plating (**Fig. 2**). Combined SEM/EDX analysis allows for some clarifications related to the production process of coins of the first and second tinned type (**Fig. 3**). The mediaeval technique of hot tinning was used in the production of the speculative coinage. After heat treating the coins were immersed in a bath of molten tin.

In 1371, the Tarnovo metallurgists and blacksmiths produced the first tinned type of coins using the technique of initial tinning and subsequent hammering (Type IA; **Fig. 1.1, Fig. 4**). This technological solution led to problems. During hammering, due to the different plasticity of copper and tin, many peeled and torn places become visible. Very few coin finds reveal tin plating features. Later emissions of this type, which are lighter, were first hammered and then tinned (Type IB; **Fig. 1.2–3**).

In 1375, the Tarnovo metallurgists and blacksmiths produced a second tined type (Type II), (**Fig. 1.4**). The coins were produced entirely by the technique of initial hammering and subsequent tinning. They have a dense tin plating (**Fig. 5**). The metallurgists made the right decision because a thicker plating is more durable, but also more expensive. Most of the coin finds still reveal plating features.

Conclusions

In conclusion, these issues cannot be defined as billon because silver was not in use for additional metal plating and is not present in the alloy composition of the coin core. The chronic shortage of silver in the Tarnovo mint, the abundance of billon coins of dubious standard, as well as the newly minted tin-plated coins are clear signs of the impending financial catastrophe. These coins document the catastrophic fiscal depression caused by the imposed vassality, which accompanied the decline of the Second Bulgarian Empire. King Ivan Shishman’s tin plated coins are a phenomenon in Balkan numismatics.

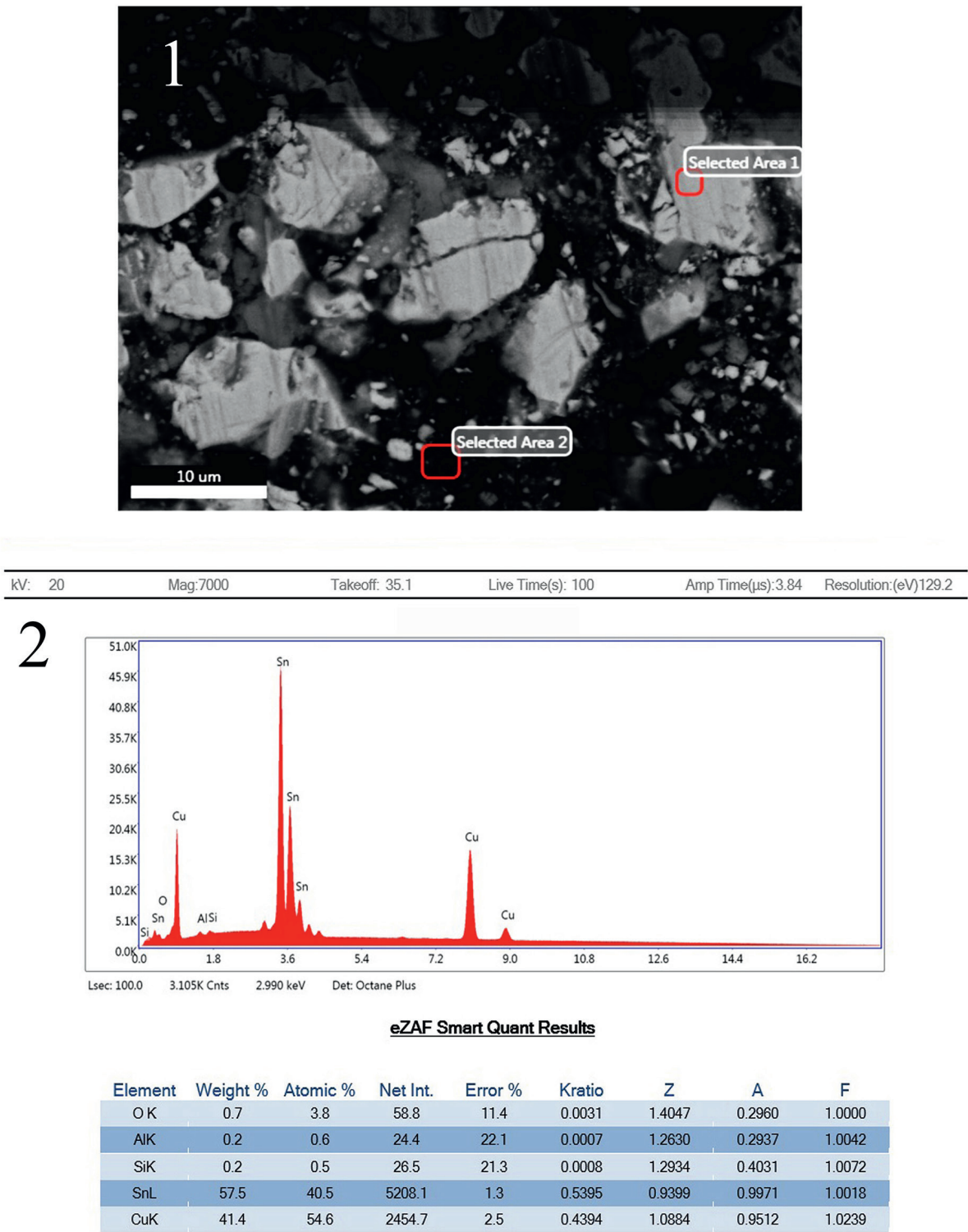


Fig. 2.1. Micrograph of the analysis carried out at an operating voltage of 20 Kv: detail of the surface of a tinned coin at a magnification of 7000x]
2. Elemental analysis of coin surface (macro- and microelements).

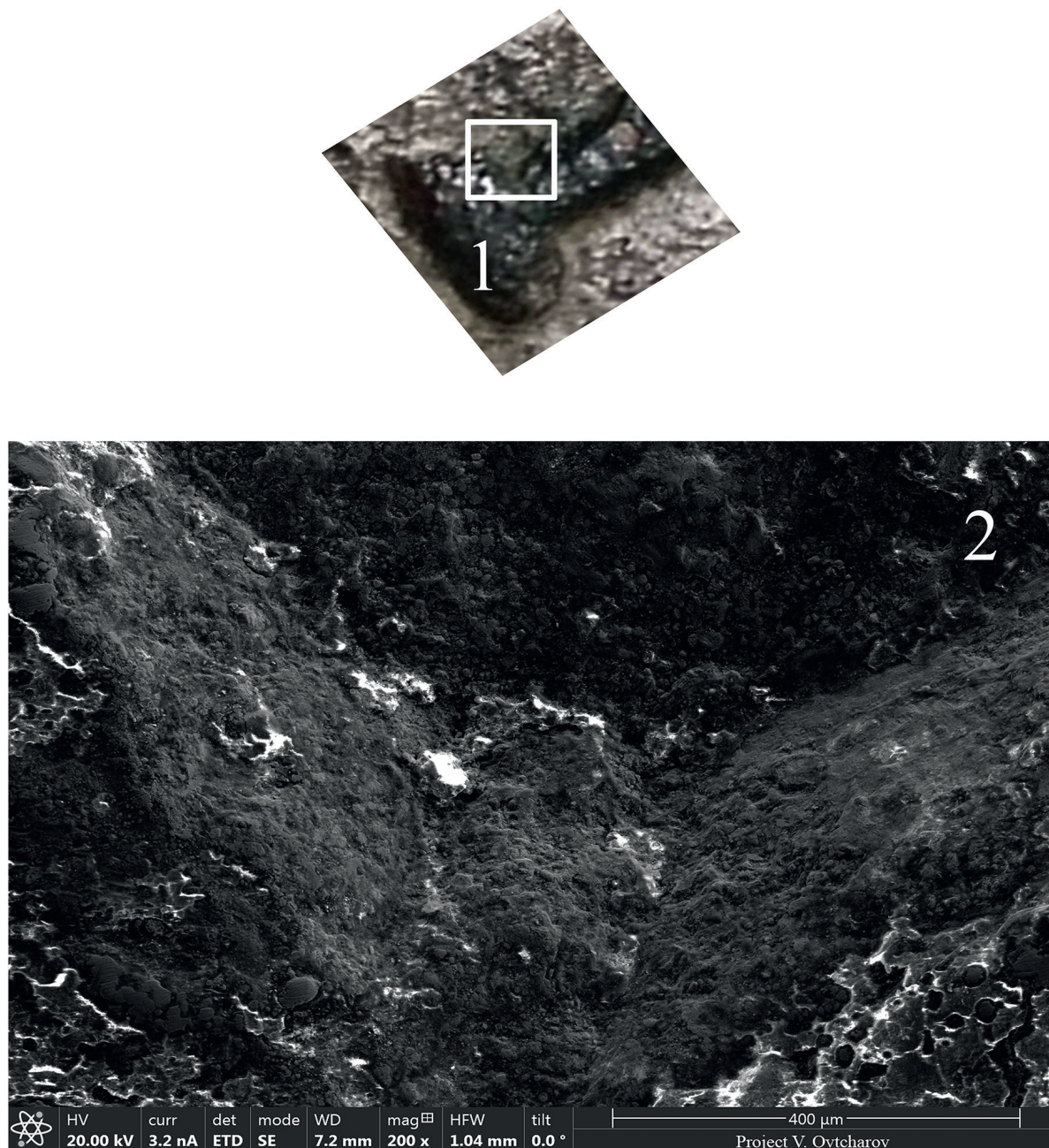


Fig. 3.1. Rotated coin surface of Type IA (detail of cross); **2.** Detail from (1) at 200x magnification. A perforated tin plating is observed (luminous spots) (Photocredits: V. Ovcharov).

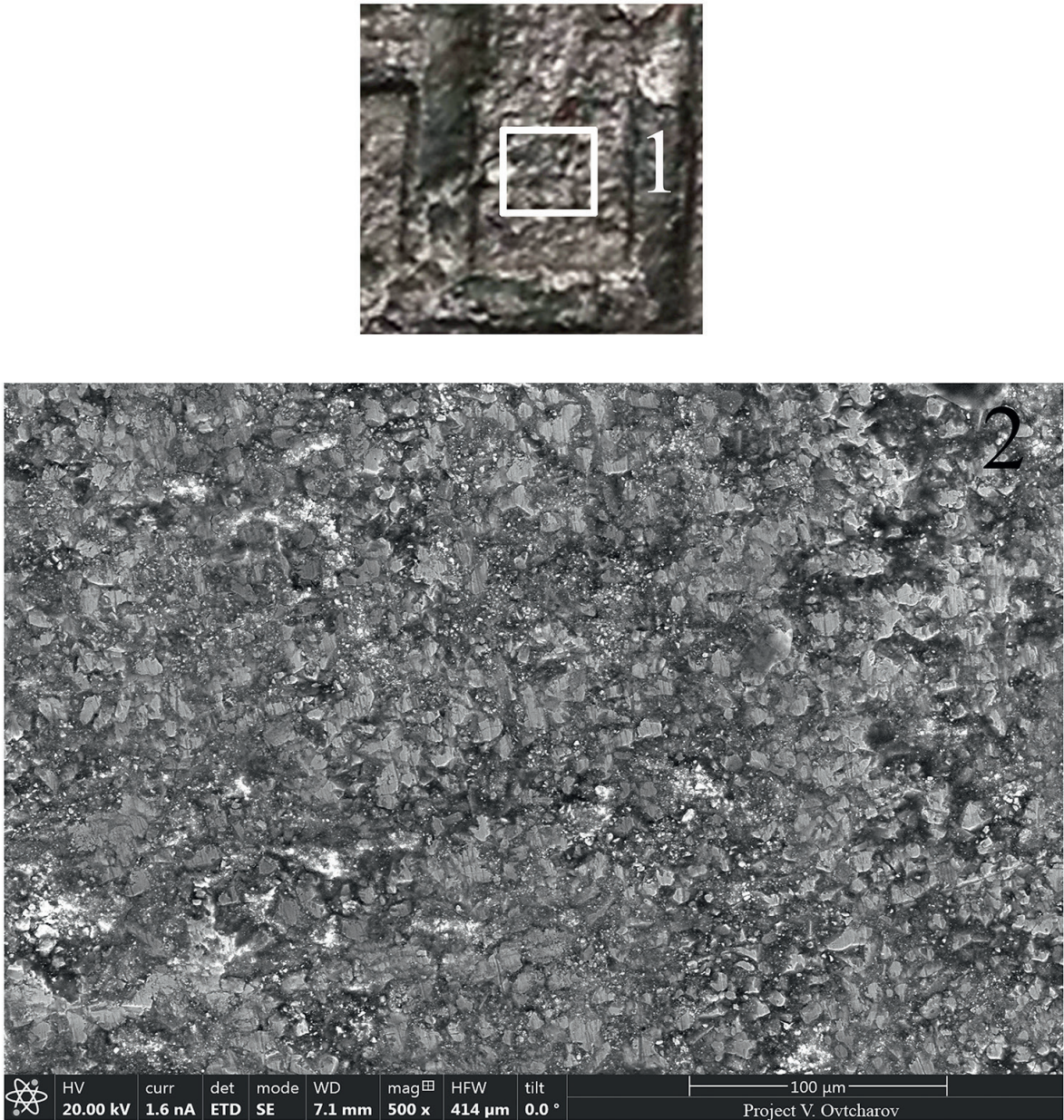


Fig. 4.1. Coin surface, detail of Type IA from Fig. 1.1. (detail of ШН monogram); 2. Detail of (1) at a magnification of 500x, a pressed tin plating is observed (Photocredits: V. Ovcharov).

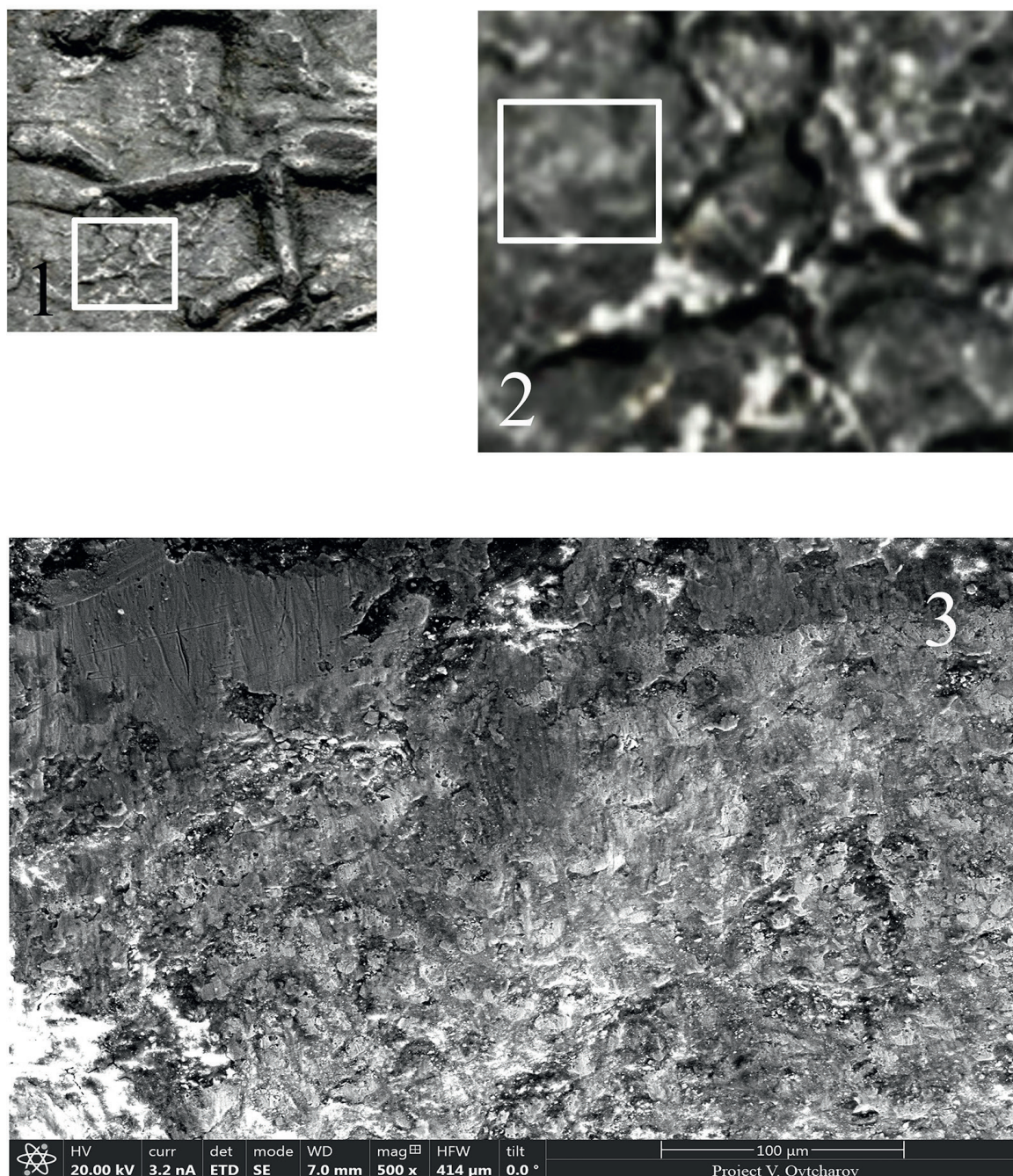


Fig. 5.1. Coin surface, detail of Type II (detail of lion); **2.** Detail of (1), with dense tin plating, which is not pressed on the coin surface; **3.** Detail from (2) at 500x magnification (Photocredits: V. Ovcharov).

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