

## Surface investigation of medieval silver coins using ultra-fast infrared spectroscopic imaging

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This study presents preliminary research concerning the distribution of chemical components on the surface of medieval silver coins.

The studied coins, namely the denarii of Boleslaus the Brave minted between 995 and 1020 AD (Figure 1), belong to the numismatic collection of the National Museum in Krakow. They were examined without performing any cleaning or pretreatment step. This spectroscopic analysis may be useful in discussing many historical aspects such as coinage production, provenance of raw materials, forgeries, and conservation treatments [1-5].



Figure 1. Photographic image of the studied Boleslaus denar.

Ultra-fast infrared imaging and mapping have been used for recording a visual image of component distribution and collecting vibrational spectra, respectively. This analysis is a necessary step prior to carrying out synchrotron studies. The aforementioned method is non-destructive and non-invasive making it adequate due to the uniqueness of the investigated objects, the first Polish coins.

The obtained data revealed that there are significant differences in the chemical compound distribution identified on the coins' surfaces (Figure 2). A detailed discussion about the relationship between the compounds

distribution and the historical and political contexts has been conducted.

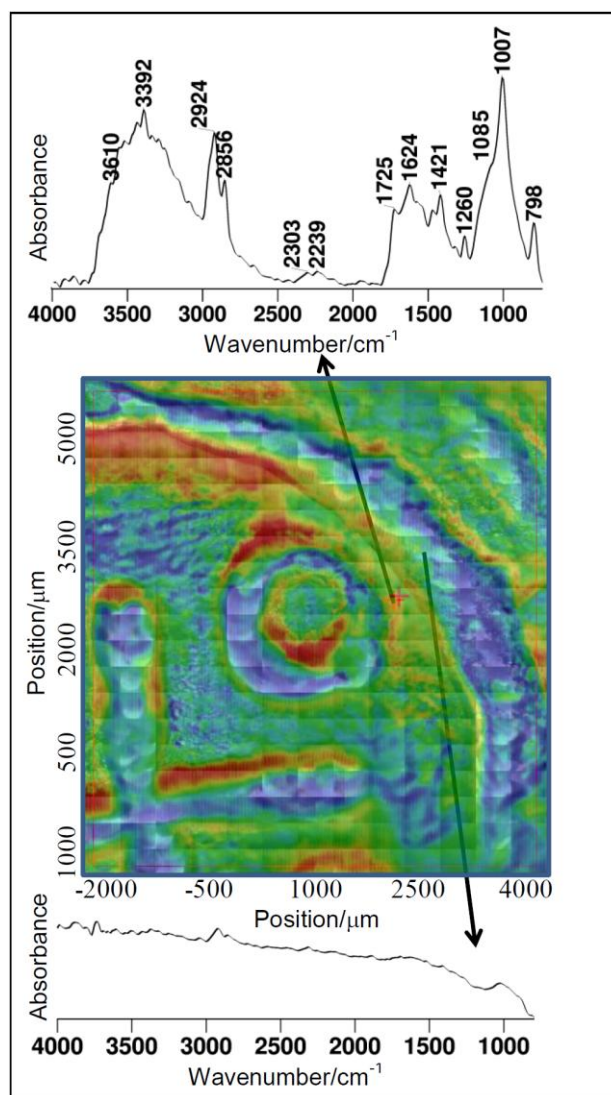


Figure 2. FT-IR image mosaic and exemplary collected spectra of the evaluated coin.

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