

**Gold enrichment in Staffordshire Hoard K358: results of SEM-EDX analysis**

Object Type Pommel  
Date 620-650  
Decoration Filigree  Glass   
Garnet  Other



SEM-EDX analysis was undertaken on a range of components as well as the base gold. The gold of the niello panel was examined along with the panel frame. XRD analysis identified the black inlay as silver sulphide niello (La Niece 2013).

Area analysed	No of analyses		Wt% Au	Wt% Ag	Wt% Cu
Base gold surface	10	Average	97.5	2.3	0.2
		Standard Deviation	0.51	0.46	0.10
Base gold sub-surface	12	Average	91.8	6.0	2.2
		Standard Deviation	0.86	0.64	0.23
Niello panel surface	5	Average	94.7	4.4	0.9
		Standard Deviation	0.67	0.70	0.07
Niello panel sub-surface	11	Average	94.9	4.1	1.0
		Standard Deviation	0.81	0.50	0.07
Frame of niello panel surface	8	Average	82.7	15.6	1.7
		Standard Deviation	1.82	1.75	0.10
Frame of niello panel sub-surface	18	Average	81.9	16.2	1.9
		Standard Deviation	0.31	0.33	0.08

SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

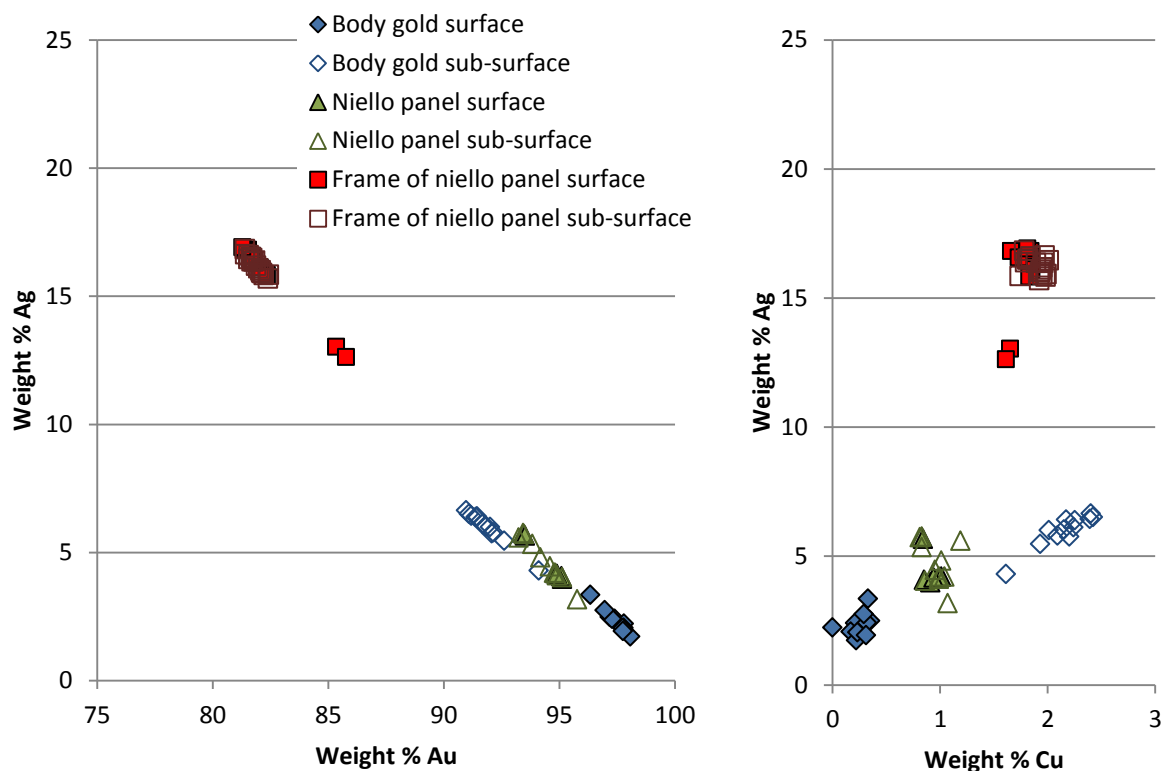
The analysis revealed a c.3.6 wt% loss of silver from the surface of the base gold (a difference of c.61% from surface to core), which is indicative of treatment to deliberately enrich the gold colour of the metal. Only copper and small amounts of silver are normally lost from the surface during burial.

The analysis of the gold frame around the gold and niello panels revealed a loss of c. 0.6 wt% silver from the surface, and a difference of less than 10% from surface to core, most likely indicative of corrosion that can occur during burial which results in natural surface enrichment but may also indicate some deliberate treatment. The analysis revealed a loss of copper and only a small loss of silver from the surface of the gold and niello panel, in quantities typical of corrosion which results in natural surface enrichment that can occur during burial.

Comparison of the sub-surface compositions of each component suggests that all the components derived from different gold alloys.

**This report contains unpublished research. Its contents should not be published without the permission of the Keeper of the Department of Conservation and Scientific Research.**

## SEM-EDX analysis of K358



Plots of gold vs silver and copper vs silver contents, based on SEM-EDX analysis, showing the differences between the sub-surface and surface analyses.

Eleanor Blakelock  
Analysed August 2013

### Reference

La Niece, S., 2013. The scientific analysis of niello inlays from the Staffordshire Hoard. British Museum, London. Science Report PR07444-3.

**This report contains unpublished research. Its contents should not be published without the permission of the Keeper of the Department of Conservation and Scientific Research.**