

Gold enrichment in Staffordshire Hoard K88: results of SEM-EDX analysis

Object Type Pommel
Date 610-630

Decoration Filigree Glass
Garnet Other

SEM-EDX analysis was undertaken on a range of components, including two types of filigree wire, the separate cap and the base sheet to which the wires were attached.



| Area analysed | No of analyses | | Wt% Au | Wt% Ag | Wt% Cu |
|--|----------------|--------------------|--------|--------|--------|
| Base sheet surface | 5 | Average | 74.6 | 24.6 | 0.8 |
| | | Standard Deviation | 0.71 | 0.72 | 0.14 |
| Base sheet sub-surface | 8 | Average | 62.9 | 33.6 | 3.5 |
| | | Standard Deviation | 1.27 | 1.12 | 0.19 |
| Top of cap surface | 9 | Average | 57.2 | 39.5 | 3.3 |
| | | Standard Deviation | 1.72 | 1.75 | 0.13 |
| Top of cap sub-surface | 14 | Average | 57.9 | 38.4 | 3.7 |
| | | Standard Deviation | 1.58 | 1.47 | 0.17 |
| Small filigree edge wire surface | 6 | Average | 56.6 | 42.1 | 1.3 |
| | | Standard Deviation | 1.85 | 1.81 | 0.44 |
| Small filigree edge wire sub-surface | 8 | Average | 58.7 | 38.6 | 2.7 |
| | | Standard Deviation | 1.24 | 0.96 | 0.57 |
| Large filigree wire on panel surface | 6 | Average | 60.4 | 36.8 | 2.8 |
| | | Standard Deviation | 1.50 | 1.45 | 0.10 |
| Large filigree wire on panel sub-surface | 8 | Average | 61.6 | 35.2 | 3.2 |
| | | Standard Deviation | 0.79 | 0.82 | 0.10 |

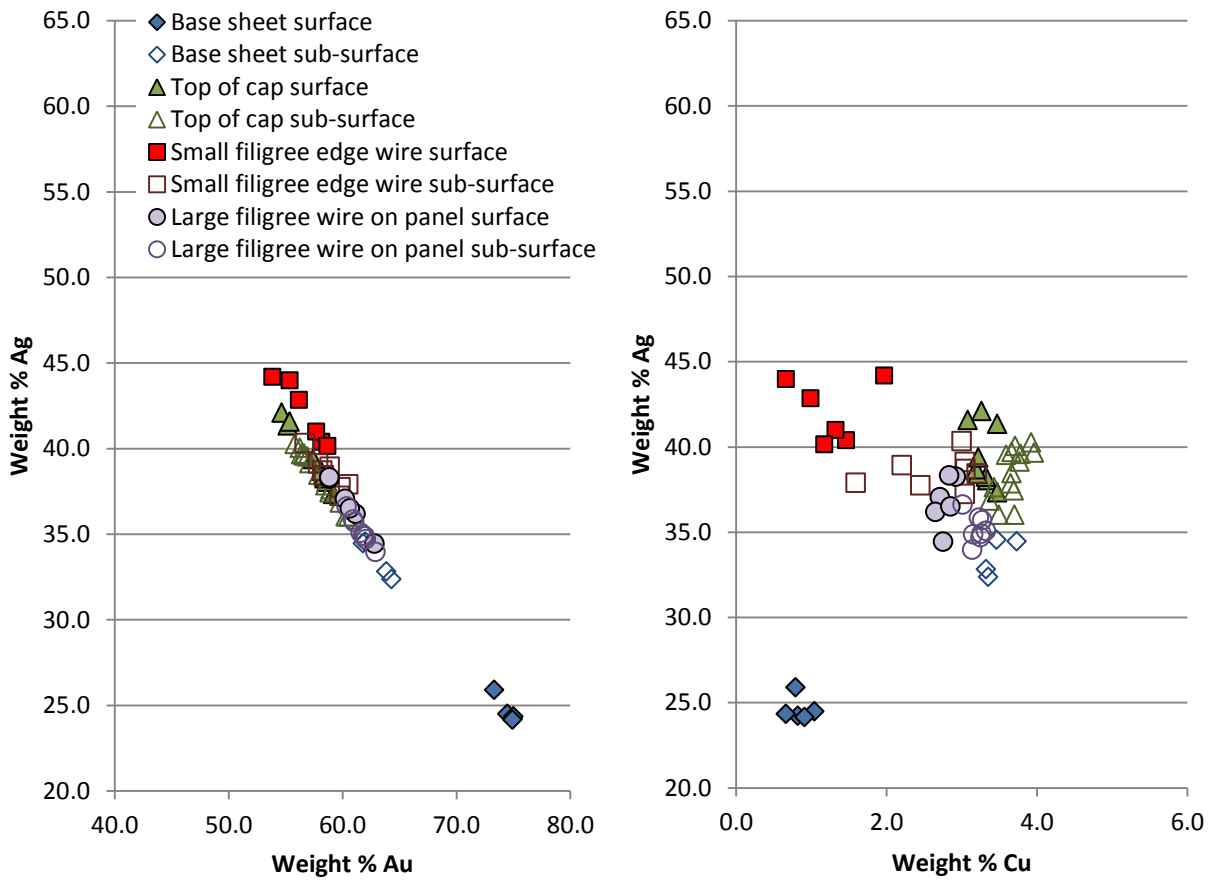
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis revealed a c.8.9 wt% loss of silver from the surface of the base sheet (a difference of c.27% from surface to core), which is indicative of treatment to deliberately enhance 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 other components revealed only a loss of copper from the surface, most likely indicative of corrosion that can occur during burial which results in natural surface enrichment.

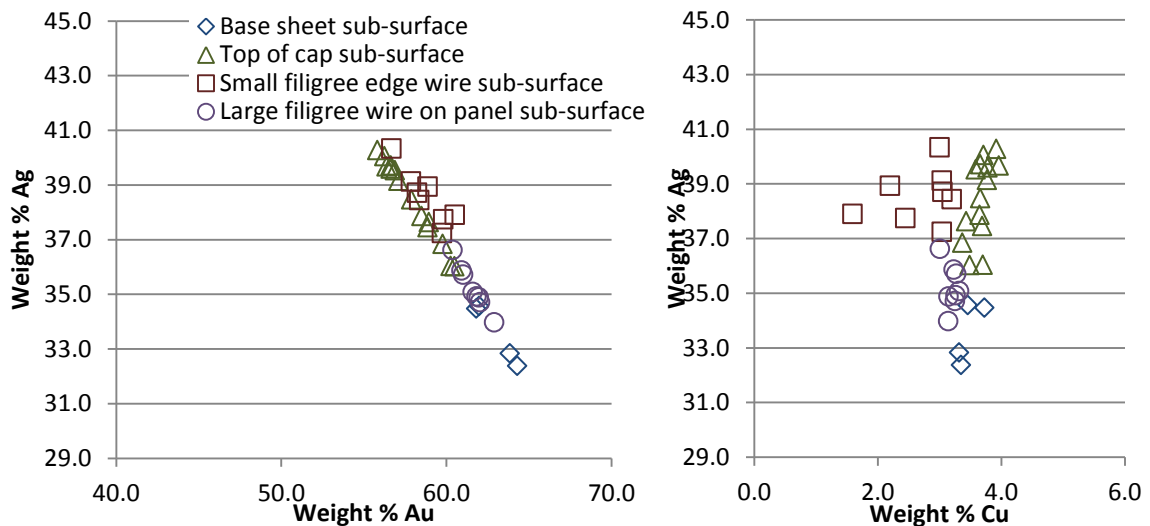
Comparison of the sub-surface compositions of each component suggests that all the components may have been made using the same, or a similar, gold alloy. The possible exception is the base sheet which had a slightly lower silver content, but there is still significant overlap. The base sheet is the only component demonstrating deliberate gold enrichment which suggests that the sheet was treated separately before being incorporated into the pommel.

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SEM-EDX analysis of K88



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.



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

Eleanor Blakelock

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Analysed May 2013

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