

Gold enrichment in Staffordshire Hoard K689: results of SEM-EDX analysis

Object Type Pommel
Date 600-650

Decoration Filigree Glass
Garnet Other



SEM-EDX analysis was undertaken on a number of components, including the sheet that was used as a base for the filigree, the large filigree wire on the edge of the piece and the pseudo-plaited wire.

| Area analysed | No of analyses | | Wt% Au | Wt% Ag | Wt% Cu |
|---------------------------------|----------------|--------------------|--------|--------|--------|
| Base sheet surface | 23 | Average | 86.9 | 10.5 | 2.6 |
| | | Standard Deviation | 1.04 | 0.88 | 0.26 |
| Base sheet sub-surface | 37 | Average | 72.1 | 23.9 | 4.0 |
| | | Standard Deviation | 0.99 | 1.98 | 1.41 |
| Large filigree wire surface | 14 | Average | 81.2 | 15.3 | 3.5 |
| | | Standard Deviation | 1.55 | 1.65 | 0.85 |
| Large filigree wire sub-surface | 14 | Average | 77.8 | 18.9 | 3.3 |
| | | Standard Deviation | 1.06 | 1.12 | 0.12 |
| Pseudo-plaited wire surface | 18 | Average | 82.4 | 14.5 | 3.1 |
| | | Standard Deviation | 2.84 | 2.47 | 1.30 |
| Pseudo-plaited wire sub-surface | 15 | Average | 78.0 | 18.7 | 3.3 |
| | | Standard Deviation | 0.60 | 0.59 | 0.08 |

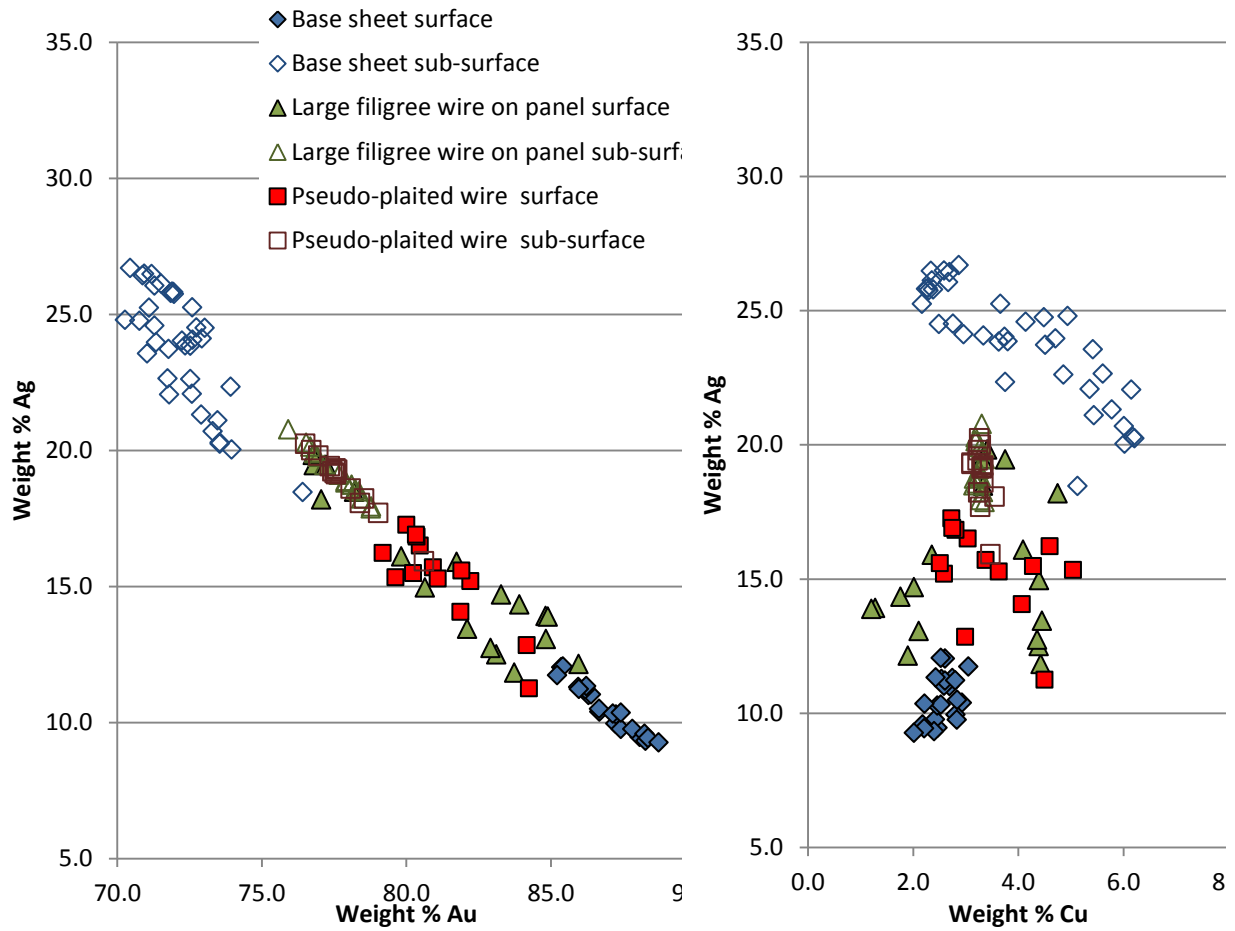
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis of the base sheet revealed a c.13.4 wt% loss of silver from the surface (a difference of c.56% from surface to core), which is indicative of treatment to deliberately enrich the gold colour of the metal. The filigree and pseudo-plaited wire also showed depletion of silver at the surface (beaded wire c.3.5 wt% and pseudo-plaited wire c.4.2 wt%) with a difference of between 19-23% from the surface to core. Only copper and small amounts of silver are normally lost from the surface during burial.

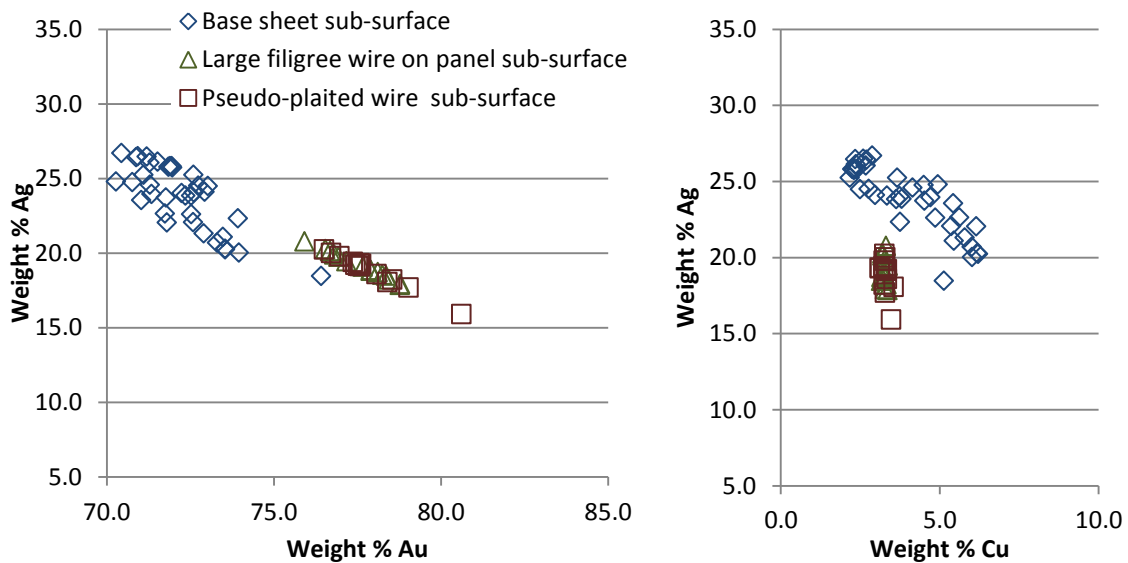
Comparison of the sub-surface compositions of the components suggests that the beaded and pseudo-plaited wire may have been made using the same, or a similar, gold alloy. The base sheet on the other hand shows a distinct composition and the surface has most likely been deliberately treated to create a gold enriched surface.

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SEM-EDX analysis of K689



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.

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Analysed July 2013

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