

**Gold enrichment in Staffordshire Hoard K457: results of SEM-EDX analysis**

Object Type Pommel  
Date 580-610

Decoration Filigree  Glass   
Garnet  Other

SEM-EDX analysis was undertaken on a range of components, including the 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	8	Average	90.4	9.0	0.6
		Standard Deviation	0.78	0.81	0.10
Base sheet sub-surface	12	Average	82.8	15.1	2.1
		Standard Deviation	0.69	0.65	0.09
Cap surface	8	Average	84.4	13.4	2.2
		Standard Deviation	1.74	1.71	0.09
Cap sub-surface	9	Average	82.2	15.7	2.1
		Standard Deviation	2.08	2.03	0.11
Filigree wire surface	8	Average	85.0	13.1	1.9
		Standard Deviation	0.76	0.79	0.08
Filigree wire sub-surface	10	Average	81.4	16.5	2.1
		Standard Deviation	1.32	1.35	0.09

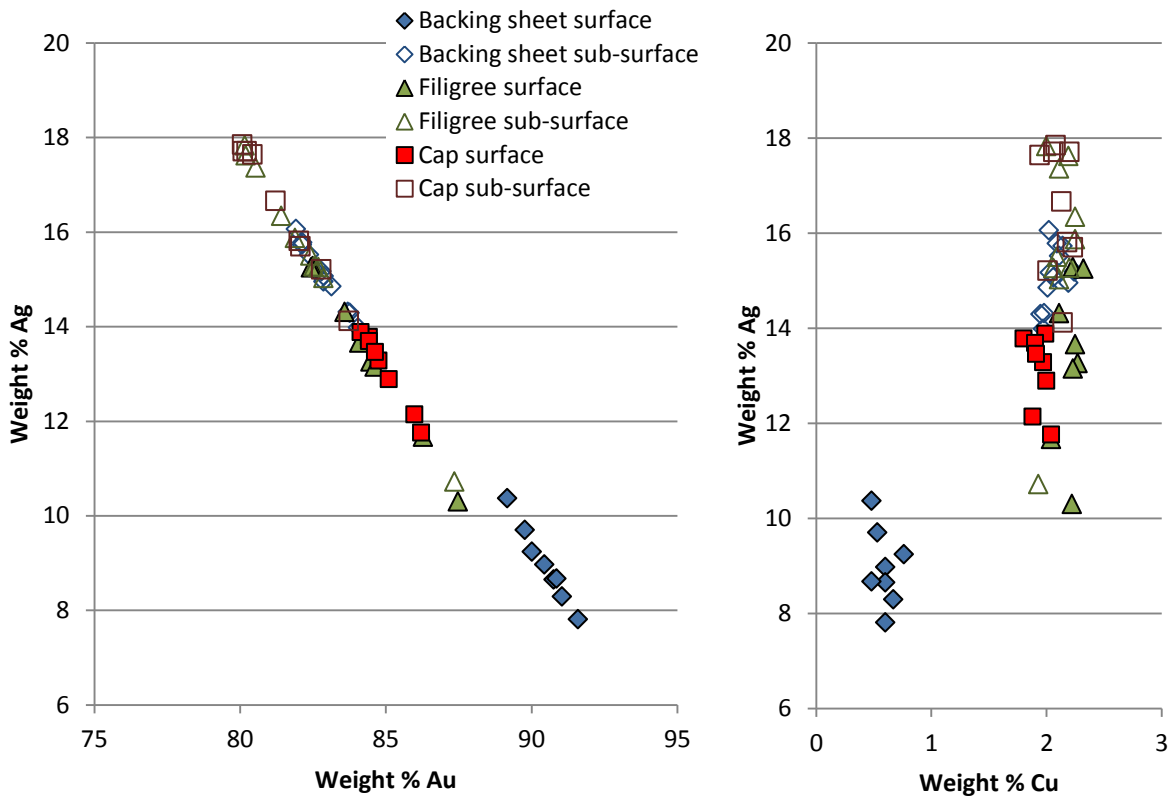
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis revealed that the sub-surface composition of all the components were similar, and most likely from the same gold alloy. There was a c.6.1 wt% loss of silver from the surface of the base sheet (a difference of c.41% from surface to core), which is indicative of chemical 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 filigree wire and the cap suggested they may have been treated, the cap had a c.2.3 wt% loss of silver (a difference of c.15% from surface to core) and the filigree wire had a c.3.4 wt% loss of silver (a difference of c.20% from surface to core)

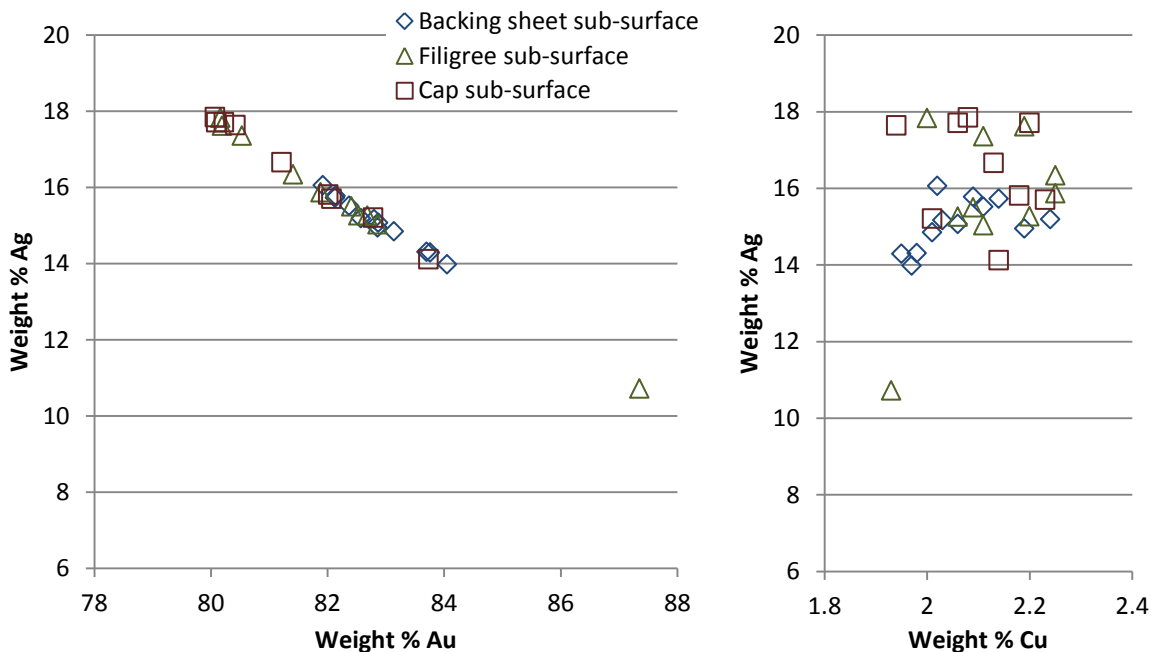
Comparison of the sub-surface compositions of each component suggests that all the components may have used the same, or a similar, gold alloy. The possible exception is the base sheet which had a slightly lower silver content. All the components showed evidence for some enrichment, but the base sheet was particularly enriched in gold due to the loss of silver. This suggests that each component is treated separately before being incorporated into the pommel.

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SEM-EDX analysis of K457



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  
Analysed December 2013

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