

Gold enrichment in Staffordshire Hoard K399: results of SEM-EDX analysis

Object Type Hilt-collar/hilt plate
 Date 600-650
 Decoration Filigree Glass
 Garnet Other



SEM-EDX analysis was undertaken on a range of components, including the backing sheet of both the collar and hilt plate, and the filigree wire on the hilt plate.

Area analysed	No of analyses		Wt% Au	Wt% Ag	Wt% Cu
Backing sheet hilt plate surface	8	Average	81.1	16.9	2.0
		Standard Deviation	0.87	0.94	0.12
Backing sheet hilt plate sub-surface	13	Average	75.3	22.2	2.5
		Standard Deviation	0.39	0.51	0.18
Backing sheet hilt-collar surface	8	Average	86.2	10.8	3.0
		Standard Deviation	0.81	1.04	0.30
Backing sheet hilt-collar sub-surface	10	Average	73.9	23.1	3.0
		Standard Deviation	1.39	1.36	0.16
Filigree wire surface	6	Average	84.4	13	2.6
		Standard Deviation	2	1.42	0.77
Filigree wire sub-surface	10	Average	76.9	20.8	2.3
		Standard Deviation	2.32	2.33	0.16

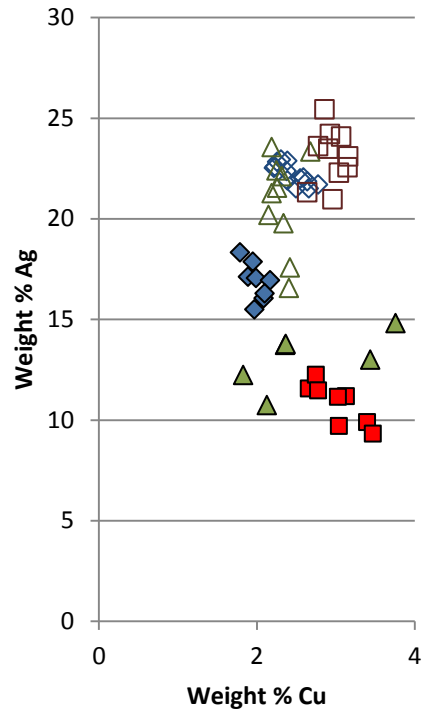
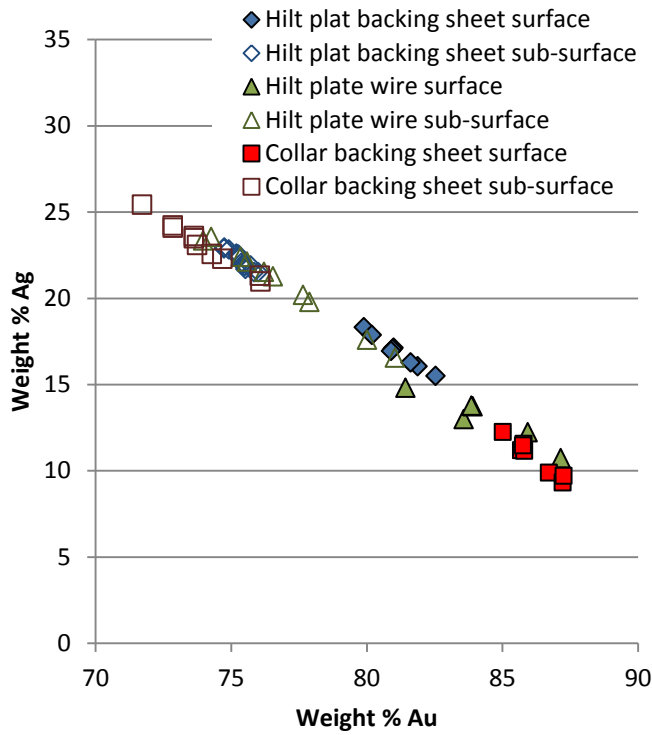
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis revealed a c.5.3 wt% loss of silver from the surface of the base sheet of the hilt plate (a difference of c.24% 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 also revealed evidence for deliberate treatment but to different degrees. The wire had a c.7.8 wt% loss of silver from the surface (a difference of c.37% from surface to core) and the base sheet of the collar had a c.12.3 wt% loss of silver from the surface (a difference of c.53% from surface to core).

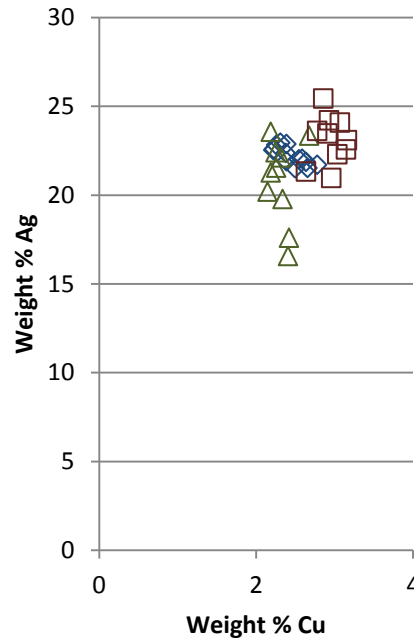
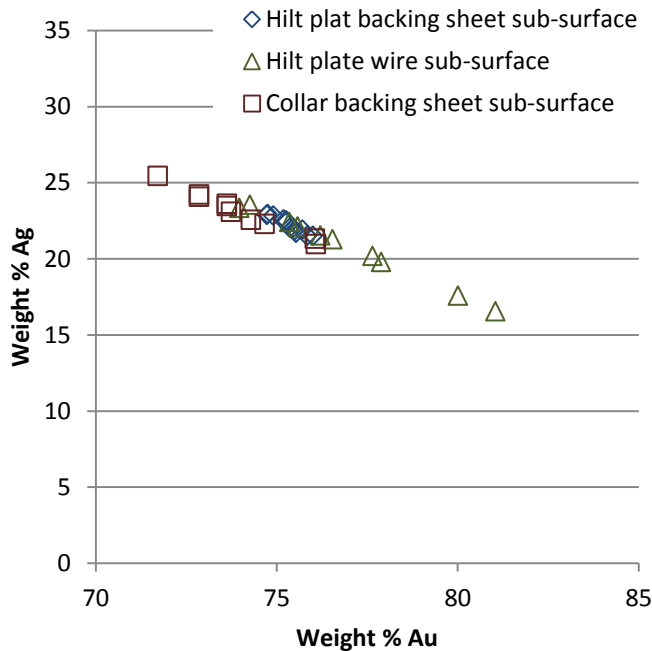
Comparison of the sub-surface compositions of each component suggests that all the components may have been made using the same, or a similar, gold alloy. The different levels of enrichment suggest that the different components were treated separately before being incorporated into the piece.

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SEM-EDX analysis of K399



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 December 2013

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