

Gold enrichment in Staffordshire Hoard K376: results of SEM-EDX analysis

Object Type Pommel
Date 620-650

Decoration Filigree Glass
Garnet Other



SEM-EDX analysis was undertaken on the sheet of the base, the thick surrounding cell wall and the thin cell walls. The pommel is part of a set of fittings from a seax handle.

Area analysed	No of analyses		Wt % Au	Wt % Ag	Wt % Cu
Base sheet surface	10	Average	71.5	26.8	1.7
		Standard Deviation	1.01	1.06	0.09
Base sheet sub-surface	24	Average	70.4	27.8	1.8
		Standard Deviation	1.04	1.01	0.06
Surrounding cell wall surface	12	Average	73.7	24.0	2.3
		Standard Deviation	0.94	0.63	0.32
Surrounding cell wall sub-surface	25	Average	73.0	24.4	2.6
		Standard Deviation	1.42	1.34	1.01
Cell wall surface	6	Average	71.2	24.7	4.1
		Standard Deviation	1.58	1.37	0.24
Cell wall sub-surface	9	Average	70.3	24.8	4.9
		Standard Deviation	1.60	2.27	1.41

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

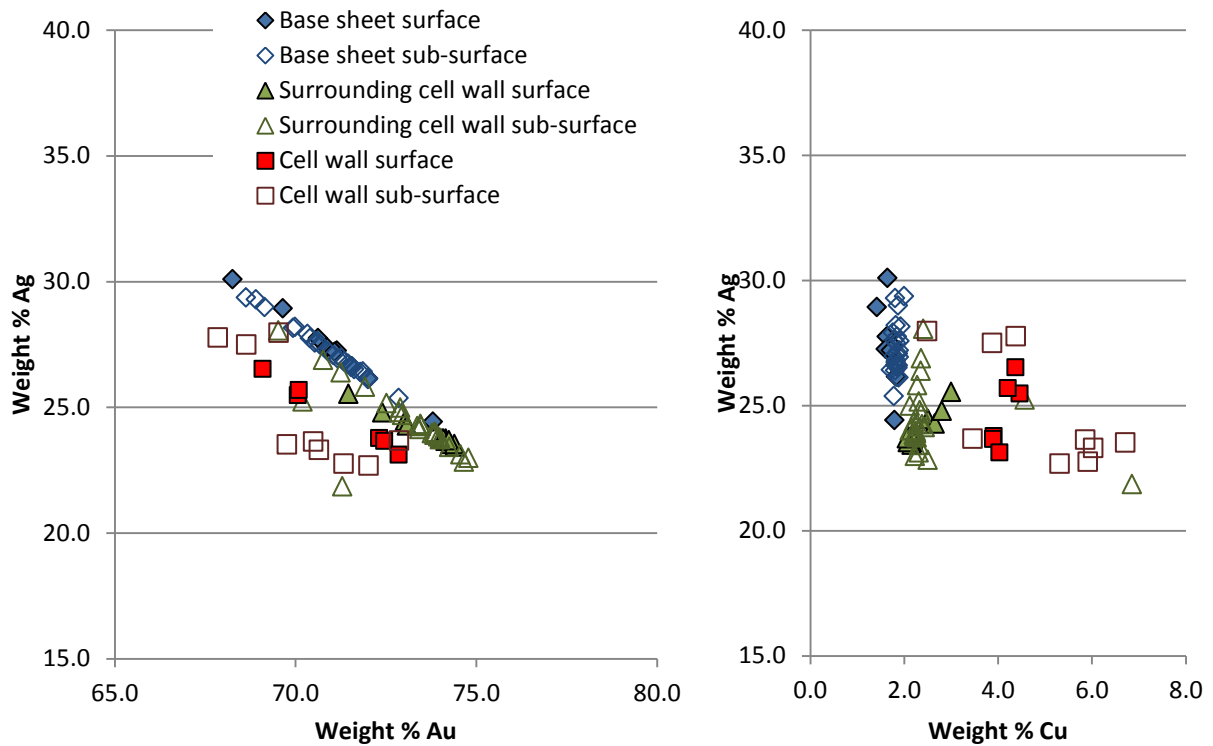
SEM-EDX analysis of the sub-surface of the base sheet indicated a composition of approximately 69-71 wt% gold, 26-29 wt% silver, the rest being copper. The analysis of the base sheet and surrounding cell wall revealed a c.1.1-1.3 wt% loss of silver from the surface (a difference of c.4-5% from surface to core), most likely indicative of corrosion that can occur during burial which results in natural surface enrichment but could also be the result of some deliberate surface treatment.

SEM-EDX analysis of the sub-surface of the cell wall indicated a composition of approximately 69-71 wt% gold, 22-27 wt% silver, the rest being copper. Analysis of the cell wall revealed no loss of silver, and a small loss of copper at 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 were made from different gold alloys.

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SEM-EDX analysis of K376



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.

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