

Gold enrichment in Staffordshire Hoard K377: results of SEM-EDX analysis

Object Type Sword pyramid
Date 600-635

Decoration Filigree Glass
 Garnet Other



SEM-EDX analysis was undertaken on a range of components, including the base of the pyramid, the suspending bar and a cell wall.

Area analysed	No of analyses		Wt% Au	Wt% Ag	Wt% Cu
Base surface	8	Average	87.7	11.5	0.8
		Standard Deviation	0.21	0.20	0.07
Base sub-surface	12	Average	86.9	12.2	0.9
		Standard Deviation	0.41	0.40	0.03
Suspending bar surface	8	Average	89.1	9.7	1.2
		Standard Deviation	0.85	0.64	0.24
Suspending bar sub-surface	13	Average	86.8	11.5	1.7
		Standard Deviation	0.25	0.24	0.05
Cell wall surface	8	Average	87.9	11.2	0.9
		Standard Deviation	0.80	0.72	0.10
Cell wall sub-surface	12	Average	86.7	11.9	1.4
		Standard Deviation	0.58	0.43	0.67

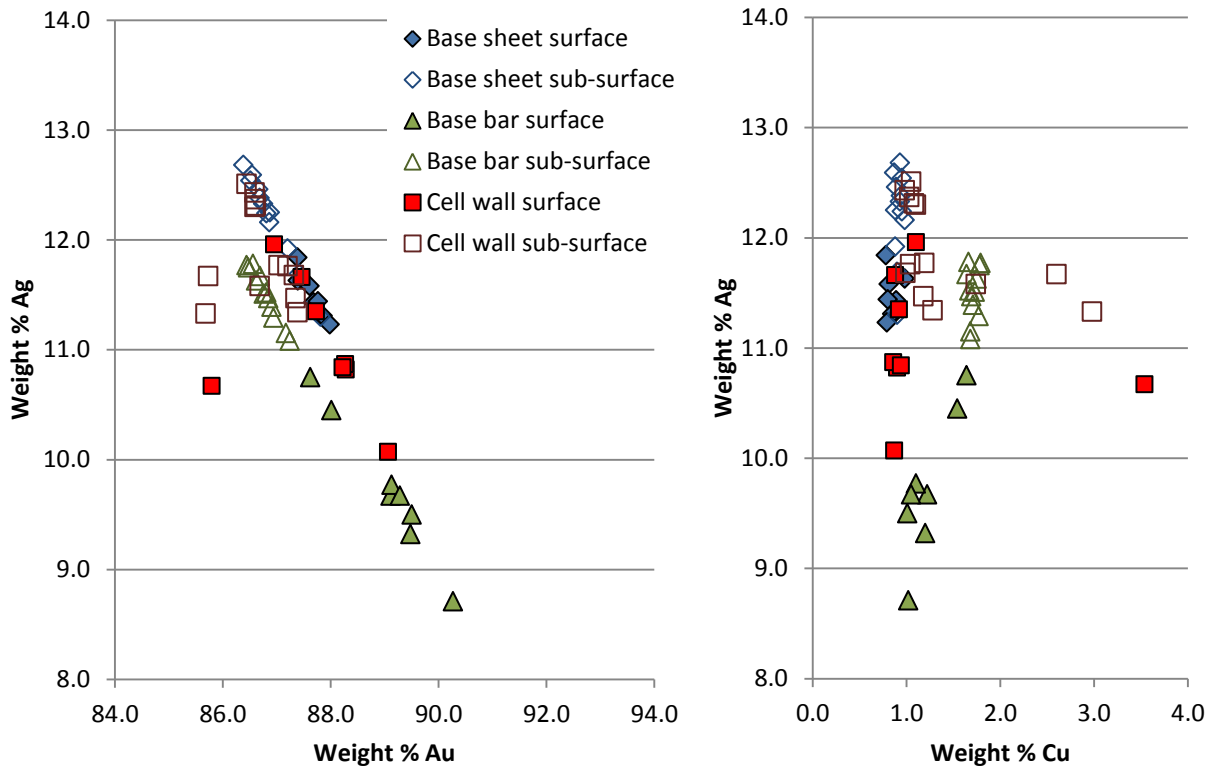
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis revealed a c.0.6-0.7 wt% loss of silver from the surface of the base sheet and cell wall, most likely indicative of corrosion that can occur during burial which results in natural surface enrichment. The suspending bar had a loss of c.1.8 wt% from the surface (a difference of c.15% from surface to core), which is indicative of 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.

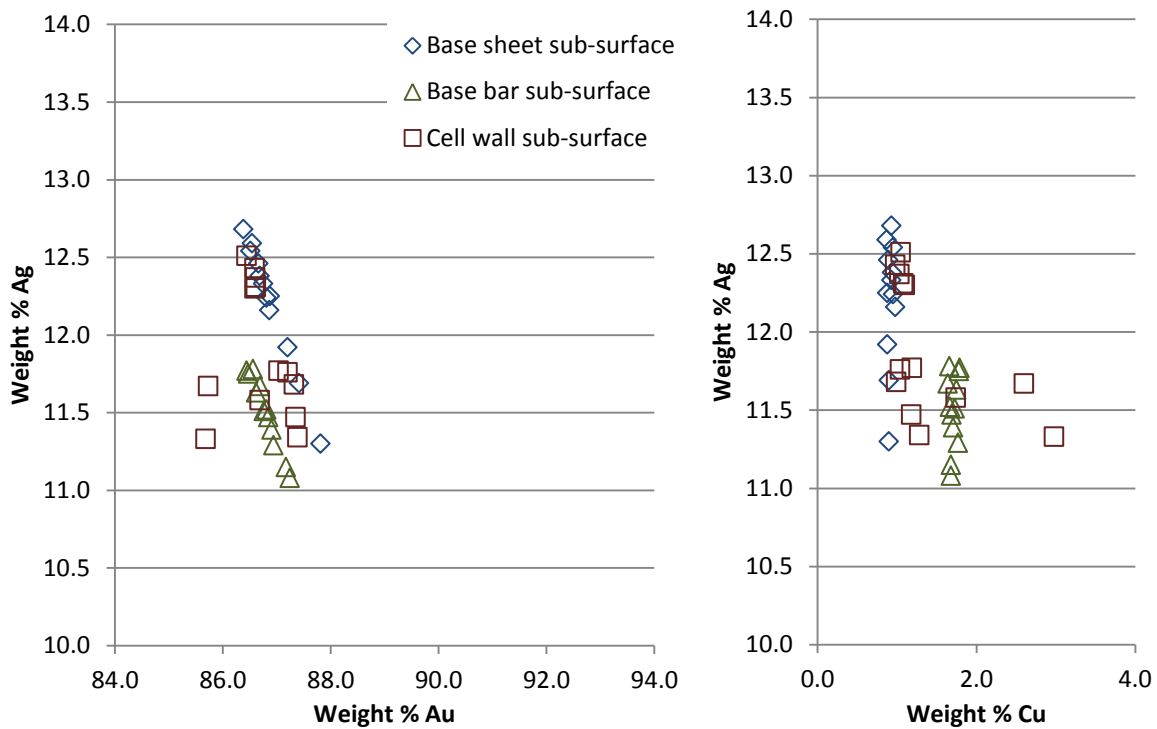
Comparison of the sub-surface compositions of the base sheet and the cell walls suggests they were probably made from a similar gold alloy. The suspension bar appears to be a different alloy, with more copper present.

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SEM-EDX analysis of K377



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 November 2013

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