

Gold enrichment in Staffordshire Hoard K655: results of SEM-EDX analysis

Object Type Great Gold Cross
Date 630-670

Decoration Filigree Glass
Garnet Other

This piece consisted of two sheets, and therefore SEM-EDX analysis was undertaken on both.



Area analysed	No of analyses		Wt% Au	Wt% Ag	Wt% Cu
Front decorated sheet surface	8	Average	87.1	12.6	0.3
		Standard Deviation	1.40	1.40	0.09
Front decorated sheet sub-surface	12	Average	83.0	16.0	1.0
		Standard Deviation	0.56	0.47	0.16
Back base sheet surface	8	Average	83.2	16.3	0.5
		Standard Deviation	0.74	0.67	0.09
Back base sheet sub-surface	10	Average	80.8	17.8	1.4
		Standard Deviation	1.41	1.09	0.36

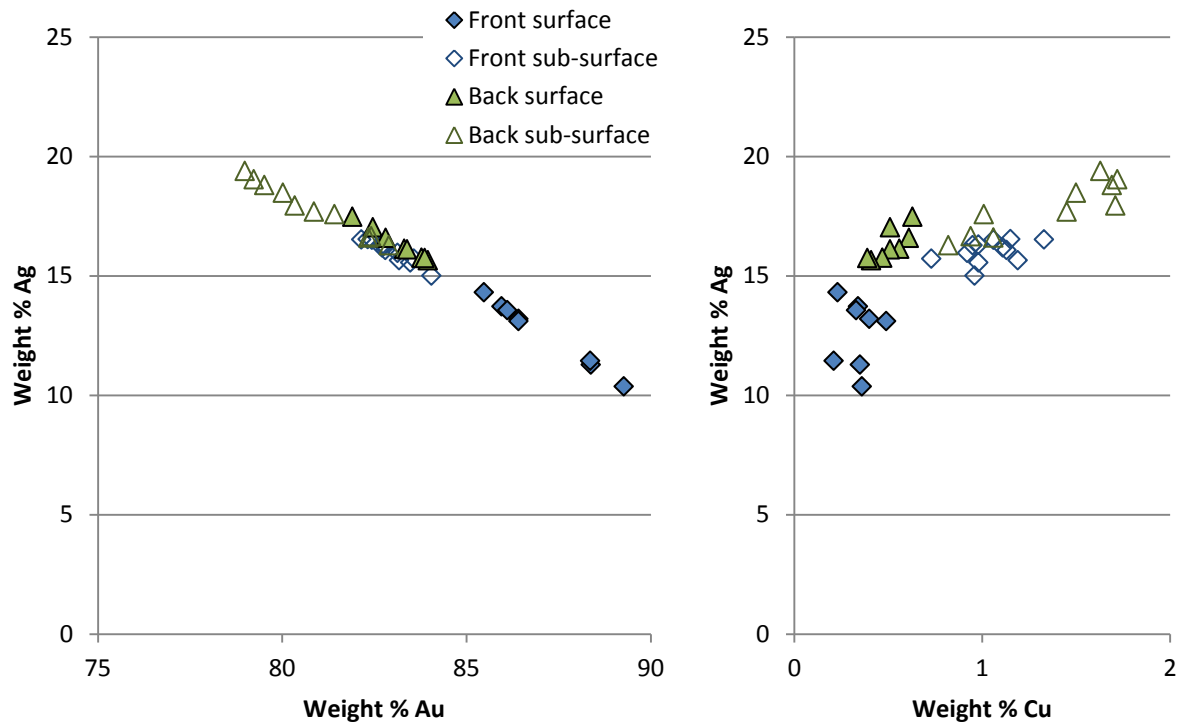
SEM-EDX surface and sub-surface compositions for each component analysed (the results are normalised). This analysis was carried out as part of the gold enrichment study. For full details of methodology and associated results see report PR07444-10 and PR07444-15

The analysis revealed a c.3.4 wt% loss of silver from the surface of the decorated sheet (a difference of c.21% 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. The back sheet also had a loss of silver (c.1.5 wt%, with a difference of c.9% 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.

Comparison of the sub-surface compositions of both sheets suggests that they may have used a similar gold alloy. The front sheet has been treated differently to create an even more gold enriched surface.

This report contains unpublished research. Its contents should not be published without the permission of the Keeper of the Department of Conservation and Scientific Research.

SEM-EDX analysis of K655



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.

Eleanor Blakelock
Analysed November 2013